EVALUATING THE BUDGET'S DISTRIBUTIVE INFLUENCE

ON HOUSEHOLD INCOMES

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By

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C O N T E N T S

List of Tables	iii
List of Figures	x
List of Charts	xiii
Abstract	xv
Acknowledgements	xviii

Chapter		Page
One	Evaluating the Budget's Distributive Influence	1-28
	A. Chapter Outline	3
	B. The Government Income Distribution Policy	10
	C. The Design of this Study	11
	D. Focus of this Study	19
	E. Summary and Conclusion	22
Two	Redistribution Studies: The Theory and the Practice	29-102
	A. Basic Concepts of Budget Incidence	31
	B. HMM Two-Sector General Equilibrium Models	44
	C. SWF Multi-Sector General Equilibrium Models	74
	D. General Equilibrium Models of the New Zealand Economy	90
	E. Quantitative Studies of Budget Redistribution by Size	93
	F. Methodology in this Thesis	102
Three	Income: The Appropriate Measure for Assessing Budget Incidence	103-166
	A. An Income Concept : Comprehensive Income	105
	B. Income Concepts Underlying Empirical Studies of Budget Incidence	114
	C. Three Income Measures Behind Four Stages	126
	D. Grouping Income Information : The Household Unit	129
	E. New Zealand Household Income Distribution	132
	F. Broad Measures of Income : Stages Three and Four	153
	G. Summary and Conclusion	164
Four	The Government Budget : An Income and Outlay Account	167-202
	A. The Concept of the Budget	168
	B. Budget Concept in Empirical G-E Models and Quantitative Studies	175
	C. New Zealand Budget Data	178
	D. The Central Government Income and Outlay Account	187

Chapter		Page
Five	Payments to Central Government by Household Income Group	203-262
	A. Personal Income Tax Payments	207
	B. Indirect Taxes	224
	C. The Company Income Tax	243
	D. Other Government Receipts : Government Property Income and Miscellaneous	255
	E. Conclusion: The Distribution of Payments to Government By Household Income Group	258
Six	Government Spending by Household Income Group	263-352
	A. Social Welfare Benefits	276
	B. Distribution of Collective Goods	285
	C. Distribution of Money-Income Benefits from Health Expenditure	294
	D. Education Expenditure	311
	E. Interest Paid by Government to Households	318
	F. Household Consumption of Subsidies and Miscellaneous	324
	G. Conclusion : Private Household Consumption of Government Expenditures	332
Seven	Conclusion : And Where to Go from Here	353-385
	A. The Quantitative Results	354
	B. Further Areas of Research	371
	C. Where to From Here	377
Appendices:	(Go with Chapter of Same Number)	386-460
One	Notation Used in this Thesis	387-388
Two	Tax Incidence Conclusions of HMM Studies	389-399
	Section One: Three Conclusions From Harberger Model	389
	Section Two: Derivation of Extensions to Harberger	394
Three	Data On Household Income Distribution in New Zealand	400-429
	Section One: Income Definitions Measured By Four New Zealand Data Sources	400
	Section Two: Weights	413
	Section Three: Grouping the Census Population	422
Four	Central Government Capital Account	430-435
Five	More Tables: Government Receipts	436-447
Six	NZSNA Central Government Consumption	448-450
Seven	Summary Tables of the Quantitative Results	451-460
	Bibliography	461-486

L I S T O F T A B L E S

Table		Page
1B.1	Comparison of Distribution of Persons and Private Households by Household Type in 1981/82	7
1B.2	The Market Income Brackets Derived to Contain 10 Percent (A Decile) of Households and the Amount of Market Income by Decile in 1981/82	8
1E.1	Money-Income Effects of the 1981/82 Budget: Comparison of Different Income Distributions	23
1E.2	Stage Two: Distribution of Household Money Income Adjusted for Total General Government Non-Market Activities	25
3E.1	Number of Private Households: Tabulated by Decile of Household Market Income and Household Type	136
3E.2	The Distribution of Private Households by Household Market Income Deciles and Household Type	137
3E.3	The Distribution of Private Households of Each Household type by Household Market Income	139
3E.4	Comparison of Percentage Household Distribution Based on Two Income Definitions: Market Income and Total Income	140
3E.5	Comparison of Distribution of Persons and Private Households by Household Type	141
3E.6	Average Number of Occupants and Children per Household by Range of Household Market Income	142
3E.7	Average Number of Earners per Household by Range of Household Market Income	143
3E.8	1981/82 Household Income Shares Compared Using Different Income Definitions	144
3E.9	Household Income Shares to those Earning Below and Above \$13,350 Compared Using Different Income Definitions	146
3E.10	Household Income Shares to those Earning Below and Above \$13,350 Compared for Different Social Welfare Definitions	147
3E.11	Estimated Amount of Market Income in 1981/82 By Range of Private Household Market Income and Household Type	148
3E.12	Distribution of Household Market Income for 1981/82 By Private Household Type	149
3E.13	Average Household Market Income per Year By Range of Household Market Income and Household Type	150

Table		Page
3F.1	Stage Three : Initial Income 1981/82 Gross Domestic Product By Range of Compensation to Households	158
3F.2	Stage Three : Initial Income 1981/82 Gross Domestic Product By Private Household Type	159
3F.3	Stage Four : Adjusted Gross Domestic Product By Range of Private House	162
3F.4	Stage Four : Adjusted Gross Domestic Product By Private Household Type	163
3G.1	Initial Income Defined for Stages of Taxonomy	164
5A.1	Percentage of 1981/82 Personal Income Tax Paid By Household Market Income and Household Type	220
5A.2	1981/82 Personal Income Tax: Average Amount Per Household Per Year By Range of Household Market Income and Household Type	221
5A.3	The Progressivity of the 1981/82 Personal Income Tax: Different "Effective Rate" Definitions Compared	222
5B.1	Average Direct Wholesale Sales Tax Payments for 1981/82 Per Private Household By Range of Household Market Income	233
5B.2	Proportion of 1981/82 Wholesale Sales Tax Paid By Range of Household Market Income and Private Household Type	234
5B.3	Direct Wholesale Tax Payments for 1981/82 by Private Households As a Proportion of Household Income and Expenditure By Range of Household Market Income	235
5B.4	Specific Tax Payments By Household Market Income in 1981/82	236
5B.5	Lottery and Racing Duty Paid for 1981/82 By Private Households By Household Market Income	237
5B.6	1981/82 Indirect Taxes By Household Income Group	238
5B.7	1981/82 Stage Two Indirect Taxes: Estimated Distribution By Household Type	241
5C.1	Distribution of Company Tax By Income Group: Comparison of Six Incidence Assumptions	249
5C.2	Distribution of Company Tax By Household Type: Comparison of Six Incidence Assumptions	251
5C.3	Distribution of Company Tax Payments by Private Households (Case 1) By Range of Household Market Income and Household Type	253

Table		Page
5C.4	Comparing Distributions of Total 1981/82 Payments to Government Using Six Cases for Company Tax	254
5D.1	Comparing Different Assumptions: Other Government Receipts	257
5E.1	Stage One: 1981/82 Government Direct Payments By Household Income Group	258
5E.2	Stage Two: Distribution of Total Government Payments By Household Income Group in 1981/82	259
6A.1	Estimated Distribution of National Superannuation Income Paid to Private Households in 1981/82 By Household Market Income and Household Type	277
6A.2	Distribution of Children By Range of Household Market Income and Household Type	279
6A.3	The Percentage Distribution of Social Welfare Income Support Paid to Private Households 1981/82 By Household Market Income and Household Type	280
6A.4	Monetary Benefits (Cash Transfers) By Household Income Group in 1981/82 (Stage One and Stage Two Definitions)	281
6A.5	Monetary Benefits for 1981/82 By Household Type (Stage One and Stage Two Definitions)	283
6B.1	Assumptions for Distributing the Money-Income Value of Government Collective Goods - Eight Cases Compared	287
6B.2	Comparing the Effect of Extreme Assumptions about Collective Government Benefits on the Distribution of Total Government Expenditure	290
6B.3	The Money-Income Value of Collective Goods Allocated In Proportion To Household Expenditure (Case One) By Household Income Group and By Household Type	293
6C.1	Hospital Utilisation Rates (Weighted Days per Head per Year)	297
6C.2	Hospital Expenditure By Different Household Types: Three Cases Compared Using 1981/82 Data	300
6C.3	Distribution of Hospital Expenditure By Household Market Income Range : Three Cases Compared Using 1981/82 Data	301
6C.4	Per Capita Vote Health Expenditure in 1981/82 By Age (Excluding Hospital Services and Capital)	303
6C.5	1981/82 Central Government Non-Hospital Health Services For Private Households By Household Market Income and Household Type	304

Table		Page
6C.6	Non-Hospital Health Services For Private Households By Household Market Income : Some Selected Comparative Data	305
6C.7	Central Government Health Expenditures Consumed By Private Households : The Estimated Distribution and Average Money-Income Value By Household Market Income In 1981/82	306
6C.8	Central Government Health Expenditures (Case 1) Consumed By Private Households By Household Market Income In 1981/82: Some Selected Comparisons	307
6C.9	Central Government Health Expenditure By Different Household Types In 1981/82 : Three Cases Compared	309
6D.1	Estimated Distribution of Education Consumption In 1981/82 By Household Market Income and Household Type	316
6E.1	Distribution of Government Net Interest In 1981/82 By Private Household Market Income and Household Type	322
6E.2	Redistribution of Money Income Via Taxes And Interest Payments On Public Debt	323
6F.1	Subsidies : Estimated Distribution In 1981/82 By Income Group	328
6F.2	Subsidies : Estimated Stage One and Stage Two Distributions By Household Type In 1981/82	329
6F.3	Estimated Distribution of Miscellaneous Government Expenditures In 1981/82	331
6G.1	Stage One : The Estimated Distribution of the Money-Income Value of Government Direct Expenditure In 1981/82	333
6G.2	Stage Two : The Estimated Distribution of Total Government Current Expenditures : Money-Income Value By Income Group	335
6G.3	Stage Two : Government Expenditure : Effective Benefit Rates and Annual Average Money-Income Values In 1981/82	339
6G.4	Stage One : Government Direct Expenditure - Estimated Distribution By Household Type In 1981/82	341
6G.5	Stage Two : Money-Income Value of Total Government Expenditure - Estimated Distribution By Household Type In 1981/82	342
7A.1	Personal Income Tax Distribution Compared With Distribution of Stage One and Stage Two Government Expenditure	355
7A.2	Annual Amount By Which the Money-Income Value of 1981/82 Central Government Expenditure Consumed By a Particular Household Exceeds What That Household Pays to Government	359
7A.3	Effective Rates of Payment and Expenditure : Different Definitions	365

Appendix Tables		Page
A1.1	Occupied Dwellings 1976 and 1986	402
A3.2	Occupied Permanent and Private Dwellings By Tenure	403
AA3.1	Distribution of 1981/82 Household Survey Sample Households By Income Group and Household Type	414
AA3.2	Distribution of 1981 Census Households By Income Group and Household Type	415
AA3.3	Comparison of Household Type Representation in the 1981 Census and the 1981/82 Household Survey	417
AA3.4	Adjusted Distribution of 1981 Census Households By Income Group and Household Type	418
AA3.5	Final Weights to be Applied to Household Survey Data	419
AA3.6	Relative Weights: Final Ratios for Multiplying Household Survey Data to 1981 Census Totals	420
AA3.7	Ratio of Households in Sample Survey to Census Households Standardised By Household Type	421
AAA3.1	Population Breakdown by Location - Derivation of De Jure from De Facto Distribution	422
AAA3.2	Population Breakdown by Location on Census Night By Age and Receipt of Income - Total Population	423
AAA3.3	Population Breakdown By Location on Census Night By Age and Receipt of Income - Visitors	424
AAA3.3a	Population Breakdown By Location on Census Night By Age and Receipt of Income - Visitors (Pro-Rata Allocation of Not Specified Incomes)	425
AAA3.4	Population Breakdown By Location, By Age and Receipt of Income - Residents in Usual Dwellings on Census Night	426
AAA3.4a	Population Breakdown By Location, By Age and Receipt of Income - Residents in Usual Dwelling on Census Night (Pro-rata Allocation of Not Specified Incomes)	427
AAA3.5	1981 Census Population Breakdown By Usual Location, By Age and Receipt of Income - Absentees	428

Appendix Tables		Page
AAA3.6	1981 Census Population Breakdown By Usual Location By Age and Receipt of Income	429
A4.1	The Capital Finance Account in Aggregate (Includes Market and Non-market Production Groups)	430
A4.2	The Central Government Capital Account	431
A4.3	Government Gross Fixed Capital Formation By Type of Capital	432
A4.4	Central Government Services - Gross Capital Formation By Function	433
A5B.1	1981/82 Indirect Taxes: Estimated Distribution By Household Type	437
A5B.2	Average Amount of Wholesale Sales Tax Paid By Private Households By Range of Household Market Income and Household Type	438
A5C.1	Comparing Distributions By Household Type of Total Payments Using Six Cases for Company Tax	439
A5C.2	Amount of Company Tax Payments By Range of Household Market Income and Private Household Type	440
A5C.3	Average Company Tax Payments Per Private Household Per Year By Range of Household Market Income and Household Type	441
A5C.4	Company Tax Payments By Private Households By Range of Household Market Income and Household Type	442
A5D.1	Average Annual Payment for Other Government Payments Per Household By Range of Household Market Income and Household Type	443
A5D.2	Amount of Central Government Receipts By Private Households Allocated in Proportion to Household Expenditure By Range of Household Market Income and Household Type	444
A5E.1	Stage One: Government Direct Payments By Household Type	445

Appendix Tables		Page
A7.1	Stage One : Direct Money-Income Effects of the 1981/82 Budget By Income Group	452
A7.2	Stage One : Direct Money-Income Effects of the 1981/82 Budget By Household Type	453
A7.3	Stage One : Percentage Distribution of Direct Money-Income Effects of the 1981/82 Budget By Household	454
A7.4	Stage Two : Distribution of Household Money Income Adjusted For Total Central Government Non-Market Budget Activities In 1981/82	456
A7.5	Stage Two : The Amount of Household Money Income Adjusted for Total General Government Non-Market Budget Activities	457
A7.6	Stage Two : Percentage Distribution of Household Money Income Adjusted for Total Central Government Non-Market Budget Activities	458
A7.7	Stage Three : Broad Measurement of Income Distributed By Income Range	459
A7.8	Stage Three : Broad Measurement of Income Distribution By Household Type	460

LIST OF FIGURES

Figure		Page
1.1	Taxonomy for Evaluating the Budget's Distributive Influence	12
1.2	Four Stages for Evaluating the Budget's Distributive Influence (To Be Analysed By Household Income Group and Household Type)	18
2.1	Empirical Application of Harberger Corporate-Tax-Incidence Model	56
2.2	Diagram of a Typical SWF General Equilibrium Tax Model	76
2.3	SWF Treatment of Taxes	79
2.4	Musgrave's Assumptions Regarding Tax Incidence	97
3.1	Income Concepts Underlying Three Stages	127
3.2	Gross Domestic Product and Expenditure	154
3.3	Estimated Gross Domestic Product Accruing to Private Households: March Year 1982	155
4.1	Central Government Expenditure and Its Financing : Budget Table 2 Basis	179
4.2	New Zealand Standard Institutional Sector Classification of Central Government Activities	183
4.3	Central Government Income and Outlay Account	188
4.4	Examples of Transfer Payments	190
4.5	Central Government Outlays Classified By Function 1981/82	192-3
4.6	Central Government Income (Revenue) for 1981/82 Classified By Source	197
4.7	Provision of Goods and Services By Central Government in 1979/80 and 1980/81	201

Figure		Page
5.1	Central Government Income for March Year 1982 Classified By Main Source	203
5.2	The Personal Income Tax Scale (Applicable Between 1 April 1981 and 1 October 1982)	209
5.3	Exempt Income in 1981/82	210
5.4	Exemptions for Life Insurance and Superannuation in 1981/82	210
5.5	Rebates Allowed in 1981/82 Tax Year	211
5.6	Indirect Taxes by NZSNA Category	225
5.7	1981/82 Indirect Taxes Classified By Main Source	226
5.8	Sales Tax Receipts by Licensed Wholesalers for 1981/82 Financial Year	228
5.9	Company Tax Returns Distributed by Amount of Assessable Income	244
6.1	Total Central Government Non-Market Expenditure in 1981/82	263
6.2	An Economic Classification of Total Central Government Non-Market Expenditures in 1981/82	271
6.3	Approximate Value of Government Expenditure Consumed by Private Households	275
6.4	Social Assistance Grants Analysed by Purpose	276
6.5	Classification of Collective Goods	285
6.6	Health Expenditure, 1981/82	294
6.7	Estimated Mean Age Distribution of New Zealand Population For the Year Ended 31 March 1982	295
6.8	Expenditure Under Vote Education In 1981/82	313
6.9	Education Expenditures By Level of Education In 1981/82	314
6.10	Attendance At A Tertiary Institution By Age Groups and Sex In 1981 Census	315
6.11	1981/82 Central Government Interest Payments Analysed By Function and Assumptions For Imputation	318
6.12	Subsidies By NZSNA Category In 1979/80, 1980/81, 1981/82, 1982/83	325
6.13	Method For Imputing Subsidies By Household Income Group	327

Appendix Figure		Page
A3.1	A Simplified Household Income of Outlay Account	411
A3.2	Polakoff's Generalised Uses and Sources of Funds Account	412
A5.1	Rates of Stamp Duty	436
A5.2	Scale of Gift Duty Rates	447
A7.1	Note to Tables A7.1, A7.2, and A7.3.	455

L I S T O F C H A R T S

Chart		Page
1.1	Relative Equality of Market Income and Stage One and Stage Three Final Income: Lorenz Diagram for 1981/82	24
1.2	Comparison of Relative Equality of the Distribution of Payments to Government and the Money-Income Value of Government Expenditure: Lorenz Diagram Based on Stage Two Definitions for 1981/82	27
3.1	Comparison of Relative Equality of Market Income, Dividend Income and Total Income for 1981/82	145
3.2	Comparison of the Relative Equality of Initial Income: Stage Two and Stage Three Definitions	165
5.1	The Shares of Indirect Tax Payments by Household Income Decile in 1981/82	240
5.2	Comparison of Effective Rates and Indirect and Direct Tax	240
5.3	Relative Equality of Three Company Tax Incidence Assumptions: Lorenz Diagram 1981/82	250
5.4	Different Company Tax Incidence Assumptions By Household Type	252
5.5	Government Payment Shares By Household Income Deciles: Stages One and Two Compared	260
5.6	1981/82 Payments to the Government: The Shares of Four Main Items By Household Income Deciles Compared	260
5.7	Effective Payment Rates for Total Payments To The Central Government in 1981/82	261
5.8	Amount of Current Government Payments By Household Type in 1981/82	262

Chart		Page
6.1	National Superannuation, The Family Benefit and Total Social Welfare Spending: Comparison of Relative Equality	282
6.2	Value of Direct Monetary Benefits By Household Type	284
6.3	The Consumption of Collective Government Goods By Household Market-Income Deciles: Lorenz Diagram of the Relative Equality of Three Cases	289
6.4	Comparison of the Pattern of Consumption of the Money-Income Value of Total Government Expenditure Based on Three Assumptions about the Consumption of Collective Goods	291
6.5	Equality of Distribution of Hospital Expenditure Between Cases 1 and 2: Lorenz Diagram of Relative Equality	299
6.6	Hospital Expenditure Shares (Cases 1 and 2) Compared with Shares of Collective Expenditures and Monetary Benefits for 1981/82 by Household Market Income Decile	302
6.7	Government Expenditure Shares to Household Market Income Deciles: Stage One and Stage Two Definitions Compared	336
6.8	The Share of Government Expenditures to Household Income Deciles: Four Largest Expenditures Compared with Total Government Expenditure (Stage Two Definition)	337
6.9	Relative Equality of Main Government Expenditures (Stage Two) Lorenz Distribution By Household And By Occupants Of Private Households Compared	338
6.10	Effective Government Expenditure: Total Government Expenditure as a Percent of Total Income, Adjusted Market Income (Stage Two Definition) and Adjusted G.D.P. (Stage Three)	340
7.1	Comparison of Shares of Central Government Payments and Expenditures In 1981/82 : Stage Two Definitions	357
7.2	Comparison of the Equality of Stage Two Final Income Between Persons and Households in 1981/82	362
7.3	Effective Rates of Payments, Expenditure and Net Residue By Household Total Income in 1981/82	369

A B S T R A C T

Many budget measures have been introduced by governments with the stated aim of transferring resources to particular groups - in general, the groups which are seen to receive lower incomes. An evaluative method is required to assess the extent to which resources are actually redistributed to households by the budget. This thesis suggests a taxonomy for assessing whether a measure of household income that takes account of central government budget activities is distributed differently from household earnings (market income).

The taxonomy for evaluating the budget's distributive influence has four stages. Each stage progresses from observable household market income data to a more comprehensive income measure.

Stage One is basically an accounting concept. Household market income is compared with an income measure which takes account of those central government budget transactions which have an obvious or direct effect on the sources and uses of household income.

Stage Two is similar to studies of the influence of the budget on income distribution, such as those by Gillespie and Musgrave, which are referred to as quantitative studies. Quantitative studies are not based on structured models of economic activity, but use the results of other incidence analysis to approximate the economic effects of budget receipts and expenditures on household incomes.

Stages Three and Four require structured general equilibrium models to take consistent account of the behavioural relationships important to the analysis of the economic effects of the budget by household income. The Harberger-Mieszkowski-McLure (HMM) two-sector general equilibrium models specify both factor and product price changes, incorporating theories about the short-run macroeconomic effects of budget measures.

Conclusions about budget incidence based on the HMM approach, however, relate to aggregate factor (capital and labour) income. Multi-sector models pioneered by Shoven, Whalley and Fullerton focus on the analysis of tax incidence by household income groups. Given the current state of the art, it is not possible to analyse the distributional effects of the entire budget on household income distribution using general equilibrium models. This thesis provides a clearer definition of some of the issues involved.

A quantitative study of the money-income effects of the 1981/82 government budget is carried out as part of this thesis. The government budget is defined as the national income account of the central government's current income and outlays. Work by the New Zealand Department of Statistics based on a tax modelling system called ASSET provides the foundation for manipulating the massive data requirements of this thesis topic. The results are expressed by 10 household income groups (deciles) and 10 household types and represents the entire population residing in private dwellings. A major contribution of this thesis is that it analyses the distribution of government expenditures by household income and household type.

It is found that the 1981/82 budget does redistribute money-income from households in the higher income groups to those in the lower-income groups. The personal income tax is shown to be the most important redistributive force, based on the assumption that households' actual tax payments are the same as their statutory liability for the tax. The household types which are estimated to receive the greatest net benefit from the 1981/82 central government non-market budget are one-adult and two-adult national-superannuitant household. According to the results, government expenditures tend, on average, to be consumed in greater proportion by childless household than by households with children.

Comparison of the results using the Stage One and Stage Two approaches, as well as a rough approximation of a Stage Three initial income base, suggests that the more theoretically comprehensive the evaluative approach, the less redistributive is the budget. Piggott

(1980b) has shown that a feature of the SWF general equilibrium models that makes them attractive for policymakers interested in social policy is that the model can be used to evaluate both the distributional and efficiency consequences of a budget change in terms of household incomes. This, and the above comparison, are powerful arguments in favour of further development of SWF models so that the incidence of the budget can be assessed in a theoretically-consistent fashion.

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CHAPTER ONE

EVALUATING THE BUDGET'S DISTRIBUTIVE INFLUENCE

Most New Zealand Governments have attempted to redistribute personal incomes. Various budget measures, primarily in the tax and social welfare area, have been introduced with the stated aim of providing more income (or charging less tax) for particular groups - in general the groups which are seen to receive lower incomes. But although there are many government policies which are said to redistribute income, it is not clear whether individually or collectively they act to bring about changes of the nature or size intended.

A method is required to analyse the change in personal incomes which may be brought about as a result of the government's budget transactions. To start with, government budget policies may be intended to achieve several (sometimes inconsistent) goals, and at the very least such a method would identify differences between intended and actual policy outcomes. In addition, even though much policy is formulated to achieve objectives other than income distributive ones, all government budget transactions (indeed, all government activity) may affect the distribution of personal incomes. Finally, a major contribution of modern economic theory has been to show that the statutory or impact effect of a policy may differ significantly from its economic effects. Any evaluation of the budget's distributive influence would need to consider the extent to which budget measures bring about changes in relative factor and product prices, output and employment, which in turn affect the distribution of personal income.

This thesis evaluates the money income effects of the central government budget (the national income account of the central government's income and outlays) on private household income distribution in New Zealand for 1981/82. Several different definitions of household income are measured, starting from a narrow concept of current market income to a more comprehensive definition of personal income which takes

into account identifiable income effects of government spending and receipts. The object is to evaluate differences in income distribution when personal income is defined in various ways and grouped into household units classified by income levels and household types.

Work by the New Zealand Department of Statistics (see Broad, 1982) provides the foundation for manipulating the massive data requirements of this analysis. The core is a computerised personal income tax modelling system called ASSET (A Simulation System for Evaluating Taxation). It measures current dollar gross income and constant dollar disposable income for salary and wage earners. It is intended to reflect the impact of personal income taxation on the purchasing power of household income. ASSET has three important components:

- 1) It is based on detailed Household Survey information of expenditure and income (but not tax liability) which can be related to the demographic characteristics of either individuals or households;
- 2) The model is programmed using the computer package SAS (Statistical Analysis System) which makes it possible to process information in matrix form. The matrices have been set up with income levels on one axis and classes of rebate eligibility on the other;
- 3) Relying on the Household Survey information and matrix manipulation, ASSET is applied to calculate personal income tax liability and the household's liability for indirect taxes on final expenditures.

This thesis extends the ASSET System to analyse the impact effect of the central government budget. In particular, the distribution of the household money-income value of all central government non-market revenue is calculated and compared with the household distribution of the money-income value of all central government non-market expenditure. In addition, 1981 Census information is used to adjust the 1982 Household Survey data so that the results can be expressed in terms of the population of all private households in New Zealand.

A major contribution of this thesis is that it analyses the distribution of government expenditures. To accomplish this, it links sources of information about the consumers of government goods and services with the ASSET model. For example, Sutton's (1984) data on health usage is the basis for estimating the distribution of health expenditure by income and household type.

A. CHAPTER OUTLINE

The remainder of this Chapter discusses the focus of this thesis and an income taxonomy designed to evaluate the budget's redistributive influence. The approach in this thesis has been designed to provide a basis for comparing the distributional aims of a government's budget revenue and outlay measures with their outcomes. According to this approach, the household income effects of budget measures are taken into account through the application of existing theoretical and empirical evidence about the incidence of budget measures; no attempt is made to measure incidence (the extent a budget measure is shifted from the impact point in terms of personal incomes) as such. A feature of this approach, however, is that it provides a model for the explicit specification of assumptions about the predicted economic effects of budget measures in terms of the household sector.

Chapter Two discusses literature relevant to the evaluation of the budget's influence on household income distribution. Budget incidence is the measure of who pays the cost of and who benefits from changes in government budget transactions, taking into account changes in relative prices and output and employment effects. During the last thirty years, numerous overseas studies have analysed the incidence of aspects of government budget activity. Early research relied almost solely on the theory of public finance. This research has evolved as economists and policymakers have become increasingly interested in analysing income redistribution, as the available data has expanded, and as (general equilibrium) economic theory has broadened to encompass public finance issues.

Meerman (1978) demonstrates that while budget incidence is most usefully seen in terms of the income effects from changes in relative factor and product prices, the present state of knowledge is not conducive to measuring all these changes. Nevertheless, an advance can be made by restricting the measured effects to tax and benefit incidence, making specific acknowledgement that relative prices, technology and output (RPTO) incidence is (probably unrealistically) assumed to be zero.

The HMM (Harberger, 1962; Mieszkowski, 1967; McLure, 1964, 1971a, 1972a) two-sector general equilibrium (g-e) approach shows how various budgetary regimes affect factor returns and commodity prices. This provides the basis for deriving a consistent set of tax and expenditure incidence assumptions. SWF (Shoven, Whalley, Fullerton) computational general equilibrium models use computer techniques to further extend the HMM approach. Based on a procedure developed by Scarf (1973) for calculating general equilibrium prices in a competitive economy, Shoven and Whalley (1972, 1973, 1977), Fullerton et al (1978) and Fullerton (1979), amongst others, broaden the HMM approach to include more than two sectors, further developing the model to analyse the effects of taxes on income groups.

Early HMM (two-sector) general equilibrium models defined income as simply the return to two factors of production (usually labour and capital). The more recent SWF (multi-sector) computational g-e models analyse the return to several income groups, when income is defined in terms of the return to labour and capital endowments. Both HMM and SWF models have proved useful in the analysis of alternative tax policies. Although they probably could be, the SWF models are not designed to observe the behaviour of several different types of households or the supply and demand conditions for goods other than specific goods such as collective, social and merit goods.

Despite the considerable development of the general equilibrium approach in the last fourteen years, it has not as yet lived up to its promise in its treatment of issues related to the effect of the government budget on the size distribution of income. As Harberger

(1978, p. 62) comments about Fullerton et al (1978), "... the division of consumers into 12 income groups is an interesting frill but not a fundamental feature of the model."

To apply a general equilibrium model to problems connected with the size distribution of income, it is necessary to be more specific about the anatomy of income distribution. For example, once the effects of various tax provisions on primary factors (labour and capital) are determined, it is necessary to know more about how these changes impinge differentially on different layers of income distribution. In addition, the specification of government as one of several industry groupings does not do justice to the variety of activities financed by it. Nor do the models adequately distinguish between consumer demand for a privately-produced good and a government-produced good.

Chapter Two spells out the strengths and limitations of the general equilibrium literature. The chief strength of the g-e literature is that it has resolved many of the issues involved in the generation of theoretically consistent micro- and macro-economic incidence results. A great deal of progress has been made in the specification of models to evaluate comprehensive budget incidence. Nevertheless, an inadequacy of the work to date is that insufficient data and the present fashion for economists to prefer research problems related to corporate behaviour or general tax reform have resulted in rather sketchy treatment of the observable behaviour of the household and public sectors. The behaviour of the household sector is complex and specification of this behaviour in relation to the government requires a detailed observation of household income and expenditure flows.

The next step is to specify a model which more fully recognises the issues associated with the analysis of the budget's influence on household incomes. Chapters Three through Six put these issues in perspective and also attempt to generate some empirical results.

Since this study is founded on the presumption that government budget measures may change relative income positions, the definition of

income is fundamental to it. Income is defined to give a measure of an economic unit's possession and exercise of economic rights and is taken to represent a household's economic welfare. The concept of income becomes more comprehensive (and the measurement more abstract) depending on the definition of budget incidence being evaluated.

Chapter Three discusses the concept of income in terms of households. A comprehensive measure of income would include those items making up a household's current economic position taking account of:

- 1) Simons' (1950) income concept which comprises gains including those from realised and unrealised wealth;
- 2) the incidence of all government budget activity; and,
- 3) some concept of welfare.

Unfortunately, there is no measureable income information which encompasses all these aspects (indeed, it may not even be possible to measure the desired income concept). In the final analysis, the choice of the income standard depends on the purpose to which it will be put. In this thesis, the money-income standard is applied to evaluate budget redistribution in relation to income maintenance. The aim of income maintenance policies is to meet deficiencies in cash income, rather than real income or some theoretician's ideal comprehensive income. So a concept of money income is chosen which is consistent with the aim of income maintenance policies and serves as a proxy for the relative welfare of households.

A number of different income aggregates are then defined (based on the money-income standard) including market income (income earned through market activity), total income (market income plus direct monetary transfers such as social welfare benefits) and broader income concepts defined to be consistent with the view of budget incidence which is applied. The New Zealand Department of Statistics Household Survey provides the data for the consideration of this wide range of income aggregates. This advantage is not enjoyed by researchers conducting budget incidence studies for other countries.

Chapter Three also discusses the way in which 1981 Census and 1982 Household Survey data are used to tabulate the results derived by this thesis. Researchers from the Department of Statistics derived weightings so that the more detailed and up-to-date information in the Household Survey could be aggregated to cover the entire Census population resident in private households.

The household is chosen as the income unit because it is an economic consumption unit for which income and wealth are pooled and for which joint decisions on consumption are taken. Households are further grouped into ten household types as first set out by the Task Force on Tax Reform (1982). The household types distinguish national superannuitant households (occupants over 60 without children), households with children and households whose occupants are adult under sixty without children. Table 1B.1 shows the percentage of persons and percentage of households classified by each household type.

Table 1B.1

COMPARISON OF DISTRIBUTION OF PERSONS AND PRIVATE
HOUSEHOLDS BY HOUSEHOLD TYPE IN 1981/82

Household Type	Percentage (%) of:	
	Total Persons in Private H'holds	Total Private H'holds
1 Adult - National Superannuitant	3.6	10.8
1 Adult - Other	2.9	8.7
2 Adults - National Superannuitant	8.3	12.4
2 Adults - Other	10.0	15.0
2 Adults with 1 Child	7.9	7.8
2 Adults with 2 Children	16.9	12.6
2 Adults with 3 or more Children	19.0	10.4
3 or more Adults - No Children	9.4	8.3
3 or more Adults - With Children	18.7	10.3
1 Adult with Children	3.4	3.7
All Households	100.0	100.0
Number of:	Persons 3,098,650	H'holds 1,035,200

Source: Department of Statistics, Household Survey 1981/82 aggregated to all people resident in private households using the 1981 Census

Income groups are derived which include 10 percent of private households when income is defined as market income. In other words, the income groups are household market-income deciles. This grouping makes it easier to compare the results when different income aggregates are analysed by income groups. From Table 1B.2 below, it can be seen that the distribution of market income by household is very unequal (see final Column). For example, it is possible to see that in 1981/82 the bottom 10 percent of households (those earning less than \$250 per annum) received a negative share (-0.1 percent) of market income (because of losses). On the other hand, the top 10 percent is estimated to have received a 27.1 percent share of market income.

Table 1B.2

THE MARKET INCOME BRACKETS DERIVED TO CONTAIN 10 PERCENT (A DECILE)
OF HOUSEHOLDS AND THE AMOUNT OF MARKET INCOME BY DECILE IN 1981/82

Market Income Brackets Derived to Contain 10% of Households	Percent of Total Private Households (Deciles)	Total Number of Households (000)	Market Income By Decile of Private Households Amount \$M	Share %
Less Than \$250	10.0	103	-22	-0.1
\$250-(\$3950)	10.0	104	170	0.9
\$3950-(\$9750)	10.0	103	731	3.8
\$9750-(\$13450)	10.0	103	1212	6.3
\$13450-(\$16900)	10.0	104	1567	8.1
\$16900-(\$20250)	10.0	104	1922	10.0
\$20250-(\$24200)	10.0	103	2291	11.9
\$24200-(\$29200)	10.0	104	2774	14.4
\$29200-(\$36650)	10.0	104	3387	17.6
\$36650 and over	10.0	103	5211	27.1
TOTAL	100.0	1035	19243	100.0

The concept of the government budget is discussed in Chapter Four. Perhaps because of the highly regulated nature of the New Zealand economy and the omnipresence of Governments, budget measures impinge on income and expenditure flows in a large variety of ways. As Chapter Four shows, use of the New Zealand System of National Account (NZSNA) data for central government non-market transactions treats a greater variety of

government-financed activities than the SWF Studies, but does not distinguish some important features of government activity such as the provision of social and merit goods. A strength of NZSNA data is that it can be linked with other economic aggregates in a consistent fashion.

Chapter Five analyses the distribution of payments from households to the government first by assessing the extent these payments reduce individual household incomes and then by showing how the distribution of household money income is changed. Chapter Six analyses the effects of government expenditures on households, first attempting to identify the consumers of government-financed goods, then imputing a money income value and finally showing how the distribution of household income changes when these effects are taken into account.

In Chapters Five and Six, the government's policy intentions are first analysed with reference to legislation which introduces particular budget measures and documentation about their outcome. When the government imposes a tax, legal liability for the tax will be defined by statute to rest upon particular consumers or firms. Similarly, when a budget spending measure is passed, it will go to purchase specific resources from a specific market or will involve a transfer of income and/or goods to particular households. There is a defined point at which the budget measure first takes effect. This point is referred to as the statutory or impact point.

The imposition of a tax may lead to factor and product price and quantity changes such that the eventual income gains or losses may differ greatly from those at the impact point. Existing economic techniques must be applied to make some assessment about what the location of the ultimate or most significant economic effects might be. Through the use of a general equilibrium model, where two equilibrium positions are compared, some significant real income effects can be isolated, or in other words, effective incidence (the effect of the budget measure on the economy) can be distinguished from the impact or statutory incidence of a budget measure.

To attribute the money-income values of budget measures to household income groups, it is frequently necessary to apply proxy distributions taken from available data to translate the results from general equilibrium studies of budget incidence (expressed in terms of factor shares) into household income groups. Take the case of the company income tax, which the HMM results suggest is largely paid out of capital. The Household Survey does not collect information about capital income. It does survey dividend income. Assuming dividend income reflects capital ownership, the company income tax can be imputed to households based on the proportion of dividend income they receive.

Chapter Seven concludes with an assessment of those household money income effects from government non-market activity which are measureable. The distribution of the most comprehensive income measure which can be derived based on available data and theoretical evidence is compared to the distribution of market income, a measure of income earned from market-place activity based on Household Survey information. Also discussed is an approximation of RPTO incidence. Attempts by Shoven, Whalley, Fullerton and others to further extend the HMM models may eventually lead to the development of a method to measure RPTO incidence by households. Meantime, Chapter Seven spells out a number of other areas for further research which could make a significant contribution towards resolving problems identified in this thesis.

B. THE GOVERNMENT INCOME DISTRIBUTION POLICY

Evidence of New Zealand policymakers' interest in the effect of budget measures on income distribution may be found in recent reports on social welfare and tax reform and as part of the debate over what may be broadly called an incomes policy.

- a) In an application for a general wage order heard by the Arbitration Court in April 1981, the terms of reference included consideration of the impact of personal income tax rates on the income positions of particular earners.
- b) The Task Force on Tax Reform, established in July 1981, undertook a thorough and systematic review of all aspects of central government taxation, devoting large sections of research to income distribution questions in particular.

- c) The 1982 Budget included income tax measures aimed to reduce taxes from certain income groups more than others based on research which suggested the tax system was not redistributing income in the most desirable manner.
- d) The 1983 Budget introduced further tax changes to correct for poorly targeted assistance to low-income families in the 1982 Budget.
- e) The 1984 Budget attempted to address problems related to lower income groups (particularly low-income families through its Family Care package) who did not benefit significantly from the tax reduction of 1982 and whose wages were frozen from June 1982 to November 1984.
- f) In its August 1985 Statement on Taxation and Benefit Reform, the Labour Government announced tax reforms; one of the stated objectives of the exercise was to provide assistance to those on low incomes.
- g) In March 1986, the Government proposed a Royal Commission on Social Policy to consider principles and philosophy over a broad range of areas including education, health and housing where there is at least some element of merit goods. It was proposed that these matters be considered in an integrated framework which permits assessment of the possible and desirable total distribution of income and social benefits which could be generated.

Income redistributive objectives of Governments are seldom articulated precisely. Since no objective method for assessing the outcome of redistributive policies has been developed, conflicts between redistributive goals go unnoticed. For example, two income maintenance objectives that may be identified among the many possibilities are 1) to provide a measure of subsistence income to members of the population who cannot otherwise obtain such income through participation in the market sector; and, 2) to compensate for unacceptable market-wage relativities which exist because of monopolies and other market-place distortions. The achievement of these objectives is likely to result in a different outcome from the more naive (but frequently implied) goal of achieving an equal income distribution. A clearer understanding of the mechanism which produces changes in money incomes would enhance current debate about income redistribution.

C. THE DESIGN OF THIS STUDY

As a means of integrating economic theory with the available statistical information (getting the most from both inductive and

deductive methodologies) this study evaluates the budget's distributive influence in four stages. Each stage progresses from observable data to what is, theoretically, a more comprehensive income measure. In practice, the latter stages are further away from observable data. Hence, the latter stages involve more data approximations and imputations.

Figure 1.1 provides a taxonomy for evaluating the budget's distributive influence in four stages. The concept of budget incidence becomes more comprehensive with each stage, as does the income concept.

FIGURE 1.1
TAXONOMY FOR EVALUATING THE BUDGET'S DISTRIBUTIVE INFLUENCE

STAGE ONE	:	Money Income Including Direct Government Transactions.
STAGE TWO	:	Money Income Adjusted for all Budget Non-Market Activities.
STAGE THREE	:	Broad Measurement of Household Income Including Budget Transactions.
STAGE FOUR	:	Economic Measure of Budget Incidence By Household Income and Type.

C.1: A Taxonomy for Measuring Budget Incidence in Four Stages

Stage One, the direct money income measurement, refers to the difference between the income directly accruing to the household sector and income adjusted for the impact of those budget transactions which have an obvious or direct effect on the sources and uses of household income. Or in other words, the government is treated as a constant which only influences household money incomes by directly taxing them or through the provision of goods with private benefits (which are evaluated in money income terms).

Stage One measures the statutory incidence of personal income taxes with no adjustments for changes to relative prices, output, or the employment of factors resulting from the existence of the government.

Only those indirect taxes on final household expenditures are analysed and they are assumed to be paid entirely by households. The benefits from government private expenditure (expenditures which are excludable and for which a private beneficiary can be defined) are evaluated at the cost of providing them. The most important government-financed private goods include health and education. There are also some minor goods, such as expenditures by the Ministry of Agriculture and Fisheries, which are consumed by farmers. In addition, some subsidies are consumed by identifiable private households.

Stage Two broadens the measurement of income, assuming that the welfare of the nation's individuals is not simply affected by government policies which impinge directly on households, but is affected by all central government non-market transactions. On the receipts side, Stage Two considers company tax and other government receipts (such as property income), in addition to the government budget transactions taken into account in Stage One. On the expenditure side, Stage Two considers government indivisible (collective) expenditures as well as the expenditures included in Stage One. There are no data which (can ever) directly measure the money-income value to households of transactions such as the company tax or expenditure on collective goods (e.g. defence). Thus, considerable approximation is required to take account of the household money-income effects of all central government non-market activity.

As with Stage One, Stage Two begins with the identification of the distribution of market income among household income groups. All government receipts and public expenditures are then imputed to households by income group and household type so that market and post-budget income distributions can be compared. To the extent that the distributions differ, the impact of government budget transactions may be seen to have influenced a redistribution of income.

General equilibrium theory looks beyond the impact effect of a budget policy to the measurement of economic incidence. Economic theory predicts that the introduction of the government budget or a change in a government budget transaction will cause a shock to the economy which will cause adjustments to employment and output, possibly leading to a

new income distribution. Two ways of tackling this problem are outlined in Stages Three and Four. Stage Three imputations are based on assumptions about the tax and benefit incidence of government transactions, assuming RPTO incidence is zero. To get a tax base consistent with government policies (which are assessed on companies as well as individuals) all sources of national income are imputed to the household sector based on their assumed ownership of factors. Stage Four would be a fully integrated multi-sector general equilibrium model designed explicitly to solve for budget incidence.

The measurement of the tax and benefit incidence of government transactions in Stages One through Stage Three involves four main steps:

- 1) Identification of the economic conditions which must apply to make incidence a measureable economic concept;
- 2) Based on conclusions of the HMM and SWF general equilibrium models, assumptions are made about the incidence of budget measures. Although the literature is by no means conclusive about the incidence of various government measures, the HMM and SWF results are selected because the models give careful and consistent attention to economic detail.
- 3) These assumptions about the incidence of budget transactions are then translated in terms of household money income.
 - a) The system of national income accounting and other statistical sources distinguish the household sector from the company and financial sector.
 - b) The money income effects of government expenditures (measured at cost) are derived to be added to household income (classified by income range and household type) and money income effects of government revenues are derived. Government receipts deplete household incomes while government provision of goods adds implicitly to household incomes. This is because the household does not need to spend its income as it would to obtain goods from the private sector.
- 4) To assess the extent to which relative household income positions may differ because of the existence of the government, a comparison is made of household income distributions, when income is adjusted to take account of the incidence of government budget measures.

Ideally, Stage Four would be based on a comprehensive measure of personal income consistent with Simons' comprehensive definition. The intention for including a discussion of Stage Four is to show what procedures are required to take account of the effects of budget measures as elucidated by modern economic theory. Lack of resources prohibits the implementation of this final stage.

The above taxonomy sets out a primarily quantitative approach designed to take account of the application of different economic theories about incidence. As these theories evolve, more conclusive results may emerge and they may be added to the taxonomy.

The body of this work does not follow the four stages as developed above sequentially. Instead, the four stages provide a context for discussing the material in each chapter.

C.2: Accounting for Budget Effects on the Household Sector

Budget incidence is defined as the change in the distribution of income brought about because of the existence of the government. The nature of this change can be expressed in terms of factor shares as in the HMM studies (functional distribution), or in terms of the change in relation to household incomes when households are grouped by income range (size distribution). This thesis concentrates on the latter.

A discussion of what is involved in an economic model designed to measure budget incidence is facilitated by the notation as set out below:

$$\Delta Y = Y^1 + G^1 - Y^0$$

where:

- ΔY = change in (real national) income;
- Y^1 = private real income given the existence of government;
- G^1 = the real income equivalent of the net benefit from government transactions; and
- Y^0 = real income before a change in government budget policy.

A finer breakdown identifies the major elements involved in deriving ΔY for the purpose of assessing budget incidence in relation to household income distribution:

$$\sum_{i=1}^m h_i^0 + \sum_{i=1}^m (g_i^e) - \sum_{i=1}^m (r_i^t) = \sum_{i=1}^m h_i^b$$

Where:

m is the number of identified income groups:

h_i^0 is real national income Y^0 by household income group before the budget is taken into account (pre-budget distribution);

G^1 consists of;

g_i^e which is total government expenditures by household income group;

r_i^t which is total government revenue by household income group;

h_i^b is the household distribution of national income after the income effects from government budget measures have been taken into account (Y^1 , post-budget distribution).

The incomes of individual households will change depending on the effects of particular budget expenditure or revenue measures. Budget measures may have an influence on both the sources and uses sides of household incomes. They affect the sources of incomes by changing relative factor incomes; and they affect the household's uses of income through the prices households pay for purchases of goods and services. These changes mean that even if the level of aggregate household income is the same before and after the budget is taken into account, the distribution of income amongst households may change. The difference between the share of pre-budget and post-budget household income to each household income group is the measure of income redistribution.

The sum of individual household incomes pre-budget $\sum_{i=1}^m h_i^0$, will be equal to the sum of individual household incomes after the budget has been taken into account, $\sum_{i=1}^m h_i^b$ only if the government's budget is defined to be balanced and demand-expansionary effects on the aggregate economy are ruled out. This means more than that total government expenditures equals total government receipts. The effect of balancing

the budget in the HMM models is that real income effects are analysed rather than changes in asset values because of changes in the financial system. What it means in terms of the household money-income effects of budget measures depends on the level of complexity of the underlying economic model.

These levels of complexity are reflected in the different stages of Figure 1.2 on the next page. For example, Stages One and Two treat the measurement of the budget's distributive influences as little more than a basic accounting exercise, with some recognition of the results of partial equilibrium economic studies. In the case of Stage One, the concept of household money-income is simply broadened to incorporate adjustments for information in the Household Survey such as: 1) household liability for income tax and indirect taxes on final expenditure; and, 2) the characteristics of households which identifies them as consumers of government private goods such as health and education. Here, total government expenditure does not equal total revenue, even in an accounting sense. Stage Two further broadens the concept of household money income to encompass the general economic principles underlying the national income account. The central government income and outlay account is balanced by definition, with savings defined as the balancing item. Both Stage One and Two are designed to measure current money-income values for one year.

Stage Three sets the the scene to consider balanced-budget economic incidence. The assessments of income would involve the measurement of the marginal value of incomes to be consistent with the differential incidence conclusions of the HMM studies. In this case, the budget is defined so that (in equilibrium) changes in the economy because of government spending are equal to changes in the economy because of government taxes and charges. The significance of this definition of balanced-budget incidence is that (assuming competition and full employment) it supposedly isolates the income redistributive effects of the budget from the employment and output effects which come about when the budget is unbalanced in equilibrium. The problem with this definition is that it also rules out the employment and output effects which come about because of the type of expenditures, taxes or charges. Since the HMM general equilibrium models are long-run, the assumption underlying the Stage Three calculations is that all the long-run adjustments to the budget take place in the current year.

FIGURE 1.2

FOUR STAGES FOR EVALUATING THE BUDGET'S DISTRIBUTIVE INFLUENCE
(TO BE ANALYSED BY HOUSEHOLD INCOME GROUP AND HOUSEHOLD TYPE)

STAGE ONE : DIRECT MEASUREMENT OF THE MONEY
INCOME EFFECTS OF THE BUDGET

<u>INCOME SOURCE OR LEVY*</u>	<u>DEFINITION</u>
A. 1 Market Income	(Current gross personal earnings. (Includes income from salary and wages; (dividends; interest; royalties; (trusts; self-employed and partnership (earnings).
+	
2 Direct Benefits	(Transfer payments including (supplementary minimum prices, social (welfare and other benefits. (Includes national superannuation, (family benefit, unemployment benefit, (domestic purposes benefit and so on.
=	
3 Total Income	(Money income accruing to people.
-	
4 Personal Income Taxes	(Tax assessed on income earned by (individuals.
=	
5 Income Available to Spend	(Money income available for current (expenditure including social welfare (benefits but excluding personal (income taxes.
+	
6 Subsidy Income	(Government expenditures to producers (which provide a private money income (benefit.
-	
7 Indirect Taxes and Government Fees	(Taxes on final products or property.
+	
8 Income Benefit from Government Private Goods	(Money income value of government (programmes for which a private (beneficiary can be identified. (Largely education and health.
=	
B. Money Income Including Direct Government Transactions Valued at Market Prices	
Difference between distributions A and B is a direct or impact measure of government budget transactions which have private costs or benefits.	

STAGE TWO : MONEY INCOME ADJUSTED FOR ALL BUDGET NON-MARKET ACTIVITIES

A. 1 Market Income	(Same as A.1 under Stage One.
-	
9 Total Payments to Government	(Personal income taxes (Company taxes (Indirect taxes (Other receipts e.g. fees
+	
10 Money Income Benefit from Total Government Non-Market Expenditure	(Social welfare and other benefits (Government private goods (All subsidies (Indivisible govt expenditures (Borrowing from the public
=	
C. Household Money Income Adjusted for all Budget (Non-Market) Activities	
Difference between A and C is a direct or impact measure of the effect of all budget transactions on household money incomes	

STAGE THREE: BROAD MEASUREMENT OF INCOME

D. National Income	(Compensation of employees plus opera- (ting surplus plus consumption of (fixed capital.
-	
9 Total Payments to Government	(Same as A. 9 Stage Two above.
+	
10 Money Income benefit from Total Government Expenditure	(Same as A. 10 Stage Two above.
=	
E. Broad Measure of Budget Incidence	
Difference between distributions D and E.	

STAGE FOUR : ECONOMIC MEASURE OF BUDGET INCIDENCE

F. Comprehensive Measure of Income	(National income plus capital gains (income before change in government (budget policy.
+	
Transfer Payments	
+	
Total Government Expenditure Incidence	
-	
Total Government Tax Incidence	
+	
RPTO Incidence	
=	
G. Economic Measure of Budget Incidence	
Difference between distributions F and G.	

Finally, Stage Four sets out the issues which economic theory shows to be important but for which there is (as yet) no applicable economic model. In this case, whether the budget is balanced or not depends on the nature of the model which is specified. In general, comparative static models require the budget to be balanced in equilibrium while growth (dynamic) models may be designed to analyse the income redistributive effects of unbalanced budgets on current and future generations.

D. FOCUS OF THIS STUDY

The focus of this thesis is on changes in household incomes which occur over a fiscal year. The fiscal year is chosen as the time period because it is appropriate to the normal budget round. An even shorter period might be desirable from the point of view of income maintenance objectives which are designed to respond to more urgent human needs. Unfortunately, there is very little data collected for a shorter time period.

Existing general equilibrium economic models are not designed to focus on the year period as such. Most HMM AND SWF studies are designed to assess the effects of the budget in the long run, so the application of their results to a study such as this one assumes that the long-run economic decision period takes place within the fiscal year. There is not a lot of evidence for or against this assumption because the general equilibrium literature has shown little interest in the question of the calendar-time period for the long-run adjustment to be achieved. Indeed, it is not even clear that the basic concept of the long-run, a period long enough for all factors to be varied, applies to government decision making in the same way that it applies to decisions by the firm.¹

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1. In fact, it is probably short-run considerations which are of most relevance to a study of income redistribution. The long-run results of HMM and SWF studies show the changes in the pattern of household income distribution which occur because of changes in the returns to endowments (generally capital and labour) owned by the households. They are not able to evaluate what is typically seen as a redistributive measure (such as the unemployment benefit) where the level of factor returns is determined by the market place but the government acts to re-channel some of the returns to households which would otherwise receive a low return. Note, however, the general equilibrium research that has specified calendar time (including Auerbach and Kotlikoff, 1983) suggests that the short-run problems of relevance can be handled.

For the analysis in this thesis, households are grouped by income and type. These groups are not always informative about important redistribution among various groups in the population. The budget includes certain spending and taxation policies which cause substantial variation in a household's relative income position according to geographical area, type of dwelling, age composition of occupants in the household, racial characteristics of members in the household and so forth. Thus, it should be borne in mind that comparisons of average households in one income bracket with average households in another may not be valid since there may be factors more significant than income influencing household behaviour. Much policy, however, is made on rougher generalisations about the behaviour of households than income-related behaviour.

Fourteen years ago, SWF general equilibrium models appeared to have considerable potential as tools to evaluate the effects of budget measures on income distribution. But while the models have developed rapidly and continue to impress because of their consistent treatment of significant economic effects, they have failed so far in their treatment of the size distribution of household income and the expenditure side of the government budget. One explanation for this failure is that since the models require considerable resources (time, computing, money, data and researchers), they have been diverted to policy areas seen by those funding the research to have greater priority. For example, Fullerton, King, Shoven and Whalley (1980) (1981) analyse the issue of the integration of the corporate and personal tax in the United States.

Provided the resources could be made available, an avenue for further research would be the specification of a SWF general equilibrium model to evaluate the incidence of the entire government budget when the results are expressed in terms of the changes in the relative income positions of households. Such an exercise requires the derivation of several important additional equations. The models would need to be designed to consider short-run changes to household incomes and demand for government-provided social and merit goods. Even then, definite conclusions about the incidence of taxes or of government spending could only be reached under highly restrictive assumptions.

Meantime, Governments continue to make policy which is intended to redistribute household income in some way. A method is required to evaluate the budget's distributive influence, utilizing current economic, statistical and computing resources to derive empirical results. The virtue of the income taxonomy spelled out in this chapter is that it is capable of generating empirical results in spite of the limitations of current economic theory. The evaluation of these results within different stages is a means of giving explicit recognition to the context in which they are derived.

Purists may argue that the results generated by the approaches in Stages One, Two and Three are little more than statistical manipulations. Until there is a properly specified general equilibrium model, however, these are the results that can be generated. The advantages of this approach are:

- 1) It evaluates the totality of government budget activity;
- 2) Once developed, it can be easily (and quickly) updated so that current budget policies can be assessed;
- 3) The underlying assumptions are explicit;
- 4) Different assumptions can be easily tested;
- 5) As new theoretical results emerge, they can be linked into the framework.

The objective of the exercise is not to predict response to policy changes or the time lags involved, but to identify the possible first-round changes in money-income distribution. Attempts to quantify the income effects are intended to provide an approximation of the extent of change within the limitations of current economic theory. They are not intended to be an exact measurement of the change in income resulting because of the introduction of a budget measure. Although policymakers must be cautious about making too much out of this circumstantial evidence, it does provide a basis for selecting budget policies which meet more closely with their redistributive intentions.

E. SUMMARY AND CONCLUSION

This chapter outlines a taxonomy for evaluating the budget's distributive influence which has four stages. Each stage progresses from observable data to a more comprehensive income measure. Empirical results are derived for the first three stages. The general conclusion which emerges is that the extent of redistribution of income towards the low-income households is reduced in relation to the increase in theoretical complexity of the model applied to evaluate the budget.

Table 1E.1 on the next page compares the final income distributions (see Columns D, E and F). Also displayed in Table 1E.1 for illustrative purposes are the distributions of market income (A), total income (B), and household income available to spend (C). The Stage Three distribution (F) does not favour the low-income households as much as Stages One (D) and Two (E). It seems likely that if such concepts as excess burden and the index of the marginal utility of government expenditure with respect to income and externalities were also taken into account, the resulting distribution would be even more in favour of high incomes. Also, if the economic incidence of taxes (especially the personal income tax) was modelled, the resulting distribution would be less in favour of low income households.

Stage One, the direct money-income measurement, is designed to reflect what could be described as a "common sense" view of the areas where government has an influence on income distribution. Households pay personal income taxes and some indirect taxes and in return they receive the benefits from social welfare payments, direct subsidies and government private goods such as education and health.

The distribution of income received from market-place activities (salary and wage income, investment income, self-employed income and so on) is quite unequal. The lowest two household income deciles (20 percent of households) earned less than 1 percent of the total of market income in 1981/82 (see Column A, Table 1E.1). When direct monetary benefits are taken into account to derive total income (Column B), the distribution becomes more equal with the lowest 20 percent of households receiving 6.4 percent of the total.

Table 1E.1

MONEY-INCOME EFFECTS OF THE 1981/82 BUDGET: COMPARISON
OF DIFFERENT INCOME DISTRIBUTIONS(By Household Income Group : Each Group Represents a
Decile, 10%, of Private Households)

Household Market Income (\$ p.a.)	Market Income For All Private Households	Total Income	Household Income Available to Spend	Money Income W/Direct Govt Tran- sactions (Stage One)	Market Income Adjusted for Govt Budget (Stage Two)	Broad Income Gross Domestic Product Adjusted for Govt (Stage Three)
	A	B	C	D	E	F
Money Income Amount (\$ Million)						
Less Than \$250	-22	632	582	748	805	967
\$250-(\$3950)	170	772	683	823	871	1288
\$3950-(\$9750)	731	1141	985	1165	1234	1951
\$9750-(\$13450)	1212	1425	1170	1309	1394	1998
\$13450-(\$16900)	1567	1761	1395	1568	1672	2407
\$16900-(\$20250)	1922	2084	1601	1762	1880	2670
\$20250-(\$24200)	2291	2414	1820	1998	2125	2935
\$24200-(\$29200)	2774	2923	2146	2294	2449	3457
\$29200-(\$36650)	3387	3521	2527	2646	2819	4087
\$36650 and over	5211	5373	3585	3809	3896	6646
TOTAL	19243	22046	16494	18122	19145	28407
	A	B	C	D	E	F
Proportion of Total (%)						
Less Than \$250	-0.1	2.9	3.5	4.2	4.2	3.4
\$250-(\$3950)	0.9	3.5	4.1	4.5	4.5	4.5
\$3950-(\$9750)	3.8	5.2	6.0	6.4	6.5	6.9
\$9750-(\$13450)	6.3	6.5	7.2	7.2	7.3	7.0
\$13450-(\$16900)	8.1	8.0	8.5	8.7	8.7	8.5
\$16900-(\$20250)	10.0	9.4	9.7	9.7	9.8	9.4
\$20250-(\$24200)	11.9	10.9	11.0	11.0	11.1	10.3
\$24200-(\$29200)	14.4	13.2	13.0	12.7	12.8	12.2
\$29200-(\$36650)	17.6	16.0	15.3	14.6	14.7	14.4
\$36650 and over	27.1	24.4	21.7	21.0	20.4	23.4
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Notes: Numbers may not add exactly because of rounding. Market income ranges have been defined so that each contains 10 percent of total private households.

Further adjustments to income (taking account of personal income taxes, subsidy income, indirect taxes and government private goods) generate the Stage One definition of income, direct money income including direct government transactions. Income valued in this way is distributed more in favour of low-income households than is market income or total income. The lowest 20 percent of households receive 8.7 percent of total Stage One income. (see Column D, Table 1E.1).

Chart 1.1 is an illustration of the relative equality of different income concepts. Lorenz curves are plotted for Columns A, D and F of Table 1E.1 to show the relative equality of Market Income and Stage One and Stage Three Final Income. The Stage One and Stage Three curves are closer to the line of equality than the curve for Market Income. This shows that when income is defined to include budget transactions, it is more equally distributed.

CHART 1.1
RELATIVE EQUALITY OF MARKET INCOME AND STAGE ONE AND
STAGE THREE FINAL INCOME: LORENZ DIAGRAM FOR 1981/82

Table 1E.2

STAGE TWO: DISTRIBUTION OF HOUSEHOLD MONEY INCOME ADJUSTED FOR
TOTAL GENERAL GOVERNMENT NON-MARKET ACTIVITIES
(By Household Income Group: Each Group Represents 10% of Private Households)

Household Market Income Group (\$ p.a.)*	Payments to Government			Government Expenditure			Market Income Adjusted for Govt Budget
	Personal	Other	Total	Collective	Other	Total	
	Income	Pay-	Payments	Government	Gov't	Gov't	
	Tax	ments	(A1+A2)	Expend. (Case 1)	Expend.	Expend. (B1+B2)	
	A1	A2	A	B1	B2	B	C
Proportion of Total (%)							
Less than \$ 250	0.9	3.1	1.8	3.9	13.9	11.0	4.2
\$ 250 - (\$ 3950)	1.6	4.6	2.8	4.8	12.9	10.6	4.5
\$ 3950 - (\$ 9750)	2.8	7.0	4.4	6.5	11.5	10.1	6.5
\$ 9750 - (\$13450)	4.6	7.5	5.7	7.5	7.9	7.8	7.3
\$13450 - (\$16900)	6.6	8.8	7.4	9.0	8.5	8.7	8.7
\$16900 - (\$20250)	8.7	10.2	9.3	10.4	8.3	8.9	9.8
\$20250 - (\$24200)	10.7	10.6	10.7	11.1	8.1	8.9	11.1
\$24200 - (\$29200)	14.0	12.3	13.3	12.7	8.7	9.9	12.8
\$29200 - (\$36650)	17.9	14.9	16.7	15.4	8.7	10.6	14.7
\$36650 and over	32.2	21.0	27.9	18.7	11.5	13.5	20.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Stage Two takes the view that it is households which ultimately make all payments to government and consume all government expenditure. Based on this view, the entire income and outlay account of the government is allocated to households by income group and household type. In this case, it is necessary to apply economic theory about the incidence of taxes (such as the company income tax) and expenditures (such as national defence) which do not directly impact on household incomes. In the text of the appropriate chapters, several assumptions are tested.

Table 1E.2 above shows some of the results based on the Stage Two approach. Based on the least extreme assumptions, four conclusions are:

- 1) Payments to government are very redistributive with the upper 10 percent of households contributing 27.9 percent of the money-income value of total government revenue and the lowest 10 percent contributing 1.8 percent (see Column A, Table 1E.2);

- 2) Personal income taxes are extremely redistributive with the upper two deciles paying over 50 percent of the tax;
- 3) The money-income benefits of total government expenditures are more evenly distributed than payments to the government. It is estimated that 10 percent of households in each income range receive between 7.8 and 13.5 percent of the money-income value of total government expenditure, with the middle income deciles consuming a lower share of government spending than the upper and lower income groups (see Column B, Table 1E.2);
- 4) Even though Stage Two covers a broader concept of the government budget than covered in Stage One, the final distribution of income accounting for this broader concept is little different from the distribution of "money income including direct government transactions" in Stage One (see Columns D and E, Table 1E.1).

Stage Three derives a "broad income measure" based on the view that if the entire government budget is to be taken into account, then all of the output of the economy should be attributed to households for comparative purposes. The proper derivation of Stage Three income distribution would benefit from a general equilibrium model to guarantee consistency between the assumptions for deriving an income base and evaluating budget incidence. The results based on this less rigorous (but possibly more theoretically valid) approach are tantalising because the upper income decile's share is greater than in the other two Stages while the share to the lower income deciles is smaller (3.4 percent compared with 4.2 percent).

When the results are analysed by household type, the significant redistribution is to national-superannuitant households. The largest share of market income (18.7 percent) is earned by the 15.0 percent of households containing two adults (without children or national superannuitants). The share earned by three-adult-no children households is a more modest 14.2 percent, but households of this type make up only 8.3 percent of total households. When adjustments are made for the Stage One definitions of "direct" government budget transactions, the income share going to two-adult and three-adult household reduces. On the other hand, the income share going to one-adult and two-adult national-superannuitant households increases, as does the share to one-adult households with children. The income shares of national superannuitant households are even greater under the Stage Three method than under the methods applied by Stages One and Two.

CHART 1.2

COMPARISON OF RELATIVE EQUALITY OF THE DISTRIBUTION OF PAYMENTS
TO GOVERNMENT AND THE MONEY-INCOME VALUE OF GOVERNMENT
EXPENDITURE: LORENZ DIAGRAM BASED ON STAGE TWO DEFINITIONS FOR 1981/82

Chart 1.2 is a graphic illustration of the difference between the distribution of payments to the government and total government expenditure. Total government expenditure is nearly equally distributed. Payments to the government are redistributive with those in the highest income groups paying the largest share.

A Stage Four income measure requires further resources to derive an empirical income distribution for New Zealand. SWF models show how the economic effects of budget measures differ from their impact effects. It would be an interesting exercise to see whether this would translate into a significantly different household income distribution than is indicated by Stages One through Three.

Chapter Two describes the nature of the economic effects measured by HMM and SWF models. An obvious subject for this thesis could have been the extension of these models to treat the size distribution of household income and the expenditure side of the government's budget. However, the resources required to carry out such an extension are considerable and could not reasonably be commanded.

Chapters Three through Six of this thesis are devoted to the analysis of the impact of the entire government budget on household incomes and household types. While this task has more modest theoretical aims than the SWF studies, it has two things in its favour: 1) it is able to generate results given the current state of knowledge; and, 2) it clearly identifies areas for further study so that the research of this broad topic can be spread among those who are expert in particular areas.

CHAPTER TWO

REDISTRIBUTION STUDIES : THE THEORY AND THE PRACTICE

This chapter discusses the insights provided by general equilibrium models, especially in relation to their generation of theoretically consistent micro- and macro-economic incidence results. It also shows the limitations of these models when they are applied to the question at the base of this thesis, the evaluation of the budget's influence on household incomes. There is potential for existing New Zealand general equilibrium models to be augmented to assess budget incidence in relation to the household sector. However, the theoretical and computational resources involved in structuring this study in relation to a general equilibrium model are great. Hence, this thesis is devoted to a clearer definition of the issues involved using a quantitative approach.

Section A distinguishes some of the issues involved in the analysis of budget incidence, focusing on Meerman's (1978) taxonomy. Meerman (1978) clarifies the concepts underlying studies of budget incidence, showing at the same time that an attempt to assess even the differential incidence of an existing programme is apt to be extremely complex. The research inputs of time, money and the massive data requirements may not be at all commensurate with the expected benefit from the research. One way to reduce the research inputs is to redefine the concern of incidence studies by assuming that the impact of government policy on relative prices, technology and output is zero.

Section B examines the Harberger (1962) tax-incidence model and extensions to it by Mieszkowski and McLure (HMM models). The HMM two-sector general equilibrium approach integrates a microeconomic and a macroeconomic perspective to assess budget incidence within the context of modern economic theory.

Section C surveys empirical work carried out using descendants of the Harberger model devoted to evaluating government public finance policies. Shoven, Whalley (1972, 1973, 1977) and Fullerton (1979) have

developed the HMM model to include several sectors, including consumer groups at different income levels. These models are referred to as SWF models. Mostly the SWF models have been concerned with stabilisation issues of tax policy. Section C discusses how these models treat methodological problems which have relevance to the analysis of the size distribution of the government budget and suggests some possible extensions which would make them more applicable. Pertinent SWF incidence results are also discussed.

Section D is a brief discussion of some general equilibrium models of the New Zealand economy. The Victoria University Research Project on Economic Planning (RPEP) has two general equilibrium models, Joanna and Julianne. Joanna provides greater detail on the effects of tax instruments while Julianne is designed to analyse the longer-run effects of foreign trade and tariffs on the structure of the economy. The Canterbury University Department of Economics and Operations Research (CUDEOR) is in the process of designing a general equilibrium model of the New Zealand economy for the purpose of addressing issues of government policy. There is potential for either the RPEP or the CUDEOR models to be applied to the evaluation of the effect of the budget on household income redistribution; however, first the models would need to be substantially augmented.

Section E surveys some quantitative studies of the effects of the government budget on income distribution. The quantitative research of budget incidence by income group has been much criticised because of its failure to incorporate many of the concerns that arise in the theoretical literature. For example, the research is open to criticism because of the limitations of the partial equilibrium approach adopted, its inability to fit observed economic relationships within existing theoretical models and its failure to incorporate a consistent macroeconomic approach. This section argues that quantitative studies have been unfairly maligned. Some limitations are inevitable because of the complexity of the problem of analysing the distribution of government budget measures by income group and because of the narrowness of existing theoretical models. Quantitative studies have made an important

contribution by translating theoretical results into terms which enable issues of budget incidence to be addressed in relation to household income groupings.

Section F is a summary of the methodology adopted in this thesis. A general equilibrium model is not specified as such, but the insights from HMM, SWF and RPEP models are applied to assess household money income when central government budget measures are taken into account. An advantage of this approach is that it highlights some of the extensions to general equilibrium models which are required.

A. BASIC CONCEPTS OF BUDGET INCIDENCE

Budget incidence is a measure of who pays the cost of, and who benefits from, changes in the government's budget. As the problem of incidence is designed in this thesis, the way of summarising the meaning of "who" across a total population is to define incidence in terms of households grouped into income brackets. Then incidence becomes the total change in the distribution of household income, defined to include publicly provided goods and services, due to the government's budget activities.

Like most work in economics, the analysis of budget incidence involves the comparison of two equilibrium states. Depending on whether budget incidence is analysed within a comparative statics context or one of equilibrium growth paths, the budget may be balanced or unbalanced in equilibrium.

Within a comparative statics context, the budget must be balanced in equilibrium because a stationary state is one in which financial and physical stocks are constant. A comparison of stationary states simplifies the analysis of budget incidence because it avoids some of the complications of deficit financing and the problems raised by defining 'income' within a growing economy. In this case, balanced budget incidence is defined as the total change in the equilibrium distribution of household incomes due to an increase in taxes used to finance an exactly equivalent increase in expenditure. This implies some symmetry between the incidence of taxes and public spending or in other words, the

resource value of taxes is equal to the resource value in what they go to produce.

The focus of incidence analysis is on the distribution of income, not the change in the level of incomes. The effect of this tax and expenditure incidence symmetry in relation to output depends on whether the underlying model is classical or Keynesian. In a classical model, national income is held constant and the introduction of a budget measure effects the composition of output. In a Keynesian model, budget measures can lead to changes in aggregate demand and there can be growth in national income.

If the context of the analysis of budget is that of an exponentially growing economy, then as shown by Domar (1944) the budget does not have to be balanced. If the equilibria being compared are steady-state growth paths, government spending need not be equal to total tax receipts, even in the long run. There can be a continuing expanding debt (presumably used to finance capital spending which benefits future generations) which will increase absolutely through time but will tend to some constant rate with respect to the annual real income. Thus, within the context of a growing economy, it is not only the distribution of taxes and expenditures by household income groups which matters, but also the distributional effects of government budget debt financing. Future and present generations are the beneficiaries and the financial supporters of the budget, so discounted-present-value-income measures are required.

A.1: Meerman on Incidence

One of the clearest expositions on budget incidence in relation to household income classes is Meerman (1978). Using what is apparently a classical model, he categorises balanced-budget incidence as:

- 1) Benefit incidence is the value to the recipients of the resource transfer made through the public expenditure.
- 2) Tax incidence is the resource transfer away from those who pay the tax, defined as equal to the amount of the tax.

- 3) RPTO incidence, the abbreviation for relative price, techniques and output incidence, is the residual of the income change less the sum of tax incidence (with negative sign) and benefit incidence.

Benefit and tax incidence are the distribution of the direct (first round) income effects on the households ultimately enjoying the resource transfer or paying for it and RPTO incidence is the associated general equilibrium adjustment. Conceptually, as discussed by Meerman, the RPTO incidence of a given tax or expenditure can be analysed independently of all other effects of those taxes and/or expenditures. Harberger's (1962) application of the Stolper-Samuelson two-sector general equilibrium model to the analysis of the incidence of the corporation income tax is actually an analytical calculation of RPTO incidence (but for factors, not for income classes).

A.2: Meerman's Model

In Meerman's model, all income in the economy is received by households and consists solely of returns to factors. The factor labour is defined as the capitalized value of labour income. Hence, only factors and their returns - dividends, interest, wages, and so on - appear in the household budget constraint. All factors are assumed privately owned, but they have no exchange value after their initial sale or allocation. This means there are no capital gains and losses, simplifying the measurement of income.

Meerman's analysis of incidence uses comparative statics. He defines three equilibrium states (designated by subscripts 1, 2, 3)¹. The first state refers to an economy in equilibrium without government.

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1. Meerman's definition of three stationary states is an expansion of the meaning of comparative statics covering two different periods. The first-period analysis is short-run, with Meerman's first stationary state at the base. The second-period analysis, which is designed to focus on changes in relative prices, technology and output, is long-run. Meerman's second stationary state (an economy involving government) is at the base and this is compared with the third stationary state (after adjustment for a new publicly-financed private good).

The second and third equilibrium states include government which is financed solely by taxes, has a balanced budget and provides goods. The third state occurs after the provision of a new government specific good financed by an equivalent increase in tax.

There are a number of households, h , each with its income H_j ($j = 1, 2, \dots, h$) based on the earnings of its factor endowments. Factors owned by the j^{th} household are indicated by A_{kj} ($k = 1, 2, \dots, m$). Each type of factor (including capitalized labour) earns a one period return equal to w_k ($k = 1, 2, \dots, m$).

There are n private goods and services designated as Q_i ($i = 1, 2, \dots, n$) and n prices corresponding to the various Q_i designated as P_i ($i = 1, 2, \dots, n$). Returns per unit of factors as well as prices of goods are identical for all households due to perfect competition in factor as well as goods markets. There are no externalities or economies of scale. Thus, P_i equals marginal cost.

For each household j , there is a budget constraint:

$$H_j = \sum_{i=1}^n P_i Q_{ij} = \sum_{k=1}^m w_k A_{kj} \quad (A1)$$

Q_{ij} is the amount of the i^{th} good purchased by the j^{th} household whether for consumption or investment. Asset accumulation through investment does not affect the supply of factors available because the comparisons are of stationary states.

Now introduce government which is funded solely by taxes and has a balanced budget. The government finances either completely private consumption and investment goods, or completely public goods and transfers. Government private goods are those provided directly to households. Government taxing and expenditure measures affect relative prices, returns to assets and asset endowments.

For household j in Meerman's second stationary state involving government:

$$H_{2j} = \sum_{i=1}^n P_{2i} Q_{2ij} + \sum_{i=1}^n B_{2j}^P Q_{2ij} + B_{2j}^G G_2 \geq \sum_{k=1}^m W_{2k} A_{2kj} \quad (A2)$$

where

B_{ij}^P = Marginal value to recipient household of Q_i financed by government, ($i = 1, 2, \dots, n$). (In terms of the usual utility analysis, $B_{ij}^P = MU_{Qij}/MU_{Yj}$)

G = quantity or total output of public good

B_j^G = marginal value per unit of G to household j .

(In utility analysis, $B^G = MU_G/MU_Y$)

Some of the implications of the second-state equilibrium (Meerman's first equilibrium introducing the government) bear further consideration. The benefits of the government budget are measured in terms of values which are analogous to market sales. The measure of the value of private goods and services (Q_{ij}) purchased by the household is $P_i Q_{ij}$. The value of government supplied private goods is $B_{ij}^P Q_{ij}$ and $B_j^G G$ is the value of the government supplied public goods for which the household is willing to pay.

Consumer surplus is not integrated into the analysis. This treatment illustrates the approach frequently taken in empirical studies of tax incidence. In these empirical studies, tax incidence is defined in value terms, not in terms of the total reduction in utility or consumer surplus associated with the introduction of a new tax measure. In other words, the estimate of the value of the benefits from public services is based on the marginal rates of substitution between public expenditure measures and privately provided goods and services. In the same way that national income accounting ignores the consumer surplus inherent in consumption of private goods, this approach ignores consumer surplus provided by additional units of public goods and services.²

2. Piggott and Whalley (1984, p.1) have shown that this procedure, which reflects both the deadweight losses from taxes and the consumer surplus from public goods, "can be quantitatively large enough to significantly change the measured redistributive impact of government policies."

Underlying Meerman's analysis is the assumption that the government provides publicly financed private goods at zero direct cost to the household; their use is assumed to be rationed through non-market mechanisms. This means that the marginal value to the household of publicly financed private good (Q_{ij}) and its public or private cost of production are not necessarily equal. If in addition to government allotment, a household purchases part of the consumption of Q_{ij} privately, the marginal value to the recipient household of the government financed good will equal its market price (P_i). But in the latter case, the market price (P_i) need not equal the marginal cost of publicly financing the good or service (Q_i), depending upon the relative efficiency of government provision of the publicly-financed private good.

Household income (H_j) is measured after adjustments for all government effects have taken place - it reflects the adjustments after each household consumes the total output of the public good (G). The inclusion of public goods in the identity means that consumption plus saving is no longer identically equal to factor income for each of the households, although it is in aggregate.

Spending per household, that is the price of goods and services consumed times the quantity, must equal the return to the factors of the household less any tax paid and any transfer received.

When T_q = tax or negative tax (transfer), ($q = 1, 2, \dots, z$), there is a Lindahl equilibrium and relation (A2) can be rewritten as:

$$H_{2j} = \sum_{k=1}^m w_{2kj} A_{2k} - \sum_{q=1}^z T_{2qj} + \sum_{i=1}^n B_{2ij}^P Q_{2ij} + B_{2j}^G G_2 \quad (A3)$$

A.3: Efficient Benefit Taxation

Equation (A2) only becomes an equality in a Lindahl equilibrium, where all taxes are direct. According to a Lindahl solution, where there is solely efficient benefit taxation such that the marginal value of benefit received equals tax paid, then (A2) above is an equation for

household j or for the economy as a whole. This equation becomes (A4) and could be written in national accounting terms, assuming that total final output equals total factor incomes.

$$\sum_{i=1}^n \sum_{j=1}^h P_{2ij} Q_{2ij} + \sum_{i=1}^n \sum_{j=1}^h B_{2ij}^P Q_{2ij} + \sum_{j=1}^h B_{2ij}^G G_2 = \sum_{k=1}^m \sum_{j=1}^h W_{2kj} A_{2kj} \quad (A4)$$

And for each household j :

$$\sum_{q=1}^Z T_{2qj} = \sum_{i=1}^n B_{2ij}^P Q_{2ij} + B_{2j}^G G_2 \quad (A5)$$

Meerman questions the widespread belief that the adoption of a Lindahl solution to the problem of financing public expenditure is necessarily Pareto superior in the sense that no household's total utility diminishes and at least one increases in moving from one equilibrium to another equilibrium. Meerman argues that a Lindahl solution is Pareto optimal, not Pareto superior. The assertion of the latter requires household welfare comparisons which are unambiguous. The change in relative prices resulting from a budget measure may make it possible for one household to attain a higher level of utility per dollar of private spending while another household may move to a lower indifference curve for a given budget constraint. Because consumption patterns differ between households, changes in the relative prices faced by all households change their true cost-of-living indexes in different ways. Since households may prefer lesser incomes with more favourable prices, a successful comparison of measured incomes in two different static equilibria does not necessarily give unambiguous results.

A.4: Specification of Three Types of Incidence

Two types of incidence can be specified from equation (A3): benefit incidence and tax incidence. Benefit incidence is defined:

$$\sum_{i=1}^n B_{ij}^P Q_{ij} + B_j^G G$$

Tax incidence could then be expressed as:

$$\sum_{q=1}^Z T_{qj}$$

In the 1960s and 1970s, a number of specialists in public finance attempted to assess budget incidence in various countries. Perhaps the most familiar quantitative incidence studies are by Gillespie (1965) and by the Musgraves (1973).³ Typically, these studies define a concept of tax and benefit incidence which is similar to the above.

A number of the quantitative studies acknowledge the importance of some of the general equilibrium effects of budget incidence. In practice, however, the studies were specified in such a way that the implicit underlying assumption was that RPTO (relative prices/technology/output) incidence was zero. Because of this assumption, factor incomes

($\sum_{k=1}^m w_{2k} A_{2kj}$) are defined as though the existence of the government makes no difference.

One of the most important conclusions of contemporary economic theory, however, is that RPTO incidence is significant. Although Meerman (1978, p.301) is one of the first to identify the precise problem, most of the controversy concerning empirical studies of budget incidence is centred on the assumption, which is quite often implicit, that RPTO incidence is zero.

Meerman was able to identify the problem because he treated the issue of redistribution in relation to household size groups (not factor shares), given a more complex budget concept than is usually at the base of empirical budget incidence studies (such as SWF).

3. See also: Bird and de Wulf (1973); de Wulf (1975). Many of these empirical studies base their analysis of the expenditure side of the budget on McLure (1974).

A.5: Effects of the Budget on Techniques, Output and its Composition

Government budget transactions do not just effect output. They also affect savings decisions, occupational decisions and the development of institutions. While this is an obvious point to most economists, it is not so obvious how to specify a model to include this sort of effect. A rigorous empirical treatment of budget incidence can only be done using two approaches:

- a) Assessing differential balanced budget incidence where small changes in budget transactions (a new public good financed by an equivalent increase in tax) are compared for the combined incidence of a tax and the expenditure it finances; and,
- b) An approach where returns to factors, factor prices and the quantity of output are specified independently of budget activity.

A.6: Differential Balanced Budget Incidence

The usual approach in differential balanced budget incidence is to define a new (third) state which is the equilibrium occurring after a new government expenditure (Q_s) financed by an equivalent increase in a tax (T_s). The new expenditure is defined as a specific good (B_s) with no joint product properties. The new equilibrium state is Meerman's stationary state 3, (but more accurately, equilibrium state 2). Assuming that the rest of the budget is unchanged and there are no effects on techniques, the change in income for household j (ΔH_j) on the income side is as follows:

$$\Delta H_j = \sum_{k=1}^m \Delta W_k A_{2kj} + \sum_{k=1}^m W_{3k} \Delta A_{kj} - \Delta T_{sj} + B_{3sj}^p Q_{3sj} \quad (A6)$$

Looking at the household j 's consumption (C) side, the new equilibrium is:

$$\Delta H_{ij} = \sum_{k=1}^n \Delta P_{1k} Q_{21kj} + \sum_{k=1}^n P_{31k} \Delta Q_{1kj} + B_{3sj}^p Q_{3sj} \quad (A7)$$

This equilibrium state will have adjusted to a number of different changes. An example will illustrate what they are. Suppose the new expenditure programme (Q_s) is twenty-four hour crèche facilities for the children of low-income families. In the short term, there will be a number of effects on the distribution of income.

Looking first at the source of income to the household, there will be two main types of effects:

- . ΔW_i , an increase in the wages to childcare assistants and in the returns to the buildings used for the crèche and the equipment used. There may also be changes to other wage rates.
- . ΔA_{ij} , an increase in employed childcare assistants and changes in the distribution of other employed factors.

Secondly, there will be effects because of the change in the budget measure:

- . ΔT_{sj} , an increase in taxes equal in the aggregate to the total costs of Q_{3sj} .
- . $B_{3sj}^p Q_{3sj}$, consumption of "free" childcare (hitherto, publicly financed crèches were non-existent) by low-income households.

Finally, there will be effects from changes in output and prices on the consumption or uses-of-income side of the equation:

- . ΔP_i , an increase in the price of childcare, plus other changes in relative prices.
- . ΔQ_{ij} , an increase in the quantity of childcare (in addition to Q_{2s}) plus other changes in outputs.

Not all of these effects will apply to all households, so there will be a reordering of households' relative economic positions.

Meerman's incidence model assumes an unchanged average price level (there is no money), but relative prices can change because of the introduction of government or of a new tax. Equations (A6) and (A7) measure the change in income at a constant price level, but even where a

household's income has increased, it cannot be said for certain that total utility has increased (because the expression is Pareto Optimal, not Pareto Superior - see Section A.3 above). Nevertheless, for small government programmes, changes in relative prices and factor endowments are likely to be small, so calculation of the change in money income is a good enough indicator of the change in total utility.

Total incidence: In identities (A6) and (A7), H_j is total incidence of the new tax or expenditure for household j . Having obtained identities (A6) and (A7), the distribution to h households where $(j=1, 2 \dots h)$, the total budget incidence is:

$$\sum_{j=1}^h \Delta H_j$$

The three components of this are:

- 1) Benefit incidence is $B_{3sj}^P Q_{3sj}$, the last term in both identities. This is the increase in income for the j^{th} household from the new government expenditure, valued in terms of its marginal value to the recipient.
- 2) Tax incidence is ΔT_{sj} , the third term in equation (A4). This is the value of tax paid by the j^{th} household, an amount which reduces the household's income.
- 3) RPTO incidence is a residual equal to $\Delta H_j - (B_{3sj}^P Q_{3sj} - \Delta T_{sj})$.

A.7: Tax and Benefit Incidence Compared

The first and second terms on the right-hand side of equation (A6) encompasses RPTO incidence. They are:

$$\sum_{k=1}^m \Delta W_k A_{2kj} + \sum_{k=1}^m W_{3k} \Delta A_{kj}$$

But, the effects of the increased tax (T_{sj}) and the new publicly financed expenditure (Q_{sj}) are combined and cannot be separated. To calculate the RPTO incidence of either the change in tax or in expenditure, then it is necessary for the sole change to be a compensating change in either the expenditure or the tax; the common method is to replace one tax with an equal yielding alternative.

Meerman argues that:

"An implication of this reasoning is that, conceptually at least, we can also decompose total incidence into two symmetrical pieces of two parts each: Tax incidence per se (defined as equal to the total tax) and the resulting RPTO incidence; Benefit incidence per se and the RPTO incidence resulting from the expenditure. A certain conceptual symmetry results. We define tax and benefit incidences as reducing and increasing incomes directly. Their RPTO incidences are more veiled, operating through changes in relative prices in factor and product markets, as well as through changing quantity and composition of output." (Meerman, 1978, p.305.)

It is common practice for overseas quantitative incidence studies and more recently, the New Zealand Task Force on Tax Reform (1982), to study tax incidence ignoring RPTO effects. If these approaches make sense, then according to Meerman's "symmetry of incidence", it makes sense to study benefit incidence. It is possible conceptually to separate tax incidence from the RPTO effects associated with the tax. It is also possible to separate benefit incidence from the RPTO effects associated with government expenditures.

A.8: Summary of the Main Points so Far

- 1) Measurement of differential balanced budget incidence is impossible. Despite the assumption of an unchanged average price level, relative prices have changed and it is not certain that even when the change in a household's income is positive that total utility has increased. Approximate measurement is difficult if RPTO incidence is substantial, requiring a Harberger-type general equilibrium model.

- 2) It is also impossible to measure benefit incidence. However, in general, aggregate benefit incidence and community costs will be closely associated. Consequently, costs of government expenditures, which can be measured, are a proxy for benefits. This procedure brings a useful by-product, identification of the costs incurred by the community in providing benefits and the benefits to different groups. This is a necessary first step in many types of policy analysis.
- 3) It is conceptually possible to study both tax and benefit incidence independently of RPTO incidence.
- 4) Study of RPTO incidence per se is desirable. It would be useful to gauge its importance relative to that of benefit incidence.
- 5) Empirical studies of general tax and/or public spending incidence would be improved if the usual failure to consider RPTO incidence was acknowledged.
- 6) Incidence concepts of both taxes and public expenditures would be improved if the symmetry of the two were recognized: tax incidence, in conventional definition, is analogous to benefit incidence; RPTO incidence with respect to taxes is analogous to incidence with respect to expenditure.

Finally, Meerman calls empirical (quantitative) studies of budget incidence "short-run backwards" because they implicitly assume ceteris paribus conditions for relative prices, technology, labour supply, the level of employment, savings and investment decisions in making incidence estimates. But in a more recent article, Meerman and Shome (1980) show that to some degree relative price changes for factors of production (principally capital and labour) can be taken into account in a study of budget incidence using the Harberger model.

B. HMM TWO-SECTOR GENERAL EQUILIBRIUM MODELS

This section examines a general equilibrium approach to the analysis of tax incidence due to Harberger (1962), who developed a two factor, two good, two industry model to analyse the incidence of the corporation profits tax. Later extensions to Harberger's two-sector model (largely by McLure and Mieszkowski) meant it could be applied to analyse the incidence of several types of taxes and government spending within a general equilibrium framework.⁴

The main conclusion from Harberger's original theoretical work is that the incidence of a tax on capital depends on the responsiveness of demand for the final products to the degree of substitutability between labour and capital. After carrying out an empirical test using data for the United States corporate sector, he concluded that capital bears close to (possibly more than) the full amount of the tax.

The objective of this section is to give an exposition of the so-called Harberger model and extensions to it which provide insight into the concept of budget incidence. The relevance of these general equilibrium models for the quantitative work which is at the core of this thesis is that they provide a basis for selecting a set of consistent incidence assumptions.

B.1: The Harberger Model

The Harberger model assumes the existence of two competitive industries, producing x and y , which employ two factors, capital (K) and labour (L). The quantity of the two products are chosen so that their prices are initially equal to unity. Demand for each product depends on its relative price and on the level of income of consumers. Since there

4. Harberger's model was inspired by earlier work done in international trade (see Heckscher, 1919; Meade 1955; Ohlin 1933; Stolper, Samuelson 1941). Nevertheless, Harberger was the first to apply the model specifically to incidence analysis and this thesis follows McLure in referring to it as the Harberger model.

are no savings⁵, consumption falls as the result of the imposition of a tax and the government uses the tax to gain command over the resulting displaced resources.

Although all economic groups including the government, are assumed to spend their incomes in exactly the same way, at the margin, their average propensities to spend may differ and demand as a whole may change because of changes in relative prices. The model analyses the new equilibrium when small taxes are imposed in a distortion-free world. The equilibrium demand position will depend on how consumers react to the change in their incomes as factor owners and to whatever price change takes place, as well as how the government chooses to spend the proceeds of the tax. Harberger assumes that the way in which the government would spend the tax proceeds, if the initial prices continued to prevail, would just counterbalance the reductions in private expenditures on the two goods. Changes in demand are treated as a function of the changes in relative prices based on the additional assumption that the redistribution of factor incomes will not change the pattern of demand.

All factors are assumed to be fully employed and this assumption links the demand functions for products x and y. Once the level of demand for x is known for given prices and full employment income, the level of demand for y can be derived from the available information.

Other assumptions underlying Harberger's model are fixed aggregate factor supplies, perfect factor mobility, perfect competition in factor and product markets, a closed economic system and constant-return-to-scale production functions. Fixed money assets are excluded. Furthermore, the economy is in equilibrium before the imposition of the tax being analysed and there are no pre-existing taxes or other distortions in the system.

5. Harberger (1962, p.235, 236) carried out empirical work to discover how much the net savings rate depends on the rate of return on capital. He found that the effect of the corporation tax on the rate of savings is probably small.

The above assumptions define a particular tax-incidence problem. Other effects are excluded. The assumption of fixed factor supplies prevents changes in the relationship between work and leisure. Also excluded are the effects of taxation on savings, investment and growth, and the effects of interactions between the supply of labour and the supply of capital. With perfect factor mobility, there are no impediments to the movement of labour and capital among industries.

In the new equilibrium, the after-tax return on capital will be the same in both sectors. The reallocation of resources involves not only a change in the price of capital, but will also result in changes in wages and commodity prices. The model is applicable to analysis of incidence in the long run, if long-run incidence is taken to be the change in factor prices in the new equilibrium after capital has shifted between sectors. The assumption of perfect competition in factor and product markets implies that a change in price will affect supply, since as a price taker, the firm can only better its position by producing more or less of a product. Harberger's assumption of a closed economic system enables him to ignore exogenous changes other than the imposition of a tax distortion and economies of scale are ruled by the assumptions regarding the production functions. Finally, the assumption of no fixed money assets implies a continuously balanced budget consistent with a differential incidence approach. This makes it possible to consider relative price changes only and ignore the effects of absolute price changes.

Following McLure (1975), in a two-good, two-factor world, any tax or subsidy can be classified into one of four logically possible categories:

1. A general tax on all factors (such as a value-added tax) or a general tax on all products (such as a general sales tax);
2. A tax on one factor (such as a capital gains tax or an employment tax);
3. A tax on one product (a tax on cigarettes); or,
4. A tax on one factor when it is employed in producing one product.

A general tax on all factors and a general tax assessed at the same rate on all products are classified together because in both cases consumer demand will be affected in the same way. No matter whether consumers lose buying power through a change in their income as factor owners or on the uses of income through a change in relative product prices, the overall effect will depend on demand elasticity of product and factor substitution.

The Harberger model was designed to deal with a tax in category 4: a surtax on the return to capital in the corporate sector, the sector producing product x. Product y is produced by the non-corporate sector. Assuming perfect factor mobility, the imposition of a tax on capital employed in producing x will lead to a movement of capital from the taxed sector to the non-taxed sector of the economy until a new equilibrium is reached where the after-tax return on capital will be the same in both sectors. In the sense that capital use can be varied within individual sectors, the model is long run, although there is no growth in aggregate capital stock. The reallocation of resources will be reflected in changes in wages and commodity prices.

Changes in variables are indicated by differential notation. Thus, the Harberger model measures infinitesimally small changes in taxes and their comparative-static impacts upon other variables. The analysis is therefore applicable only for small changes in tax and for discrete changes the analysis is only a local approximation.

B.1.a: Equations Specifying the Harberger Model

Demand for x in the Harberger model depends on p_x/p_y . In simple versions of the model, the basic demand equation is:

$$\frac{dx}{x} = E.d \frac{(p_x/p_y)}{p_x/p_y} \quad (B1)$$

Recent studies applying the Harberger model follow Slutsky in setting E as the income compensated elasticity of demand.⁶ Differentiation and use of the convention that all prices are unity⁷ produces the standard Harberger equation:

$$\frac{dx}{x} = E (dp_x - dp_y) \quad (B2)$$

Supply of x depends on the assumption that firms are competitive where L^x , K^x are the initial amounts of labour and capital respectively, and that the production function of x is $x = x(K^x, L^x)$. Changes in the output of the industry resulting from changes in the factor inputs to the industry is the weighted average of the percentage changes in the two inputs where the weights (x_L and x_K) are the partial elasticities of output with respect to the two inputs. The formula for the percentage change in the output of x is:

$$\frac{dx}{x} = x_L \frac{dL^x}{L^x} + x_K \frac{dK^x}{K^x} \quad (B3)$$

where x_L and x_K are the initial relative shares of labour and capital respectively, in the total costs of producing x .

-
6. In his original article (1962), Harberger simply defined E as the price elasticity of demand for x . According to McLure (1975), Harberger said later that he did not intend E to be the fully compensated elasticity of demand. Instead E is a reduced-form elasticity which subsumes such income effects due to excess burden (see section B.1.a.i.).
 7. McLure (1975, p.133) notes two implications of setting all prices at unity. "First, any change in a price (dp) is also a fractional or (multiplying by 100) percentage change in that price. Second, what appear to be taxes levied on a per unit basis (dT) are really also ad valorem taxes since all prices are assumed to be unity".

The possibilities of factor substitution are indicated by the elasticities of substitution. For industry y , the elasticity of substitution between labour and capital is S_y , where w is the factor price. This gives:

$$\frac{d(K^y/L^y)}{K^y/L^y} = S_y \frac{d(w_K/w_L)}{w_K/w_L} \quad (B4)$$

Quantities are chosen setting initial product prices equal to unity. This means w is also the marginal product and (B4) can be simplified to:

$$\frac{dK^y}{K^y} - \frac{dL^y}{L^y} = S_y (dw_K - dw_L) \quad (B5)$$

In the above expression (B5), dw_K is the change in the price of capital relevant for production decisions in the sector producing product y . It measures the change in the price of capital net of the tax. For the sector producing x , the relevant change in the price of capital is the gross change, $dw_K + T$, where T is a per unit tax. Thus, the equation analogous to (B5) for the sector producing good x is given by:

$$\frac{dK^x}{K^x} - \frac{dL^x}{L^x} = S_x (dw_K + T - dw_L) \quad (B6)$$

Expressing all prices in terms of the price of labour, the price of labour becomes the numeraire and is taken to be unity both in the presence and absence of the tax. So:

$$dw_L = 0 \quad (B7)$$

Assuming full employment of all factors,

$$dK^y = -dK^x \quad (B8)$$

$$dL^y = -dL^x \quad (B9)$$

The production function of the sector producing good y , $y(K^y, L^y)$ is also assumed continuous, differentiable, and homogeneous of the first degree. These properties, along with competition in the factor markets, guarantee that factor payments just exhaust revenue, or

$$p_y \cdot y = w_L \cdot L^y + w_K \cdot K^y \quad (B10)$$

Assuming the schedules are locally straight, for small changes:

$$p_y \cdot dy + y \cdot dp_y = w_L \cdot dL^y + L^y \cdot dw_L + w_K \cdot dK^y + K^y \cdot dw_K \quad (B11)$$

Given that $dy = w_L dL^y + w_K dK^y$, then competition implies that the marginal product of labour in producing y is $\frac{w_L}{p_y}$ and that of capital is $\frac{w_K}{p_y}$, so

$$p_y \cdot dy = w_L \cdot dL^y + w_K \cdot dK^y \quad (B12)$$

Subtracting (B12) from (B11) gives:

$$y \cdot dp_y = L^y \cdot dw_L + K^y \cdot dw_K \quad (B13)$$

Dividing both sides by y , and using the assumption that the initial prices of both factors and outputs are unity, then

$$dp_y = y_L \cdot dw_L + y_K \cdot dw_K \quad (B14)$$

where y_L and y_K are the relative factor shares in the sector producing good y . The relationship for the sector producing good x is:

$$dp_x = x_L dw_L + x_K (dw_K + T) \quad (B15)$$

Equations (B7), (B14) and (B15) can be substituted into equation (B1), giving:

$$\frac{dx}{x} = E(x_K(dw_K + T) - y_K dw_K) \quad (B16)$$

Substituting equations (B14), (B7) and (B8) into equation (B4):

$$\frac{K^X(-dK^X)}{K^Y K^X} - \frac{L^X(-dL^X)}{L^Y L^X} = S_y.dw_K \quad (B17)$$

Similarly, substituting equation (B8) into equation (B5):

$$\frac{dK^X}{K^X} - \frac{dL^X}{L^X} = S_x(dw_K + T) \quad (B18)$$

Three simultaneous equations can be derived by equating the right hand sides of equations (B16) and (B3) and rearranging terms in (B17) and (B18):

$$E.x_K.T = E(y_K - x_K)dw_K + x_L \frac{dL^X}{L^X} + x_K \frac{dK^X}{K^X}$$

$$0 = S_y.dw_K - \frac{L^X.dL^X}{L^Y.L^X} + \frac{K^X.dK^X}{K^Y.K^X} \quad (B19)$$

$$S_x.T = -S_x.dw_K - \frac{dL^X}{L^X} + \frac{dK^X}{K^X}$$

Harberger's model can be applied to measure two important effects caused by a subsidy or tax distortion: loss of efficiency (deadweight loss or excess burden) and the effects on the distribution of income or incidence. Incidence analysis centres on changes in net (rather than gross) factor earnings. Because of these changes, there may be differences in the distribution of private income as a result of the budget policies introduced. It is the purpose of incidence analysis to determine how the choice of a budget policy affects the distribution of income available for private use. The value of the change in income distribution is the change in relative prices because of the tax.

B.1.a.i: Analysis of Efficiency Loss

The analysis of efficiency losses focuses on tax-induced differences in gross factor earnings between sectors. Efficiency loss is the difference between national income produced by fully-employed resources in the presence of a tax and what is produced in its absence. Looking, for example, at the case of a tax on capital, in the post-tax equilibrium, the value of the marginal product of capital in (taxed) industry x exceeds that in industry y by the amount of the tax. An efficient allocation of capital would require these two values to be equal. The presence of the tax also produces inefficiencies of consumption because the marginal rates of substitution of x for y in consumption (given by their prices gross of tax) is different from the marginal rate of substitution of x and y in production (given by their prices net of tax). The value of efficiency loss is dK^X .

Specifying first the concept of excess burden, the tax revenue received by the government is $T.K^X$. Competition ensures that:

$$\frac{x_K}{x_L} = \frac{w_K}{w_L} (1 + T) > \frac{y_K}{y_L} = \frac{y_K}{y_L}$$

So the marginal rate of substitution is not equal in the two industries and the production does not occur along the efficiency locus in factor space. The new transformation curve lies inside the efficient transformation curve except where this touches the x axis and the y axis. This will be reflected in a social loss from the tax in the producer surplus sense. It would be measured:

$$\frac{(w_K - \bar{w}_K)(K^X^0 - K^X^1)}{2} + \frac{(\bar{w} - w_{KN})(K^Y^0 - K^Y^1)}{2} = \frac{T.dK^X}{2}$$

where w_{KN} is the return (wage) to capital net of tax and where $\bar{w}$ is the pre-tax wage.

Turning now to the concept of incidence, it is necessary to measure the change in capital employed in producing (taxed good) x . The quantity of capital transferred from high productivity applications in taxed sector x to lower productivity applications in non-taxed sector y is dK^x .

To solve for dK^x , Cramer's rule is applied to the above simultaneous equations in (B19) above to give:

$$dK^x = \frac{K^x \cdot T - E \left[y_K \cdot S_x \cdot \frac{L^x}{L^y} + x_K \cdot S_y \right] - S_x \cdot S_y \cdot x_L}{E (y_K - x_K) \left(\frac{K^x}{K^y} - \frac{L^x}{L^y} \right) - S_y - S_x \left(\frac{x_L K^x}{K^y} + \frac{x_K L^x}{L^y} \right)} \quad (B20)$$

In the absence of any taxes, capital will be allocated competitively so that the rate of return is equal for the two-sectors and capital is fully employed. Upon the imposition of a tax in one sector, the gross rate of return in that sector must be such that the net rate of return is equalized across the sectors and capital is again fully employed. The difference between the gross rate of return and the net rate of return to capital is, by definition, the tax per unit of capital utilized in the taxed sector.

B.1.a.ii: The Determination of Incidence

The Harberger model determines incidence by measuring the change in price of the taxed factor, capital. Capital's price change will be determined by the factor-substitution and output effects of the tax distortion. When the taxed industry is characterised by fixed production coefficients, there will be no factor-substitution effect. There will be no output effect when the two industries have the same factor intensities.

The next step is to examine the general solution to the above equation, finding values for the demand and supply elasticities. As explained more fully in Appendix A, these calculations provide the sign for dw_K , where:

$$dw_K = \frac{E \cdot x_K \left(\frac{K^X}{K^Y} - \frac{L^X}{L^Y} \right) + S_x \left(\frac{x_L K^X}{K^Y} + \frac{x_K L^X}{L^Y} \right)}{E (y_K - x_K) \left(\frac{K^X}{K^Y} - \frac{L^X}{L^Y} \right) - S_y - S_x \left(\frac{x_L K^X}{K^Y} + \frac{x_K L^X}{L^Y} \right)} \cdot T \quad (B21)$$

If dw_K is found to be zero, then there is no change in the equilibrium price of capital or labour. Since the relative prices of capital and labour are set equal to 1 and the marginal products of factors are directly related to factors' income shares, when dw_K is equal to zero, labour and capital bear the burden of the tax in proportion to their initial contribution in national income. The shares of labour and capital in gross income measured in wage units have decreased by proportional amounts.

Capital suffers the full burden of tax when:

$$dw_K = \frac{-T \cdot K^X}{K} \quad (B22)$$

By assumption, the price of labour does not change. Therefore, the change in national income gross of tax, measured in wage units, is $K^X T + dw_K (K^X + K^Y)$. Substituting the right-hand side of the equation (B21) for dw_K gives the result that the change in national income gross of tax is zero. Capital uses the exact amount of the tax, $T \cdot K^X$, gained by the government in tax revenue.

Appendix A discusses the derivation of conditions, which if satisfied, provide the sign dw_K . If dw_K is positive, then capital's relative share of income and labour's share will be proportionately greater. If dw_K is negative, capital bears a proportionately larger share than labour, relative to their original shares in national income. Also discussed in Appendix A are the general conclusions from the model.

B.1.b: Application of Harberger Model to the United States case.

Harberger (1962, pp. 230-236) applied his theoretical model to an analysis of the United States corporation tax. The importance of this application to the approach in this thesis is that it provides the basis for the assumption that capital pays 100 percent of the corporation income tax.

Harberger's method was to divide the United States economy into two broad sectors, one corporate and one non-corporate. Excluded from consideration were the government and rest-of-world sectors, financial intermediaries and many services. The unincorporated sector mainly comprised agriculture, real estate and miscellaneous repair services. Included in the corporate sector were the industries not specifically excluded above. Industries classified as corporate paid roughly \$20 billion in corporate income taxes. The non-corporate sector paid only \$500 million in corporate tax which in Harberger's view was "practically no corporation income taxes" (Harberger 1962, p. 231) and qualified it to be the non-taxed sector.

Harberger argues that because the corporation tax is of large magnitude, the pre-tax and post-tax values of (L^X/L^Y) , (K^X/K^Y) , x_K , x_L and y_K could differ significantly. He accordingly derives two alternative sets of values, displayed by Figure 2.1. Set 1 is based on observed values and set 2 represents the values that would have emerged in the absence of the tax if each sector is characterised by a Cobb-Douglas production function. These values are substituted into equation (B21).

Next, available evidence is used to estimate the magnitude of E , S_x and S_y . Arguing that the elasticity of demand for agricultural products lies below unity and the price of elasticity of demand for residential houses lies somewhere in the neighbourhood of unity, Harberger chose unity as a reasonable upper bound for E_{xy} (the elasticity of substitution between x and y). A value of unity for E_{xy} implies a

FIGURE 2.1

EMPIRICAL APPLICATION OF HARBERGER CORPORATE-TAX-INCIDENCE MODEL
DATA RELATE TO 1953 to 1955 FOR THE UNITED STATES ECONOMY

The corporate sector contributed approximately \$240 billion per year to national income, earning roughly \$40 billion in return to capital and with a wage bill averaging around \$200 billion. It paid roughly \$20 billion in corporation income taxes.

The non-corporate sector contributed some \$40 billion per year to the national income. Capital's income was \$20 billion and labour's was \$20 billion. Less than \$500 million was paid in income taxes.

Set I below is derived from the observed values of corporate and non-corporate activity. Set II represents the values that would have emerged in 1953-55 in the absence of the tax if each sector were characterised by a Cobb-Douglas production function.

	(K^X/K^Y)	(L^X/L^Y)	x_K	x_L	y_K
Set I	1	10	1/11	10/11	0.5
Set II	2	10	1/6	5/6	0.5

Substituting these figures into equation (B21) obtains expressions specified directly in terms of the elasticities of substitution and demand:

$$\text{Based on Set 1:} \quad dw_K = \frac{T[-9E + 20Sx]}{-40.5E - 11Sy - 20Sx}$$

$$\text{Based on Set 2:} \quad dw_K = \frac{T[-8E + 20Sx]}{-16E - 6Sy - 20Sx}$$

value of $-6/7$ for the elasticity of demand for products in the non-corporate sector and a value of $-1/7$ for the elasticity of demand for the products in the corporate sector.

Recall that:

$$E_x = \frac{E_{xy} \cdot y}{x + y} \text{ and that } E_y = \frac{E_{xy} \cdot x}{x + y} \quad . \quad \text{Harberger's data records}$$

that $y/(x + y) = \$40B/\$280B$ and $x/(x + y) = \$240B/\$280B$. (Note: B=billion).

Citing evidence from Solow (1961) and Minasian (1961), Harberger assumed an elasticity of substitution between labour and capital (S_x) in the corporate sector of unity. While recognising the common finding of an elasticity of substitution near unity in farm data, Harberger's own feeling was that S_y is probably substantially below S_x since close to half the contribution of the non-corporate sector comes from real estate. Very little labour was used in the real estate industry in Harberger's judgement and he finds it "difficult to see how the elasticity of substitution between labour and capital in the provision of housing services could be very great". (Harberger, 1962, p.233).

Nevertheless, as a first approximation Harberger derives the case where S_x , S_y and E_{xy} are all equal to unity (the Cobb-Douglas case). He further applies values of S_y below unity and finds his results are not especially sensitive to these reductions. His results are even less sensitive to changes in demand elasticity, E_{xy} . While different assumptions give different results¹⁰ for capital's share of the tax burden, the main results range between 90 to 120 percent. In Harberger's view (1962, p. 234):

"It is hard to avoid the conclusion that plausible alternative sets of assumptions about the relevant elasticities all yield results in which capital bears very close to 100 percent of the tax burden. The most plausible assumptions imply that capital bears more than the full burden of the tax".

10. For example, when the assumption of a fixed capital stock is relaxed and the corporation income tax is assumed to influence the rate of savings (and the total stock of capital), Harberger still finds that capital bears close to the full burden of the tax. Harberger also attempts to extend his analysis to cover other tax provisions relating to capital (such as taxes on capital gains) and relaxes his assumption about competition in the corporate sector to accommodate the presence of monopoly elements. When he applies empirical evidence, to survey the impact of other tax provisions relating to capital Harberger concludes that no more than a quarter of the corporation income tax is shifted away from capital as a result of these provisions.

B.2: The HMM Model

McLure (1964, 1967, 1970, 1971, 1972a, 1974a, 1974b) and Mieszkowski (1963, 1966, 1967, 1969) are two of those who have extended and developed the Harberger model. Recent versions of the model are referred to as HMM models as acknowledgement of their contributions. The extended HMM versions are modeled to treat a greater number of incidence concepts, including a range of taxes, government expenditure, and some less restrictive assumptions.

B.2.a: Mieszkowski Analyses Taxes Other Than the Corporation Income Tax

Mieszkowski (1963) applies Harberger's empirical data for the United States to estimate the magnitude of taxes other than a tax on capital in the corporate sector. Briefly, six main points emerge from Mieszkowski's empirical results:

- 1) Labour is found to bear the entire burden of a partial tax on labour in either sector if $E = -1/7$, $S_x = -1$ and $S_y = -1$. If products (rather than factors) are taxed, capital will bear a proportionately larger share of the tax burden if the tax is imposed on a capital intensive product in the non-corporate sector. Labour will bear a proportionately larger share of the burden of a product-tax imposed on the labour-intensive product, x , in the corporate sector.
- 2) The incidence of a tax imposed on labour in the corporate sector does not vary appreciably with S_x , but the results are sensitive to the size of S_y . The larger the value of S_y , the smaller is labour's tax burden. Labour's share of the tax burden increases directly with the size of E , the price elasticity of demand for product x .
- 3) The incidence of a tax on labour employed in the non-corporate sector is highly sensitive to the size of S_y , the elasticity of substitution between labour and capital for industry y . The price elasticity of demand also has a significant bearing on the incidence of this tax.
- 4) The burden of a tax on capital employed in the corporate sector increases with the size of S_x (the elasticity of substitution between labour and capital for industry x), and decreases with the size of S_y . The converse is true for capital employed in the non-corporate sector. Further, the larger the value of E , the smaller will be the tax burden of a tax imposed on capital in the corporate sector.

- 5) The smaller the elasticities of substitution in the industries producing goods x and y (other things being equal), the larger is labour's share of a tax on product x , produced by the corporate sector.
- 6) The larger the elasticities of substitution in the two industries, the smaller will be capital's tax payment for a tax on the product produced in the non-corporate sector, product y .

B.2.b: HMM Treatment of Demand and Government Spending

The above discussion relates to partial taxes imposed on one of the two sectors. Another tax to consider is a general tax on all production in the economy.

A general tax on production in the HMM model does not distort output, factor utilisation, relative product prices or relative factor prices. Thus, it is borne in proportion to initial shares in national income or consumption. What the tax does do is raise product prices relative to factor prices. But whether it is borne by consumers or by the recipients of factor incomes is a meaningless question in the context of the model because these two groups are not distinguished.

As Mieszkowski argues (1963), in order to retain Harberger's simple specification of the demand side of the economy, it is necessary to stipulate that government spending will be adjusted in such a way that unless the tax sets up a disequilibrium in factor markets, relative prices and the output composition of the economy will remain unchanged. In other words, the government will adjust its spending in such a way that the income effect of a tax imposition can be ignored in determining the change in the composition of output.

Further, the assumption that the redistribution of income among groups does not affect demand implies that the consumption patterns of the two groups are identical. So, while the Harberger model may be designed to take account of both demand and supply schedules (the uses and sources of income), in actual practice the analysis of the uses side is not significant.

Mieszkowski suggests (1963) that government demand could be distinguished from private demand by specifying government spending on product x as x_G and spending on product y as y_G and then calculating dw_K for each of the six possible partial taxes. He does not carry out this procedure, however, because he argues that apart from the complexity of the resulting equations, there is still the question of how to choose x_G and y_G . For a start, to derive x_G and y_G , the simple specification of demand in Harberger's model would have to be replaced with a function which takes the income effect of a tax into account.

Meade (1955) used a precursor of the HMM two-sector model to analyse variations in spending patterns among different groups. In analysing demand, Meade divides the economy into workers and capitalists. He derives sufficient conditions whereby a small increase in an excise tax in one sector, accompanied by a small decrease in an excise tax in the other sector, will increase social welfare when government expenditures are held fixed in real terms. Meade's analysis is of particular interest because unlike Harberger, he specifies that taxes exist in the system before any tax change is imposed and he uses a social welfare function to introduce normative distributional weights for the two groups (workers and capitalists). In this way he is better able to combine the effects of the uses of income with effects of the sources of income when analysing tax incidence.¹¹

With two demand functions in the model, the demand condition that depends on the spending propensities of different groups being the same, is relaxed. If relative factor prices are fixed, that is $dw_K = 0$, a tax of any type on good x will decrease the real income of capitalists more than would an equal-yield tax on y , if capitalists spend a larger proportion of their income on x than do workers. The converse also holds. When relative factor prices change, the results on differential incidence are unambiguous only if the factor-intensity (output effect),

11. Wells (1955), Johnson (1956) and Williams (1963) further develop this approach.

the demand effect, and the factor substitution effect operate in the same direction. Taking an example, the substitution of a tax on labour used in producing good x for a tax on capital in producing y will be certain to increase the real income of capital if x is labour intensive relative to y and if capitalists spend a higher proportion of their income on y than workers do.

Mieszkowski (1967) follows Meade's approach and relaxes Harberger's assumption that the government spends its income in exactly the same way as consumers. He shows that the Harberger model is flexible enough to accommodate two demand functions, specifying his version of Harberger's model in terms of differential incidence, ignoring excess burden effects. The introduction of the different spending patterns for the two groups makes the solution of the incidence for various taxes even less definite.

Since Mieszkowski continues to assume that workers and capitalists receive only one kind of income, the basic change from Harberger's model is in the specification of demand. As well as being a function of relative prices, demand is also a function of changes in incomes plus the change in the government's demand for products x and y .

Mieszkowski finds that while the expressions for the change in the price of capital relative to the price of labour are more complicated because of the way the demand side of the model is specified, the principal qualitative results are similar to those for the simpler version of the HMM model. In the case of the three partial taxes imposed in one of the two sectors, the output and demand effects are identical for both versions. The only major differences in the results is measured by the factor-substitution effect. Here, the untaxed factor will be substituted for the taxed factor and this factor substitution acts to depress the relative price of the taxed factor. This effect increases capital's tax burden when capital is taxed, increases the price of capital (and labour's tax burden) when labour is taxed, and is equal to zero for a commodity tax.

B.2.b: McLure Extends HMM Results to Cover Trade and Government Expenditure

Another extension of the general equilibrium approach is to introduce trade between countries. Since the standard model of international trade, a two-country, two-commodity model, provides the basis for Harberger's original work, this extension is consistent. Instead of a corporate and non-corporate sector, the Harberger model may be interpreted as a two-country trade model where both countries are completely specialised in the production of a one commodity and factors may be either assumed to be mobile or immobile between countries.

The assumption of perfect factor mobility limits this application of the Harberger analysis. Theoretically, tax incidence can only be analysed in the long-run and the model cannot be applied to trade conditions where one or both factors are immobile. McLure (1971) shows that this assumption can be relaxed so that the model can be used to analyse tax incidence under conditions of factor immobility as well as factor mobility.

McLure's method is to vary the numeraire of the model. Several numeraires are possible, but McLure elects to set $dp_y = 0$ (where product y is the untaxed product)¹². Then the model can be solved for changes in both relative factor and product prices under various assumptions about the factors. Because of the equivalences of taxes in the context of the model, complete information about the output effects, the factor substitution effect and the total effect on any tax has on prices can be determined from the analysis of the total effect of four taxes for each mobility assumption.

12. McLure (1971) reasons that this approach is consistent with the assumption that monetary conditions would be such as to stabilise the price of the untaxed product. Alternatively, a simple description of macroeconomic policy may be added to the model, making it possible to solve for changes in absolute prices. For example, changes in factor or product prices may be related to the velocity of money and changes in the money supply.

McLure's research is particularly valuable because of the steps he takes to clarify several questions about the methodology of incidence analysis. For example, to develop the HMM model so that the incidence of government expenditures can be analysed, McLure places the model in the context of a balanced budget. Unfortunately, his analysis is limited because the package of expenditures financed by taxation are defined as having a neutral effect in the sense that, at the margin, the government spends tax proceeds in exactly the same way as the private sector. Further, government services are neither substitutes for, nor complements to, either product of the private sector. So, neutral government purchases cause no movement in relative prices.

The implications of McLure results are briefly set out below:

- Case 1) A factor tax levied upon one use of an immobile factor is borne entirely by that factor in the taxed use;
- Case 2) A tax levied on one product under conditions of complete factor immobility is borne by the factors specific to that industry, not by the consumer of the product, independently of the value of all the parameters of the model;
- Case 3) A general tax on one factor used in both industries is borne entirely by the taxed factor, regardless of the mobility of either factor. In each case the price of capital in both industries falls by the amount of a general tax on capital, while the prices of labour and good x are unchanged. The results for a general tax on labour are analogous. Thus, a truly general property tax is borne by recipients of capital income (and rents) and a general labour tax (such as the social security tax) by labour;
- Case 4) The effects on factor prices of a tax on production in one industry are unambiguous in sign;
 - a) In case 2, the price of labour (the mobile factor), falls and the price of capital rises in the untaxed industry and falls in the taxed industry. Labour, being mobile, is able to shift from the taxed to the untaxed industry in an effort to escape the tax. In so doing it raises the productivity of capital in the untaxed industry and lowers it in the taxed industry.
 - b) Analogous results occur in case 3.

- c) In case 4, (the numerators of the) factor price effects of a production tax depend upon the elasticity of demand and relative factor intensities in the two industries.

Case 5) If the taxed factor is mobile but the untaxed factor is not, all but one of the price effects of a tax levied on the use of one factor in one industry are identical to those of a tax levied at the same rate on the production of the industry.

The Harberger model then lends itself to a consideration of the effects of government expenditure of tax revenues (McLure, 1972a). McLure divides government activities which influence the distribution of real incomes among individuals into three groups: (a) benefits from government activities; (b) taxes used to finance these activities and, (c) government expenditures themselves. He then examines the distributional implications of a balanced-budget increase in various types of neutrally financed expenditures and the differential effects of changes in the composition of a given amount of public expenditure, both under various assumptions of factor mobility. McLure shows that tax and expenditure analysis can be combined to determine the incidence of non-neutral financing of non-neutral government expenditures. He illustrates his methodology by examining five government programmes:

- 1) public purchase of finished products financed by a general tax on income or production;
- 2) a balanced-budget shift in the composition of government procurement of finished goods;
- 3) a programme of public utilisation of factors financed as in (1) above;
- 4) a balanced-budget alteration of the pattern of public factor utilisation; and
- 5) a balanced-budget shift from purchase of finished goods to factor utilisation.

Taxes and expenditures are assumed to be neutral so as to have no impact upon relative product prices or relative factor rewards. In other words, taxes reduce all incomes proportionately and expenditures increase all incomes proportionately.

McLure (1972a) found that unless the expenditures are subsidies (negative taxes, instead of exhaustive expenditures), they generally entailed less factor substitution than taxes.

B.2.c: Feldstein's Comparison of Long-run Steady-State Paths

Feldstein (1974a, 1974b) further extends the Harberger model to compare the general equilibrium analyses of tax incidence under a comparative static approach and under the conditions of a long-run steady-state growing economy. He finds that the results implied by the steady-state growth approach are very different from the implications of the comparative static approach.

For example, in his analysis of the incidence of a capital income tax, Feldstein notes that the magnitude of the tax shifting depends on the effect of the tax on the fraction of income that is saved and thus on the capital intensity of production. He finds that the capital intensity of production is quite sensitive to changes in this overall savings rate; the elasticity of the capital intensity with respect to the overall savings rate is significantly greater than one.

The excess of capital stock may be defined as the capital stock in the presence of any tax compared with the capital without tax. Since Harberger assumes that the percentage excess of capital stock can never be greater than the percentage excess of the savings rate that would have existed in the absence of the tax over the savings rate in the presence of tax, he underestimates the effect of a change in savings on the capital intensity of the economy. Instead of Harberger's original conclusion that capital bears close to the full burden of a tax on capital in the corporate sector, Feldstein's results suggest that capital may avoid a substantial portion of the burden of the tax if the tax does have a significant effect on the overall savings rate.

In the case of a general tax on labour, Feldstein finds (1974b) that a dynamic version of Harberger's model implies that in the long run, labour will bear at least 100 percent of the net burden of a tax on labour income, even if there is a substantial positive elasticity of

labour supply. Capital's return is likely to rise in response to the introduction of a tax on labour incomes, so that the owners of capital benefit from the imposition of the tax, rather than sharing its burden with the workers.

Harberger's model shows the effect on tax incidence of differences in the supply responses of capital and labour, but does not reflect the relation between labour supply and capital formation that prevails in a dynamic economy. Feldstein's explicit growth model emphasises the difference between the supply of labour and capital. Labour is treated as a primary factor while the stock of capital depends on savings out of the previous incomes of labour and capital. The past supply of labour affects the current stock of capital directly through saving out of labour income and indirectly through the effect of labour supply on capital income (and therefore on the savings of capital owners).

B.3: Strengths of the HMM Models

The HMM general equilibrium model is equipped to overcome some of the limitations of the partial equilibrium approach. One strength of Harberger's original model was that the model was based on empirically defined quantities, making possible quantitative study. Mieszkowski, McLure and others have since shown that the model can be extended. Feldstein has mobilised the model from a comparative static model to a dynamic growth model.

B.3.a: Sources and Uses of Income

The Harberger model sheds light on the debate over the incidence of general and selective sales and excise taxes because it is constructed to distinguish the influence of a tax on relative factor and product prices from the macroeconomic effects of that tax on the levels of absolute prices. Focusing upon the relative price changes induced by a tax reveals the changes in the distribution of private income, combining the determinants of the source of income (supply) and use of private income (demand).

For example, there is no problem determining how an excise tax affects individuals in their roles both as recipients of factor incomes and as consumers of products produced by factors because the model takes into account the interdependence of markets. The model considers the productive sector through the explicit specification of the returns to the various factors as variables and constant returns to scale, initial factor endowments and factor shares, elasticities of factor substitution and the mobility of factors. It is possible to use the model to analyse how the values of these various parameters influence the incidence of a particular excise tax. McLure and Mieszkowski specify the demand function so that relative prices can be considered.

Thus, taking an excise tax, for instance, it is possible to assess both how the tax affects individuals in their roles as recipients of factor incomes (by changing the relative net returns to factors) and how it affects them in their roles as consumers (through variations in relative product prices).

B.3.b: Partial Factor Tax Incidence

Inclusion of the equations describing the conditions underlying the supply of products makes it possible to examine the incidence of the tax on one use of a factor. Harberger originally used the model to assess the effects of the corporate income tax. While the tax was assessed on one factor (capital), it was paid by capital in both the corporate and non-corporate sectors. If capital is assumed to be completely mobile, the effects can be distinguished in terms of an output effect and a factor substitution effect.

The **output effect** is the effect of an equal yield tax assessed on the taxed industry's output and occurs when only one industry is taxed. The **factor substitution effect** occurs when only one factor is taxed in an industry and can be isolated as the differential incidence of equal yield taxes on (1) the output of the industry and (2) one factor employed in that industry. As McLure (1975, p.140) notes, however, if the excess burdens created by the two taxes are not similar, "this comparison may be difficult or misleading".

B.3.c: Incidence of General Taxes

Assuming fixed total factor supplies, the HMM model can be applied to the analysis of the incidence of general taxes. As shown by the equations presented in earlier section of this Chapter, a general tax on income or consumption is borne in proportion to initial shares in income or consumption, and is unaffected by the elasticities of demand and supply of the various goods. A general tax on all uses of one factor (for example, a property tax), is paid by the factor, rather than being shifted in part to consumers or owners of other factors. This result holds independently of demand conditions for the factor, the factor-intensity of production in the various sectors, and the mobility of both factors.

The assumption of complete inelasticity of factor supplies can be relaxed, although the results for both the general income or consumption tax or a general tax on all uses of one factor will not be so clear as when the factor supplies are assumed to be fixed.

B.3.d: Expenditure Incidence

Initially, Harberger assumed "for the sake of simplicity that the way in which the Government would spend the tax proceeds, if the initial prices continued to prevail, would just counter-balance the reductions in private expenditures on the two goods" (Harberger 1962, p.219).

Mieszkowski and McLure later extended Harberger's model to consider questions of expenditure incidence (Mieszkowski, 1967; McLure 1972).

By relaxing the assumption of identical public and private expenditure patterns, Mieszkowski was able to isolate the effects of public expenditures. If the average propensities of individuals to purchase the two goods are not identical, some redistributive effects are caused on the side of the uses of income by a change in relative product prices. Also, if all marginal propensities to spend on the two goods are not identical, effects on product demand and relative prices result from the transfer of purchasing power (measured in terms of real

income) from the private to the public sector and within the private sector.

McLure's assumptions are slightly more restrictive. He assumes that consumers have equal marginal propensities to spend on the two goods, but not necessarily equal average propensities. Under this treatment, the second round effects on demand and relative prices resulting from unequal marginal expenditure patterns can be ignored, while changes in income on the uses side can be considered.

As McLure has also shown, the Harberger model can be applied to examine both the distributional implications of balanced-budget increase in various types of neutrally financed expenditures and the differential effects of changes in the composition of a given amount of public expenditures, both under several assumptions about factor mobility.

B.3.e: Stabilisation Effects

An inadequacy of the partial-equilibrium analysis is the inability to distinguish the effects of excise taxes on the prices of taxed goods from the effects when excise taxes are used as macroeconomic tools of fiscal policy. When the numeraire of the HMM model is specified to reflect macroeconomic conditions in the economy, tax incidence can be isolated. Tax incidence is the income effects arising from the change in relative prices (except to the extent that assets and liabilities exist which are fixed in money terms) and depends on the structure of taxation and the structure's effect on relative prices. Changes in the price level, on the other hand, depend on the level of taxes and other macroeconomic variables.

B.4: Weaknesses of HMM Models

The general equilibrium models underlying the HMM approach enable a much fuller treatment of tax incidence problems than the partial equilibrium approach, including the integration of both macroeconomic and microeconomic relationships, but a large number of weaknesses remain.

Most of the weaknesses centre on the inability of the model to deal adequately with change, lack of account given to current theoretical developments and poor specification of real world relationships. Private investment is set so that demand effects are ignored, the balanced-budget multiplier is zero, there is no business cycle and it is unclear whether these models can be sufficiently disaggregated to measure individual household income changes resulting from government taxing and spending.

The problems of specifying real world relationships could be partially remedied by taking fuller account of recent theoretical models. For example, the assumption of perfect competition underlies the HMM model, a condition of short-period equilibrium in neo-classical, microeconomic models. Growth of the literature on dynamic equilibrium shows potential for dealing with budget incidence in a growing economy. Harberger's attempts to modify the model to analyse monopoly power only roughly indicate how the HMM model could be specified to deal with imperfect competition.

There are a number of contradictions between Harberger's modelling of microeconomic and macroeconomic conditions. Savings are assumed to be fixed, yet firms' decisions about changes in output and prices as a result of a tax are likely to be influenced by the extent to which they are able to change their savings. Harberger's defence of this assumption is that if the tax were not imposed, the revenue would be raised by alternative tax measures. So, if it is assumed that the marginal propensity to save is the same among different economic groups, it is not far-fetched to assume that the differential impact of the corporation income tax on savings is nil. Another justification for ignoring saving is the presumed low elasticity of supply of saving with respect to the rate of return on capital. Neither of these justifications, however, are consistent with government using budget policies to stimulate investment and employment.

When taxes besides the corporation income tax are analysed, the assumption that the marginal propensity to save is the same among different economic groups seems unrealistic, given the clear differences in savings behaviour between firms and households in the economy. While empirical results seem to show a low elasticity of supply of saving with respect to the rate of return on capital, the elasticity, with respect to labour might well be high enough to affect relative factor prices and hence the incidence of a tax on labour or capital or both.

The automatic adjustment of the HMM model to achieve full employment is consistent with Wicksell's natural rate model where the rate of interest at which the volume of loanable funds demanded for investments is equal to the volume available from saving so that quantities of real capital demanded and supplied are equal. It is inconsistent, however, with macroeconomic studies which depend on the trade-off between fiscal and monetary policies and full employment. Clearly, when governments pursue demand-stimulus policies and finance expenditure through Reserve Bank borrowing, the incidence effects will be different from a policy of balancing the books. Under usual conditions, full employment is more likely to exist when the budget is unbalanced.

Another weakness with the model is its static equilibrium comparisons and its assumptions that the beginning equilibrium is a zero tax world. Not only is this an unrealistic assumption, but such an approach limits the ability of the model to handle important tax (and government expenditure) influences on savings, investment and economic growth. Meerman (1978) discusses the issues involved in measuring incidence. It is because of problems like these that he argues for setting RPTO incidence at zero and concentrating on measuring the tax and expenditure incidence effects of government budgets.

To measure expenditure incidence, the Harberger model needs further refinements. Recall to Harberger's assumption that the government spends tax revenue in such a way that (if the initial price relationships prevailed) public expenditures would just counterbalance the reductions in the private expenditures on the two goods. This simplification of the demand side of the economy is meant to ensure that government expenditure

does not affect the output composition of the economy. In other words, government spending will always be adjusted in such a way that the income effect of a tax imposition can be ignored in determining the change in the composition of output. While the demand function can be broken down into an income and substitution effect, Mieszkowski argues (1969) that the demand function relates solely to the pure substitution effect of a relative price change.

Mieszkowski shows how the model may be relaxed to deal with changes in demand and different preferences, but even his approach is still limited to a very simple demand function and kills important aggregate demand effects from budget transactions. In the real world, changes in government behaviour are likely to bring more radical response in the marketplace with consumers buying different products from the government than they would from the private sector. One justification commonly given for the existence of government is that it provides services that the private sector does not provide.

Further, although Mieszkowski and Meade derive approaches to divide the behaviour of wage earners from capitalists, they assume that the spending behaviour of each would be similar. A more realistic description of consumer behaviour would be to distinguish two separate spending functions. This is a requirement for any indicator evaluating budget incidence by household income distribution since most government redistributive measures are intended to benefit some households (thus changing their pattern of demand) and not others.

Finally, the most important weakness as far as this thesis is concerned is that the HMM approach cannot measure changes in the distribution of income among different households or factor owners resulting from changes in relative product prices induced by tax changes. The intention of this thesis is to evaluate the redistributive impact of the government's budget; HMM models are designed to take the distribution as given, dealing with incidence in aggregate without showing how the distribution may have changed.

B.5: Conclusion

The approach developed by HMM models facilitates much needed empirical work in the area of tax analysis and makes it easier to shake off partial equilibrium methods. A classic example of the way in which partial equilibrium analysis misleads, is the conventional analysis of the property tax which treats the tax as a number of partial excises that are shifted to consumers. By emphasising the impact of the tax on housing, this approach loses sight of the fact that the tax is imposed on industrial property as well as family housing and is actually a tax on profit income. Even if the property tax were imposed only on residential real estate, the fact that the price of housing services would increase as a result of the tax is probably less important for incidence than the decrease in return on capital that would result from a shift of capital of the extremely capital-intensive housing sector.

Because the HMM approach is based on an integrated theory of macro and micro-economics, it thus provides a consistent basis for generating assumptions about the incidence of both sides of the government budget (revenues and expenditures).¹³ It could provide a basis for assessing the redistributive effects of budget by household income, but first the approach needs to be augmented. To begin with, it would be necessary to add a household sector. However, this would be only a start. To focus on household income distribution, it would be necessary to further divide the household sector by income groups. In addition, the government sector must be specified so that the government's demand for products is distinguished from that of the household sector. The following section discusses descendants of the HMM models which apply a multi-sector approach to assess the problems of fiscal incidence.

13. Burbidge (1976) argues that a more consistent approach for setting up macro models with micro foundations could be based on the non-competitive version of Kaleki's model (1967). Burbidge admits, however, that he can only indicate interesting possibilities for future research at this time.

C. SWF MULTI-SECTOR GENERAL EQUILIBRIUM MODELS

This section examines the multi-sector approach to general equilibrium analysis of public finance policy as pioneered by Shoven and Whalley (1972, 1973, 1977). Fullerton (et al 1978, 1979) further developed this approach to describe a general equilibrium model of the (U.S.) economy with nineteen producer groups, sixteen consumer goods and twelve consumer groups. Others have further developed these models¹⁴, but in this thesis they are referred to simply as SWF models.

The multi-sector approach enables the inclusion of large numbers of producers and consumers, simultaneous purchase and supply decisions, many taxes or other distortions in the system, large tax changes, and variable factor supply. Mostly the SWF models have been concerned with allocation issues of tax policy, rather than income distribution issues. However, Piggott (1980a, 1980b, 1983) and other recent applied models give explicit consideration to the distributional and efficiency effects of taxes within the same framework.

Shoven and Whalley (1972, p.282) identify three shortcomings in the HMM studies:

- 1) the level of aggregation (two sectors, two factors) is too severe to capture the major impact of the market imperfection;
- 2) the assumption of fixed factor endowments is not realistic;
- 3) analysing one distortion at a time can be misleading since the effect of two simultaneous distortions need not even approximate the sum of their individual effects.

Of course, the year before Shoven and Whalley published, McLure (1971a) had already showed that the HMM approach could be modified to overcome objection 2 (See Section B.2.b). Shoven and Whalley (1972) found that with some modification, the algorithmic approach due to Scarf (1969) is applicable to each of the problems described above. Within the constraints of computer

14. For example, Piggott (1980 University of London Ph.D) introduces an even greater number of groups, including diverse consumer groups.

time and cost, the number of factors and sectors could be increased. Hence, several distinct consumers or consuming classes can be specified with differing tastes and initial endowments. In their early works, Shoven and Whalley define the government as another consumer. They also introduced an additional commodity, "capital tax tickets". The government consumer can purchase goods and services with the proceeds derived from the sale of these tickets. Shoven and Whalley contrived this strange arrangement to overcome the problem of how to handle the proceeds of a tax introduced into the general equilibrium framework.

Solving by computer rather than by hand (as in the case of Harberger) removes the need to work in small dimensions. Large changes in the corporate tax rate can be examined with the Scarf computational technique. It is also possible to consider the effects of several distortions simultaneously. This is important because taxes compound in effect with other taxes, even if only one tax is changed. In addition, the approach readily lends itself to dynamic extensions. Finally the easier computational technique assisted Fullerton to design a larger scale general equilibrium model. He advanced the general equilibrium research by building a more detailed model, based on a recent data set incorporating all US taxes.

Fullerton, Henderson and Shoven (1982) survey eight models designed primarily to evaluate fiscal reforms. These models are of the SWF type, but have some unique features. The models surveyed include: Auerbach and Kotlikoff (1983), Ballentine and Thrisk (1979), Fullerton and Gordon (1983), Fullerton, Shoven and Whalley (1978, with King - 1981, 1982), Keller (1980), Piggott and Whalley (1976, 1982), Serra-Puche (1979 Yale Ph.D) and Slemrod (1980 Harvard Ph.D, 1983). Shoven and Whalley (1984) survey work by many of the same authors, titling their models **applied general-equilibrium models of taxation**. The following discussion draws heavily from the two survey articles, as well as Fullerton (1979) and Piggott (1980a, 1980b and 1983).

The models of Piggott and Whalley (the United Kingdom), Fullerton, Shoven and Whalley (the United States), Ballentine and Thrisk (Canada),

Keller (the Netherlands) and Serra-Puche (Mexico) are large, general purpose models for the countries in brackets. The models of Slemrod and of Fullerton and Gordon attempt to specify how financial decisions are made by household and firms. Fullerton and Gordon introduce the innovation that marginal tax rates on capital differ from average tax rates. Auerbach and Kotlikoff study intergenerational incidence. Their model is unique in its use of perfect foresight rather than myopic expectations.

Figure 2.2 illustrates the profile of a "typical" applied general equilibrium model. Some of the differences in SWF models which have specific relevance to redistribution studies are discussed in Section C.1.

FIGURE 2.2
DIAGRAM OF A TYPICAL SWF GENERAL EQUILIBRIUM TAX MODEL

Competitive equilibrium achieved when: 1) Demands equal supplies for all goods and factors; 2) Zero profits (net of taxes) prevail in all industries; and 3) Agents are on their budget constraints (e.g., total government expenditures equal to receipts from taxes and from selling endowments of capital or "bonds"). Source: Fullerton, Henderson, Shoven (1982).

Turning first to some of the common features of SWF models, the producer side has several industrial sectors, in which fully mobile and homogeneous labour and capital are used in production in a profit-maximising combination. Technology is described by either constant returns to scale (CES) or non-increasing-returns-to-scale production functions.

On the consumer side, there are several household income groups who receive an income from their endowments of labour and capital. These household income groups also derive income from government transfers and in some models, from subsidies.

The principles of budget-constrained utility maximization are applied to model how households decide between different consumption goods. Taxes on incomes, factors and outputs are usually *ad valorem* and these enter into the appropriate production and consumption decisions.

Solution for the equilibrium is carried out using a computer algorithm and is reached when demand and supply are equal for all goods and factors. In addition, it is usual that in equilibrium producers receive no excess profits and all agents are on their budget constraints. Most SWF models feature some form of balanced international trade, which sometimes refers just to net exports of goods and services, and sometimes encompasses capital flows as well. Generally, the models do not feature endogenous factor supply, financial assets or a full modelling of the government budget.

SWF models have been mainly applied to the long run analysis of alternative tax policies. In particular, they have examined policies such as a value-added tax, corporate and personal income tax integration, consumption (expenditure) taxes, housing subsidies and inflation indexation. Although some of the models measure the distributional effects of these policies, no SWF model has been specifically devoted to the analysis of the effects of public finance policy on household income distribution.

The following discussion about aspects of SWF models is divided into three main areas. First, there is a description of the various methodological approaches where they relate to the analysis of the size distribution of the government budget. Then, there is a brief discussion

of the limitations of the SWF approach, arguing that while it could be usefully applied to the analysis of size distribution, it would first require substantial augmentation. Finally, there is a discussion of SWF incidence results where they pertain to this thesis.

C.1: SWF Treatment of Methodological Issues

The following sub-sections discuss how the SWF models treat six methodological issues at the base of this thesis. They are treatment of: a) the receipts side of the government budget; b) the expenditure side of the government budget; c) the household sector; d) household income; e) the budget deficit; f) the meaning of redistribution in general-equilibrium models.

C.1.a: SWF Treatment of Taxes

SWF models main focal point is the taxing activities of the government. In some cases, the focus is further narrowed to study corporate taxes. The Scarf simplicial search algorithm means that large changes in the corporate tax rate can be examined. Shoven and Whalley (1972) re-examine Harberger's original results. While they find some errors, the errors offset each other and the conclusion that capital pays most of the tax holds. More recent developments in the analysis of corporate tax incidence have centred on the financial behaviour of corporations. Corporate financial behaviour has been modelled by Slemrod (1983) and Fullerton and Gordon (1983).

Fullerton *et al* (1978) and Piggott and Whalley (1976, 1982) capture the progressivity of the personal income tax by treating the tax as a separate linear function of income for each household group. A shortcoming of this treatment is that the marginal tax rate each household faces stays the same when simulations of a policy change show a redistribution of income.

Slemrod (1983) improves on this shortcoming by endogenizing the marginal tax rate. Household behaviour is modelled so that portfolio

choices are made on the basis of the real after-tax rate of return to each asset (endowment), as well as its riskiness. His model computes a household's taxable income on the basis of assets (including the endowment of labour) selected by the household and other aspects of modelled behaviour that redistributes income to the household. The marginal tax rate is calculated by applying an approximation of actual tax tables to the household's computed taxable income. Slemrod's improvement is significant because a common issue of redistributive policy is the difficulty of phasing out eligibility for income maintenance schemes so that those deciding whether to take a paying job are not discouraged by the effective high marginal tax rates.

Most of the models are specified to cover all the taxing activities of the government (often Local, State and Federal). The taxes are not modelled according to their statutory liability. Instead they are defined to mirror the definitions of g-e models, as shown by Figure 2.3.

FIGURE 2:3

SWF TREATMENT OF TAXES

<u>Type of Tax</u>	<u>SWF Treatment</u>
Individual Income Tax	Treated as a tax on income (income is determined endogenously, see Section C.1.d.)
Company Income Tax	Treated as a tax on capital use
Estate and Gift Duty	Treated as a tax on income
Customs, Excise and Stamp Duties; Vehicle Taxes	Treated as a tax on final and intermediate expenditures using input/output table
Sales Tax	Treated as tax on consumer expenditure
Primary Production Taxes, Liquor and Gambling Taxes	Treated as a general factor Tax
Payroll Tax	Treated as a tax on labour use
Property Taxes	Treated as a tax on capital use

Source: Piggott (1983).

C.1.b: SWF Treatment of Government Expenditures

A very important aspect from the point of view of household income distribution is the assessment of how government revenue is spent. Some of the SWF models only compare tax policies of equal revenue yield and make the assumption that the expenditure distortions are unaffected by the tax alternatives being considered. Shoven and Whalley (1972) assume that all government revenues are redistributed to consumers (including the government as one consumer) as transfer payments (there are no public goods and services provided). In equilibrium, transfer payments made by government to consumers equal taxes collected by the government. Piggott (1980a, 1980b, 1983) and Keller (1980, 1981) attempt to treat government expenditures in more depth.

Piggott (1983) identifies the government as one of four sectors on the demand side of his model. The government is treated as a special type of consumer. It has an income including that from the capital services it is deemed to own, the net surplus from public enterprises, the funds it borrows from the private sector, and those tax revenues which are not paid out as transfers. Its expenditures cover subsidies, transfers, public administration and defence (of which it is the only consumer) and various other goods and services.

Keller (1980, Chapter 8) explains the functions of the government in relation to his specification of private and public goods. Private goods are characterized by rival consumption, they are provided through the market mechanism and each has a price. On the other hand, public goods are characterised by non-rival consumption which means that the benefits of public goods apply to all individuals while the consumption by one individual does not reduce the benefits derived by others. Keller assumes that the benefits of public goods apply to private households, but not to firms. The provision of public goods is subject to a budget, which is determined by the "fisc".

The "fisc" is a mechanism which collects the tax revenue and returns this as lump-sum payments to the public and private households. The

transfer to the public household constitutes the public budget. Like a private household, the public household demands private goods. Unlike the private household, the public household tries to satisfy the collective, or public needs. In contrast, private households only try to satisfy their own private needs.

Like the other SWF models, Keller's focus is not on changes in government expenditure as such - it is on the changes in government expenditure which may come about because of a change in tax. His explanation is helpful in elucidating the concept of "balanced-budget incidence" and "differential" incidence. It clearly identifies the restrictive assumptions required to treat individual preferences for public goods within the model.

C.1.c: The Household Sector

Modellers have succeeded in incorporating a large number of household groups. Beginning with Piggott and Whalley (1976), most of the applied SWF general equilibrium models have disaggregated households into several income classes. Piggott and Whalley further disaggregate households by occupation, family composition and work status (100 groups). Serra-Puche (1979 Yale Ph.D) disaggregates his model into urban and rural sectors. Keller (1980) uses a local linearization procedure to solve for tax change equilibria, concentrating on the distributional effects between low income/unskilled labour and high income/skilled labour. Auerbach and Kotlikoff (1982) distinguish household groups by the age of the occupants.

A major advantage of the SWF general equilibrium models is that they are able to treat the effects of the government budget on both the sources and uses of household income when households are grouped by income and other characteristics. The sources side (income) of household behaviour is discussed in the next section.

The SWF models can be applied to consider the two aspects of the uses side of household behaviour: consumption and saving. Looking at

consumption, when the production sectors are classified as agriculture, housing and manufacturing, the results of analysis of taxes on consumption differ significantly by section. This is because household consumption patterns differ for these three sectors. The statistical data for various countries tends to show that the percentage of income devoted to expenditures on food and housing decline markedly with income. On the other hand, expenditures on services increase somewhat with income and the consumption of manufactured items increases even more. The existence of different tax rates by industry justifies even further disaggregation.

C.1.d: Household Income

Household income in the SWF models is endogenous to the model. It is the return to endowments (generally defined as the factors, labour and capital) owned by the household. Households also receive lump-sum transfers from government based on their receipts of unemployment compensation, welfare, government employee pensions, veterans benefits, social security, and so on.

Evidence in New Zealand and overseas shows that the asset holdings of income groups vary significantly. This argues for models which also specify portfolio behaviour as a determinant of household income. In general, the largest asset for the lower income income groups is owner-occupied housing while the top group holds more corporate equity and tax-exempt debt. Slemrod (1980 Ph.D, 1983) treats this issue by distinguishing six assets: corporate equity, taxable and tax exempt debt, rental and owner-occupied housing and liquid assets.

Another refinement to the determination of household income, which has profound implications in relation to the personal income tax, is the choice between labour and leisure. Fullerton et al (1978) and Piggott and Whalley (1976, 1982) model the labour-leisure choice by applying an average figure from the literature for the elasticity of labour supply with respect to the after-tax wage. However, they shortcut the exercise by using an average elasticity instead of specifying different labour supply elasticities and labour endowments by household groups.

C.1.e: The Budget Deficit

Most of the SWF models assume that the government budget is in balance. The models tend to ignore financial assets so a balanced budget is a necessary assumption, since deficits are financed by an increase in government securities or by money creation. As a result of the balanced-budget assumption, any change in tax must be matched by an offsetting change to another tax or an offsetting change in government spending.

Applied studies of budget effects almost always analyse economies (such as the United States) where the government budget is in deficit. They commonly assume that the existence of a budget deficit does not change incidence or efficiency results. McLure (1970) shows that in the HMM models, the allocation of resources depends on relative prices instead of absolute prices. HMM models are solved in terms of relative prices and another equation is needed to close the model if absolute prices are to be derived. When McLure closes his model with the quantity equation for money, he finds that it has no additional real effects on the economy. From this, McLure concludes that the existence of the deficit does not change economic decisions.

When portfolio choice is modelled, however, the existence of a budget deficit is important because of its financing effects. In particular, the corporate income tax may distort asset demand decisions even when it does not distort production decisions. Concern over the amount of distortion in asset demand decisions has led to developments by Auerbach and Kotlikoff and Serra-Puche aimed at modelling unbalanced budgets.

Auerbach and Kotlikoff (1983) define the government budget constraint as follows:

the present value of expenditures must equal the present value of revenue less the initial value of government debt, where financing by money creation is not an option and private and government capital are perfect substitutes in portfolios.

They find that government debt crowds out private capital formation and lowers the potential efficiency gains when a tax reform is financed by issuing government bonds.

C.1.f: Redistribution Between Households and G-E modelling

In the HMM model, incidence is measured by the change in the price of the taxed factor relative to the size of the tax. Only functional distribution is considered. The SWF models measure welfare changes, as well as their distribution among households in terms of personal income changes. Piggott (1980a, 1980b) observed that a social welfare function is implicitly assumed in interpreting the measure of welfare cost which is widely used in general equilibrium models. Distributional results of these exercises are easily reported. Thus, he applies the SWF approach to evaluate a tax change with respect to both efficiency and equity in terms of a single index (income).

Most SWF models measure the response to a policy change by comparing two static equilibriums. The underlying assumption about calendar time in the SWF models relates to their concept of general equilibrium. The economy to be investigated is in equilibrium in the particular year or over a longer period represented by average yearly data. The National Accounts and other blocks of data are modified so that this equilibrium can be observed.

Parameters for the model's functions are calculated by calibration to the assumed equilibrium for the economy. Estimates of price elasticities of demand and substitution elasticities by industry in production are introduced. The calibration is such that the model will replicate the assumed equilibrium data set as an equilibrium solution. The equilibrium state is characterized by observed prices and quantities. The parameter values are determined by solving the equations which describe the equilibrium conditions of the model. Provided CES production functions are used (which is generally the case in SWF models), specification of the elasticities of substitution is sufficient to guarantee that the solution of these equations is determinate.

The construction of the benchmark equilibrium state implies that the equilibrium conditions of the model under consideration must be satisfied.

The construction of the benchmark equilibrium set (BEDS) involves adjusting blocks of data that are available separately, but which may not be consistent with equilibrium conditions. The BEDS provides an observation of transactions in value terms. To obtain information on equilibrium prices and quantities, a units convention must then be adopted.

C.2: Designing SWF Models to Focus on Redistributive Issues

The previous section described how the various SWF models treat some of the methodological issues at the base of this thesis. It showed that the models give a very thorough coverage to the taxing activities of the government. Almost all the models specify a function for government demand but their treatment of government spending has been restricted by their fixation with modelling the effects of tax changes. Modellers have succeeded in incorporating a large number of household groups which are classified by the size of their budget constraint where their income from endowments is equal to their consumption (and savings are also specified in some models). Household income is endogenously determined by the model and tends to be a very broad measure indeed, including the return to endowments labour and capital and transfers from the government. Most of the SWF models measure the reaction to a policy change by differential balanced-budget incidence. Finally, the models are marvelously well-designed to treat the income distributional effects of tax changes, both with respect to efficiency and equity.

When it comes to the analysis of the influence of total government budget activity, however, the SWF models are still in their infancy. Existing models are not designed to evaluate the redistributive effects of the expenditure side of the government budget. Even worse, their structure obscures many of the important issues in relation to expenditure incidence. To focus on the problem in this thesis, they would need further development. Some of the developments relate to weaknesses inherent in the models and the others are extensions to treat government spending.

C.2.a: Weaknesses of SWF Models

As the discussion of the HMM models showed, the basis for the general equilibrium approach depends on the elasticities of substitution and demand. Yet, in the SWF models, key elasticity parameters are little more than guesses. While there is some agreement about the elasticity of substitution of primary factors, issues such as technical change and substitution among intermediate inputs need to be more fully incorporated in the SWF models.

The SWF models mainly focus on inter-industry differences in tax payments and in general the evidence on demand elasticities for outputs and factors is not robust enough to point to significant differences. In the case of households, the evidence is even less available and the differences are likely to be even greater. And yet the SWF and Slemrod models assume Cobb-Douglas demands, so that, within an income class, relative expenditures on consumption goods are constant.

The models uniformly assume perfect competition and constant returns to scale. Although these assumptions may be convenient abstractions, incorporation of imperfect competition and government regulation are likely to make a significant difference to the results. More significantly, perfect competition rules out the existence of monopolies. Since some of the government expenditure is to provide goods where the government has a virtual monopoly, this is a major weakness for a study of public finance policy.

C.2.b.: Augmenting SWF Models

The most important addition to the SWF model required to assess the distributional consequences of budget policy is the addition of a better-defined government sector. Two main reasons for this are discussed in the following two paragraphs.

First, as presently specified the models treat the government as very little different from a household, except in its capacity to tax. This denies the richness and variety of government behaviour and rules out analysis of some of the most important things that government's do. Among those functions

are the provision of goods where the government acts as a monopolist such as in the provision of education.

Secondly, as the SWF models are designed to analyse distribution solely in relation to tax effects. Government spending, as well as other payments to it, also have distributional consequences.

On the tax side, more work is required to take account of the legal definition of taxes. The simple characterisation of taxes as *ad valorem*, constant marginal rate taxes may not reflect some significant features of taxes. Shoven and Whalley (p. 295) noted that "the institutional workings of any particular tax are always far more complex than can be conveniently incorporated into a general equilibrium framework". Since then, the models have developed a greater capacity for detail. More detailed specification of taxes is desirable.

Personal income taxes probably play the greatest role in redistributing income. The personal income tax is also a major source of government revenue. Hence, an area of development is the more accurate modelling of the progressive rate structure of the personal income tax. Further, the personal income tax structure is also defined by the legal definitions of assessable income, exemptions, deductions and rebates which may not be consistent with the economic concepts in the model. These differences offset some of the redistributive effects of the marginal tax rates. Where significant, these factors should also be incorporated into the g-e models.

Calendar time plays an important role in the design of specific redistributive policies since the aim is to provide assistance while the household is in need and reduce that assistance when circumstances change. SWF models do not treat this issue specifically; few, if any, g-e models are designed to give regard to the calendar time it takes to adjust to a new equilibrium. However, some of the recent SWF studies have made innovations which show potential for the development of analysis of this sort. For example, Auerbach and Kotlikoff (1983) studied the effects of the replacement of an income tax by a wage tax and by a consumption tax for 55 different age cohorts. The model is able to provide insights about the effects on the different cohorts in the transition to the steady state equilibrium, which they estimate takes about 40 years.

The economy may take a substantial period of time to adjust to tax policies and the impact may discriminate between generations. Life cycle modelling may be appropriate for some issues. For the issue of income maintenance, it is important to know more about the time of the adjustment process.

Already evident is the likelihood of further progress in SWF modelling of dynamics and financial behaviour. Since deficits are a feature of the Auerbach/Kotlikoff model, it would not be difficult to introduce money on the supply side. Portfolio decisions would need to be specified in more detail on the demand side, however. Serra-Puche's (1979 Ph.D) model has an initially unbalanced budget and is being expanded to include monetary phenomena. Slemrod (1983) already has portfolio behaviour with money and debt as available assets. Developments like these will assist in the analysis of the influence of government deficits on income distribution and tax analysis where financial flows are being taxed in non-neutral ways.

Finally, in New Zealand, the model of the foreign sector is critical to an assessment of the effects of taxation. There are a significant number of duties and excises on imported goods. In addition, company income taxes are assessed in the production of goods used for export but not for import. A useful extension to SWF models would be the addition of a foreign sector.

C.3: SWF Incidence Results

The SWF literature provides some conclusions about the incidence of taxes and subsidies which are pertinent to this thesis. This section gives a flavour of some of them. They will be referred to again where they contribute to the analysis in the following chapters.

In their review of the general equilibrium literature, Shoven and Whalley (1984 p.1032), claim that a striking feature of the results from the general equilibrium tax models is their suggestion of considerably larger deadweight loss from tax distortions (especially at the margin) than had been indicated from less complex incidence models. In addition, when their general equilibrium effects are taken into account, tax policies appear to have more redistributive power than otherwise thought.

Shoven and Whalley (1972) examine the imposition and removal of existing taxes on income from capital under twelve different model parameter specifications. They find in half of the cases examined, capital bears more than the full burden of the surtax. In the other six, labour shares in the burden.

Ballentine and Thrisk (1979) analyse changes in local government expenditures, corporate and property income taxes, federal income taxes and housing subsidies. They find that personal income taxes are markedly progressive while property and corporate income taxes have a more mixed pattern of incidence.

Keller (1970) considers changes in marginal tax rates in various production and consumption sectors. He finds that the efficiency effects of taxes are generally small, with the exception of the corporate income tax. He also finds that the changes in marginal tax rates only result in a small amount of tax shifting.

Piggott (1980a, 1980b, and Whalley 1976) look specifically at the changes in the distribution of household income as a result of tax changes. In both Australia and the United Kingdom, taxes are shown to have a significant redistributive effect. Subsidies to local authority housing are found to be a significant source of welfare loss.

It is clear that the SWF models are now being successfully applied to a range of policy issues and have returned some important insights. In interpreting the results for policy purposes, however, it must be kept in mind that the knowledge of elasticity values for specifying the parameters is limited. Until better elasticity values can be determined, the dilemma is how much confidence to have in results of an approach which is so elasticity-dependent. Until advances are made, the SWF models are best valued for their insights about economic relationships, rather than for their precise results.

D. GENERAL EQUILIBRIUM MODELS OF THE NEW ZEALAND ECONOMY

There are four general equilibrium models of the New Zealand economy which could potentially inform a study of the influence of government budget revenue and expenditure transactions on household income distribution. Joanna and Julianne are two general equilibrium models designed by the Victoria University Research Project on Economic Planning (RPEP). The Canterbury University Department of Economics and Operations Research (CUDEOR) is in the process of designing a general equilibrium model which is based on SWF techniques using New Zealand data and programmed on a personal computer. There is a version of this model already in existence designed by Henry (1982 University of Canterbury Ph.D, 1982).

Joanna and Julianne are variants of a basic computable general equilibrium (c.g.e.) model. Their major emphasis is resource allocation and the main force for reallocation is changes in relative prices. Although both models have many features like those of the SWF models, articles about them do not refer to any overseas literature and their antecedents are unclear.

The differences between Joanna and Julianne lie in two areas - the solution technique and the policy focus. Joanna's solution technique tends to favour an emphasis on short-run issues. This model provides greater detail on the effects of tax instruments, Julianne's design lends itself to the analysis of longer-run effects of foreign trade and tariffs.

Joanna is a price-endogenous, twenty-two sector, input-output based model which follows the New Zealand System of National Accounts classifications with the latest version based on the 1981/82 interindustry study. Its variables are expressed (and solved) in percentage change form, in which the model is linear. Like most general budget policy, Joanna does not operate in real time.

Julianne is expressed in level form and requires a much more complex solution routine. This is the reason that it is less amenable to the incorporation of government budget and finance flows. Because it does

give a level form solution, however, its results can be interpreted in terms of real time.

One particular advantage of the Joanna model is its flexibility. As Wells (1983) points out:

"It is one of the great strengths of the RPEP that the structures have sufficient flexibility to allow modifications for the analysis of particular issues, with concomitant changes in structure, equilibrium assumptions and the endogenous/exogenous status of particular variables".

It is this flexibility that makes the Joanna model particularly attractive from the point of view of fiscal incidence analysis. Although the SWF models have also shown great flexibility in focusing on different tax and foreign trade problems, at the end of the day that flexibility to analyse fiscal policy issues could be constrained by limiting assumptions that are apparently not fundamental to the Joanna model.

Another attractive feature of the Joanna model is that there is quite a disaggregated treatment of household incomes by source. Similar to SWF models, these income-sources are generated from the endogenous factor-employment and price variables. As presently specified, Joanna does not disaggregate households by type, so issues related to income distribution by size cannot be addressed.

Joanna treats the government sector's demand as defined in the input-output table that is integrated as part of the model's production sector.

CUDEOR also characterise their model as a c.g.e. model. It closely mirrors the methodology of the SWF models. So far, the model appears to be in its design stage. The value of the CUDEOR work is that it treats some of the problems of implementing a c.g.e. model. Information about the model can be found in Henry, Manning, McCann, Woodfield (1986) where the authors demonstrate the construction of a benchmark equilibrium data set (BEDS). BEDS are the adjustments which must be made when there are discrepancies between official data and the theoretical restrictions of a given c.g.e. model.

As discussed in Section C.1.f., a model which is consistent with economic theory must also be consistent with the facts. The empirical data required to carry out a general equilibrium study in New Zealand include specific knowledge about tax rates, capital intensity, consumer price elasticities of demand for outputs, and degrees of factor substitution. Difficulties arise when the published data and the c.g.e model do not have a common theoretical base. For example, the economic theory which informs the national income accounts, the source of much macroeconomic data, is different from the theoretical basis of c.g.e models.

To illustrate their points, Henry et al use a version of the original Harberger two-sector, two factor, one consumer economy. After calibrating the model, it is subjected to a replication test. The authors succeed in illustrating that a model yields more robust results in a counterfactual exercise if it is possible to replicate its BEDS.

Apparently the CUDEOR stable includes, as work-in-progress, a larger c.g.e model of the economy. If it resembles the SWF models, it is likely to contain the same strengths and weaknesses described in Section C when it comes to the analysis of the budget in relation to the size distribution of income. Even so, when the main sectors of the economy have been satisfactorily modelled, the CUDEOR c.g.e model, like the SWF models, could be amenable to extensions consistent with the measurement of fiscal incidence.

Henry (1982) uses a model similar to Shoven and Whalley (1972) to analyse the preferential tax treatment of owner-occupied housing in New Zealand. His three sector model is designed to measure deadweight loss and explicitly recognizes feedbacks due to income effects based on Ballentine and Eris (1975). Henry finds that most of the burden of the preferential tax treatment of owner-occupied housing is on the non-residential sector.

E. QUANTITATIVE STUDIES OF BUDGET REDISTRIBUTION BY SIZE

Dissatisfaction with partial equilibrium techniques led to the development of general equilibrium models of public sector activity. As the first four sections of this chapter have shown, these models are extremely rich in their treatment of the economy and in their ability to analyse supply and demand effects with reference to more than one particular market. As a result, g-e models are able to generate theoretically consistent micro- and macro- economic tax incidence results. Nevertheless, these models have not focused on the evaluation of the influence of the budget on the current distribution of income. This survey of quantitative studies of budget redistribution by size (distribution by personal or household income group) highlights some of the issues.

Following Shoup (1972), the studies discussed in this section are called **quantitative** rather than **empirical** because they are not based on refutable hypothesis subject to testing by appeal to another set of data. While failure to structure the analysis around a refutable hypothesis is an important limitation, it is not a fatal one. Indeed, it is a limitation which the field of income redistribution shares with other respectable fields of economic analysis, including applied general equilibrium analysis (see Shoven and Whalley, 1984, p.1045), the assessment of national income aggregates and cost-benefit analysis.

As will be shown in Section E, quantitative studies are well equipped to answer the questions at the base of an evaluation of budget redistribution by size, given the current state of knowledge. As well as answering questions about income redistribution, these studies serve as important milestones of the progress of economics. When they make explicit use of economic theory, their methodology reflects the interpretation of that theory into practice. The four significant milestones may be broadly characterised as: 1) partial equilibrium; 2) balanced budget or differential fiscal incidence; 3) applied general equilibrium results; and 4) general equilibrium modelling.

E.1. Partial Equilibrium Quantitative Studies

Prior to 1962, most theoretical incidence analysis was concerned with taxes only and confined to a **partial equilibrium** framework.¹⁵ While economists such as Brown (1939), Musgrave (1952), Rolph (1954) and Wells (1955) attempted to place these partial results within a general equilibrium framework, there was no theoretical model specified that could be used to obtain precise results about the questions of budget incidence by household income distribution in a general equilibrium setting.

This explains why most quantitative studies of redistribution carried out prior to 1962, are based primarily on partial incidence results. One of the most detailed studies, that by Musgrave and his associates for the United States in 1949, sets the scene for later empirical analysis in the area of tax incidence (Musgrave et al, 1951). Following earlier precedents, Musgrave calculates the burden of all taxes to spending units according to income class. Data covering the United States population are grouped by family income brackets broken into "spending units" as defined by the 1949 Survey of Consumer Finances. Information was classified according to the types of household expenditure. Musgrave was able to improve on earlier studies because he had data to allocate tax costs directly to the income groups without first determining individual family tax liability. The total amount of tax allocated is determined by the total revenue from tax collections in 1948.

Musgrave's study of tax incidence in 1949 produced what was a surprising conclusion at the time of publication, that the tax structure was regressive for those in the lowest income class. It was generally believed that the progressivity of the personal income tax balanced out the regressivity of the other taxes. Musgrave found, however, that those earning under \$1,000 paid 28.1% of their income in taxes compared to those earning between \$1,000 and \$2,000 who paid only 24.3% of their

15. Some early quantitative studies include: Musgrave et al (1951), Adler (1951), Barna (1945), Cartter (1955), and Nicholson (1967).

income in taxes. This reflects the number of elderly families in this group who are shareholders and as a result pay corporate tax.

In attempting to quantify budget incidence within a partial equilibrium framework, these early studies did not take into account the interdependence among markets and of what occurs in product and factor markets simultaneously when a tax is imposed. The shape of the supply curve is given and so it is not possible to see how the demand for factors is affected by the existence of a tax (or other type of budget measure). This inability to relate the supply curve to the production function and to see how conditions in factor markets change in response to a budget transaction when the incidence of a factor tax or subsidy is being examined means that a number of incidence issues were overlooked.

E.2: Fiscal Incidence Studies

Musgrave's Theory of Public Finance (1959) formalised the concept of the government as both collector of taxes and a provider of goods and services. After that, most quantitative studies evaluated the distribution of the entire budget. Those by Gillespie (1965, 1966), are among the most detailed examples. Much later, O'Higgins and Ruggles (1981) replicated Gillespie's approach for the United Kingdom and the United States.

De Wulf extensively reviews (1972, 1975) quantitative studies for developing countries. He refers to them as **fiscal incidence** studies instead of **tax incidence** because they treat both taxes and government spending. His review discusses many limitations of these studies which he argues are still centred largely on partial equilibrium analysis. He concludes that the changing research methods in this area reflect the increased availability of data and the greater emphasis of government policies on redistribution, but in general finds quantitative studies too statistically and conceptually weak to bear the weight of interpretation given to them.

E.3: General Equilibrium Results

Noting the impressive body of incidence literature produced in the previous twenty years, Break (1974) heralded the development of a consistent **general equilibrium theoretical framework** to serve as a basic analytical tool. This referred to Harberger's development of two-sector general equilibrium models to analyse corporate tax incidence in 1962 and the body of HMM literature since then.

For Break, the basic dilemma of incidence analysis is "to reveal the basic tax burden picture without simplifying things so much that important details are lost in the process" (p.122).

Many of those researching the effects of the government budget revealed the basic tax burden picture by using the results of general equilibrium studies. Instead of building a general equilibrium model, researchers simplified things by applying these results within frameworks similar to the Musgrave et al (1951) approach. Two approaches of this type include Musgrave, Case, Leonard (1974) and Pechman and Okner (1974).

The 1974 Musgrave et al quantitative study was considerably advanced on the study headed by Musgrave in 1951. It treated the government as both a collector of taxes and a provider of goods and services and was based on the concept of balanced-budget incidence.

Tax incidence assumptions applied by Musgrave were based on the results from general equilibrium models at the time, mainly the HMM models. For example, the six corporate tax incidence assumptions and five property tax assumptions reflect the debate then about aspects of these taxes. Although other taxes also have both uses and sources effects, they were not the focus of general equilibrium analysis available at that time. Musgrave's most "regressive" corporate tax assumption (see Figure 2.3, next page) that the tax was fully shifted to consumers is consistent with the seminal article by Harberger (1962) (see Section B.1.b in this chapter). Musgrave's benchmark assumption that the corporation income tax is equally distributed between consumption and

capital was justified by Cary Brown (1974) as probably the best choice from the range of theoretical results about company tax incidence.

Figure 2.4 illustrates Musgrave's "benchmark" tax assumptions, as well as the "progressive" and "regressive" variants.

FIGURE 2:4

MUSGRAVE'S ASSUMPTIONS REGARDING TAX INCIDENCE

Tax	Effect in Relation to Income:		
	"Progressive"	"Benchmark"	"Regressive"
Corporate Income Tax	Falls on dividend recipients	Half falls on all capital income receivers; half passed on to consumers.	Passed on to all consumers
Property Tax	Falls on all capital income receivers	Residential - occupants Commercial - half on all capital receivers - half on consumers	Residential - occupants Commercial - on consumers
Employers' Social Insurance Contributions	Falls on employee	Passed on to consumers	Passed on to consumers
Personal Income	Falls on taxpayer	Falls on taxpayer	Falls on taxpayer
Excises			
Tobacco	Tobacco consumers	Tobacco consumers	Tobacco consumers
Alcohol Excise	Alcohol consumers	Alcohol consumers	Alcohol consumers
Motor Vehs. & Parts			
Business portion	Consumers in general	Consumers in general	Consumers in general
Other portion	Vehicle owners	Vehicle owners	Vehicle owners
Gift, Estate and Death	Households with capital income whose total income exceeds \$25,000.		

Source: Musgrave, Case, Leonard (1974, pp.259-311)

As in the first Musgrave study, the "benchmark" results showed that over the range of middle incomes, the percentages of income going to tax (the effective tax rates) remain broadly constant. With the regressive assumptions, the effective tax rates fall slightly as income rises. The effective tax rates rise quite sharply, especially for incomes over \$35,000, when the progressive assumptions are applied. Unlike the early Study, this one did not show the tax structure to be so regressive for the lower income group.

After analysing the distributive effects of public expenditure in addition to the distribution of tax payments, Musgrave calculated the net residue (the difference between the income value of benefits gained and tax paid) for different income groups. Musgrave nets out indivisible benefits and looks only at those expenditures for which specific benefit allocations are feasible (transfer payments included) based on the assumption that each expenditure dollar for programmes subject to a specific allocation is financed by an average tax dollar.¹⁶ His results show that in 1968 those in the lower income brackets in the United States gained a net benefit from the government's budget while those earning in the higher brackets paid more in tax than they received in benefits. Gillespie's (1965, 1966) results for Canada were similar, showing that the net result of fiscal expenditure favours low incomes. The net residue is mainly neutral over a wide range of middle incomes and burdens those on high incomes.

Pechman and Okner (1974) focus on the tax side only in their study based on the differential incidence approach. They purposely avoid tracing through the effects of government expenditure in order to discover who pays taxes. They justify the exclusion of government on the general equilibrium grounds that substituting government spending for private spending does not significantly alter relative factor prices or the relative prices paid by consumers.

16. An average tax dollar was used as a measure because these specific expenditures were not tied to a specific tax but financed from general tax revenue.

Eight sets of tax incidence assumptions are adopted by Pechman and Okner. Similar to Musgrave et al, these are classified into three basic variants, each designed to illustrate a major approach to incidence. Variant 1 analyses the distribution of tax payments if it is assumed that supplies of labour and capital are fixed and that there is perfect competition, price flexibility and perfect factor mobility. Variant 2 follows the assumptions about the values of income and taxes that are implicit in the U.S. national income accounts. Variant 3 is a compromise of the other two approaches. Similar to Musgrave et al (1974), the results did not show a U-shaped pattern of the effective tax rate as did Musgrave's 1951 study. Instead, Pechman and Okner found that the curve of effective tax rates moves up as income rises.

E.4: General Equilibrium Modelling

Although Musgrave et al (1974) and Pechman and Okner (1974) attempt to incorporate general equilibrium results, their basic approaches are still partial equilibrium. Reynolds and Smolensky (1977) contrived to model a general equilibrium approach, perhaps without knowing they were doing so.

Their approach is designed to explore the response of measured income inequality over time to a definition of income which is more comprehensive than usual. The authors' definition of income includes the benefits and burdens of government expenditures and taxes at all levels of government. The motivation is to detect changes in final income distributions over two decades by constructing a systematic intertemporal comparison of the size distribution of income for 1950, 1961 and 1970. The results for each of these years can be interpreted as the adjustments consistent with their theory (a BEDS). Then, if each year is seen to be a steady state equilibrium, the intertemporal comparisons become a general equilibrium model.

The line of studies starting with Musgrave et al (1951) are usually intended to answer the question: what impact does the budget have in redistributing income? Reynolds and Smolensky argue that this question cannot be satisfactorily answered, based on the insoluble identification problem involved in distinguishing government activity from other economic activity. Hence their research problem: what happened to the size distribution of income in the United States between 1950 and 1970?

According to the authors, any measure of redistribution involves comparing a distribution of money income 'before' certain taxes, transfers, and other government expenditures with a distribution 'after' factor and product market changes brought about by government jointly determine a new consumption set attainable by each individual. This is what is meant by the net redistributive effect of government. The problem is choosing a proper set of parameters. This implies breaking into the general interdependence of public and private decisions with some counterfactual measure of the 'before' distribution. The issue becomes, what is the appropriate counterfactual?

Reynolds and Smolensky's time series research shows that there was no significant change in the dispersion of final income distributions from 1950 to 1970. The authors conclude that while the government's budget measures reduced income inequality in a given year, the amount of this reduction did not increase between 1950 and 1970. The overall tax system was found to have drifted from a progressive to slightly regressive distribution, but these changes were offset by changes in government spending patterns, especially increases in transfer programmes.

Despite their attempts to define a different approach from earlier studies of income redistribution, what Reynolds and Smolensky's actually did differed little from Musgrave's (1974) approach. Even though they published in 1977, the authors did not show any familiarity with the HMM and SWF models. Their only reference to the HMM work was to McLure's 1974 paper on the theory and methodology of estimating benefit and expenditure incidence.

An important contribution of the Reynolds and Smolensky work, however, is that it does not try to find cunning ways around the analysis of government expenditure. In order to get theoretically consistent answers about tax incidence, the mainstream general equilibrium literature (with the possible exception of McLure and certainly Meerman) treats the expenditure side of the government budget as if it is expendable. Reynolds and Smolensky's attempts to treat the entire government, give an indication (albeit slightly rough) of the sorts of issues involved if a more 'realistic' treatment of government behaviour is adopted.

E.5 Significance of Quantitative Studies

With the advent of SWF empirical general equilibrium models in the 1970s, the flurry of quantitative fiscal incidence studies stopped. If nothing else, the general equilibrium literature made a convincing case about the internal inconsistency of the assumptions of such studies and this reduced the interest in devoting the (considerable) resources required to carry them out. However, the policy problem considered by quantitative studies is much wider than what has been considered by the general equilibrium literature. The focus of quantitative studies is not only tax incidence, but extends to the effects of public sector activity on household income distribution.

Curiously, the incidence results of both general equilibrium empirical studies and quantitative studies are quite similar when tabulated by household income. So until the general equilibrium models are extended to treat the wider issues, quantitative studies provide a means of analysing the effects of budget transactions. Because they are not based on a particular model, an important feature of quantitative studies is that they are forced to spell out the reasons for, and, consequences of, all their assumptions. If this shows them to be inconsistent, then at least the inconsistencies are obvious.

As discussed in Section C, the SWF general equilibrium models, while more theoretically valid, are not without their own limitations, even leaving aside their narrow concentration on tax changes. In particular, they treat the data collection process in a very rough fashion. Because the data set for an incidence model is so comprehensive, the information sources are necessarily divergent. The two sides of a single account are often collected by different agencies with different procedures, and thus do not match. In order to use all of this data together, adjustments must be made to ensure each part is consistent with the rest. The problem is, diverse data sets (which are only adjusted for inconsistent classifications and definitions) will not necessarily describe a general equilibrium. The consequences of this problem are seldom made obvious because the SWF literature is devoted to theoretical application.

F. METHODOLOGY IN THIS THESIS

The problem at the base of this thesis, the effect of the central government budget on household income distribution, can be treated in the most comprehensive fashion if the methodology that is adopted is that of a quantitative study. After fourteen years and the addition of numerous sectors and many exciting innovations, the main focus of the general equilibrium models of the public sector has not widened much beyond the consideration of tax incidence. As Shoven and Whalley (1984) candidly state, in the few cases where models include public goods in household utility functions, it "complicates the tax models". This focus is too narrow to encompass the problem at the base of this thesis, which in the end is related to an assessment of expenditure, as well as tax, incidence.

Although the thesis does not apply a general equilibrium model as such, many important contributions of the general equilibrium literature are applied to the methodology that is adopted. Meerman's (1978) belief that the research inputs of time and data were not commensurate with the expected benefit from the research has been born out by the experience of SWF general equilibrium studies. The extent of their innovation has not been matched by the depth of their policy prescription. But Meerman's use of general equilibrium concepts to define incidence and the necessity of defining RPTO incidence as zero is helpful. Also, the insights provided by the HMM, SWF and New Zealand general equilibrium models provide a basis for the many rough assumptions required by quantitative studies of fiscal incidence.

The emphasis here is on making the best use of available methodologies to treat the very immediate problem posed by income maintenance policies. For the theoretician, the big gap in the g-e treatment of the public sector presents an extremely fascinating research opportunity. Meantime, quantitative studies provide a framework for treating theoretical issues explicitly, even if not consistently.

CHAPTER THREE

INCOME: THE APPROPRIATE MEASURE FOR ASSESSING BUDGET INCIDENCE

The familiarity of the word "income" disguises problems in establishing what, in principle, is meant by income. Income plays a major role in studies of budget incidence, so it is important that the different features of the income concept are unmasked. Income is a multivariate concept which in its wider sense is interpreted to represent the gain to factors of production, the economic welfare of households, a measure of the ability to pay taxes, the basis for measuring the net benefit or loss to a household as a result of budget measures. In the Shoven, Whalley and Fullerton (SWF) empirical general-equilibrium studies, household income is defined as the household budget constraint and also represents a pattern of distribution against which equilibrium adjustments to budget transactions are assessed. This Chapter discusses the concept of comprehensive income and the choice of a statistical measure which is applicable to the quantitative assessment of the budget's distributive influence.

As described in Chapter One, the method chosen to evaluate the incidence of the government budget (or in other words, who pays the cost of, and who benefits from, changes in the government's budget) will vary depending on the level of theoretical sophistication. Chapter Two shows that at this stage, the theoretical and computational resources required to empirically assess budget incidence within a general equilibrium model are great and that a satisfactory conclusion will only be gained when the existing models are substantially augmented. Thus, the method adopted in this thesis is similar to a quantitative study. As such, it can apply the latest insights from the general equilibrium literature, but it is not based on an internally consistent economic model. The basic approach of quantitative studies is to tabulate budget-money-income effects in terms of households grouped into income brackets. Then the budget's influence is assessed by measuring the change in the distribution of household money income, when income is defined to include a value for government-provided goods and services, less payments (taxes, charges and so on) to the government in a given year.

To clarify some of the methodological issues, an income taxonomy is set out in four stages in Chapter One (see Figure 1.2). Chapter Three defines and values **initial income** for each of the four stages. Initial income is the distribution of income before account is taken of government budget transactions.

The choice of a particular income concept has significant implications for both the theoretical and statistical results. Starting with an income concept obtained from consumer surveys - or which is derived by adding consumption to savings, or from national income or by defining income as inclusive or exclusive of government transfers, will lead to different results. Depending on the income measure used, the proportion of household money-income paid in taxes (the effective tax rate), received in benefits (effective benefits), or the net effect of the two (effective budget incidence), will differ. More importantly, the pattern of relative household incomes will vary. For example, retired people may not earn an income from working but they may earn an income from assets. An income measure which includes income from assets will show retired people to be relatively much better off than one which does not.

Simons' comprehensive income measure provides a starting point for a discussion of income as a measure of personal gain. The definition of income which is applied to measure budget incidence in this thesis flows from the use to which the concept is to be put. For example, the income concept is required to account for individual welfare as well as gain. Additional adjustments are necessary if the income measure is to be used as a common denominator for assessing budget incidence. The nature of these adjustments is discussed in the following Sections.

Chapter Three is divided into six Sections. Section A defines a comprehensive income concept. In addition, Section A also discusses the choice of an income concept which reflects economic welfare. Section B shows that the precise definition of the income concept may depend on the empirical method for assessing budget incidence. Section C describes how the use of the four stages outlined in Chapter One resolves some of the problems of finding empirical measures of the theoretical income effects

of the budget. Section D discusses the choice of an income unit at the base of a study of budget incidence. Section E tabulates market income by household income group and household type and examines the application of this concept as the initial income measure for Stages One and Two. Section F derives an approximate initial income distribution for Stages Three and Four. Section G is the Chapter summary and conclusion.

A. AN INCOME CONCEPT: COMPREHENSIVE INCOME

This section reviews the development of the concept of comprehensive income. Comprehensive income is defined as the amount that a person can consume without experiencing any increase or decrease in their capital. This is the income concept which according to Goode (1977) was developed explicitly for income tax purposes.¹ However, the concept can be reconciled with a concept of national income going back to at least as far as Adam Smith (1776, Book 2, p.271):

"The gross revenue of all the inhabitants of a great country, comprehends the annual produce of their land and labour ... after deducting the expense of maintaining ... their fixed ... and circulating capital or what, without encroaching upon their capital, they can place in the stock reserved for immediate consumption ..."

Comprehensive income is the concept which appears to be most commonly applied to assess the relationship between income and other economic variables. It is the concept behind the national income accounts which show the gain in a year, taking account of capital stock. While this is one of the preferred definitions of income, its interpretation is subject to a number of conceptual and practical considerations.

A.1: Comprehensive Income as a Measure of Economic Rights

While income has been regarded as a measure of personal gain for some time, the meaning of "gain" has evolved to incorporate the idea of

1. The Americans knew the concept from Haig and Simons (1938). However, according to Goode, this concept was presented earlier by von Schanz (1853-1931), a German economist who was the founder and editor of Finanz-Archiv in 1896. Schanz was anticipated by Davidson writing in Swedish in 1889.

purchasing power. For example, the general equilibrium models incorporate income by defining household consumer classes where income is equal to consumption plus savings.

Writing originally in 1921, Haig defined income as "the net accretion of one's economic power between two points in time".

Simons (1938), saw the concept of economic power in terms of rights and the potential of what is gained to fulfill need. He defines personal income as "the algebraic sum of (a) the market value of rights exercised in consumption and (b) the change in the value of the store of property rights between the beginning and end of the period in question". Income is seen as gain and can be measured by adding consumption during a time period to wealth (accumulated income) at the end of the period less wealth at the beginning of the period.

Culyer (1973, p. 48) simply defined income as 'potential consumption', that is:

"the value of consumption that is possible in any time period without reducing the value of ... wealth."

Under Simons' definition, a person's store of property rights is equivalent to the income value derived from ownership of factors. In empirical terms, income could thus be seen as including money-income, income in kind, fringe benefits received as personal income, gifts, capital gains, undistributed corporate earnings, income earned from foreign sources and so on.²

In the context of an economy where there is a government, an individual's economic power to fulfill need would be reduced by the government's tax claims and enhanced by the provision of public goods (which obviates their acquisition through the market or meets needs not met in the market place).

2. As Goode 1977, p.8, expresses it: "In an enumeration that may have appeared deliberately provocative in 1896 in the light of much doctrine and tax practice, Schanz made clear that his definition included not only ordinary profits but also the usufruct of property, gifts, inheritances, legacies, lottery winnings, insurance proceeds, annuities, and windfall gains of all kinds and that all interest paid and capital losses should be deducted."

However, although the net money-income gain from government taxing and expenditure activities is consistent with a comprehensive income measure, early economists did not include it as such.

Simons' definition of income presents valuation problems centred on the condition that there is to be no reduction in capital. A major problem is to find a satisfactory measure of the net change in capital values over a period. Or as expressed by Kaldor in what he calls 'ordinary terminology':

"Income is Consumption plus Net Savings; the problem of defining Income is really identical with the problem of defining Net Saving; which in turn is merely a different aspect of the problem of what is meant by 'maintaining capital intact'". (1955, p.57).

If capital comprises only non-human wealth and it is said to be intact if the money value does not change within the period, the net change in capital can be measured. Unfortunately, this narrow perspective rules out some of the significant determinants of economic power and gain related to human capital.

The problems compound when it comes to finding empirical data which properly account for the relative economic positions of individuals or households, measuring both consumption and accumulation. As Simons argues:

"Money affords, of course, a very imperfect unit for purposes of such measurement ... The measurement of consumption also presents grave difficulties, in principle, especially in the case of receipts in kind."

Accumulation is difficult to measure in practice because of the existence of unrealised and realised capital gains. For example, how is the position of someone who wholly owns his or her house to be compared with someone on a similar income who has a mortgaged house or with another person on the same income who has sold a house to buy paintings? Perhaps the differences in financing home ownership could be explained by the age of the adults in a household. A life cycle approach measures income defined to include earned and realised income as well as capital gains over a person's lifetime. This gets around some problems of comparison because it can be assumed that everyone realises their capital

over a life time, providing that a change in the ownership of assets (such as through inheritances or bequests) is treated as realising the asset. Using realised income only as a proxy for the concept of accumulation may provide a more workable empirical approximation of accrued income (than comparisons of capital plus realised gains). Over a taxpayer's whole life, the accumulated total of realised income should come to the same total as the accumulated total of accrued (consumption and wealth) income.

The basic treatment of income in the general equilibrium literature is consistent with Simons' concept of income, defined as the algebraic sum of the individual's consumption expense and accumulation during the accounting period. The SWF literatures provides the basis for there to be a consistent linkage between personal income (the returns to personal endowments of labour and capital,) and national income (the total return to labour and capital, a macroeconomic aggregate). Some account is taken of the government's influence on income by the direct inclusion of lump-sum transfers such as unemployment compensation and social security. Tax payments are subtracted from household income. Finally, the models acknowledge the supply and demand effects on household income by defining the various income groups by their budget constraints where consumption plus savings equals income less tax.

As discussed in Chapter Two, the representation of reality created by general-equilibrium incidence models is extremely stylised, even when the models are disaggregated in 100 sectors like Piggott and Whalley (1976). The income concept is heavily qualified because of the limiting assumptions applied in deriving the model. The general equilibrium approach is centred on the specification of the household demand for several consumer goods. The detail of the determination of household income from changes in the return to factors and relative prices is largely ignored. This is because income levels are imposed as the household budget constraints rather than endogenously determined by the model. Some of the SWF models have made a beginning at treating the issue of capital gains for a number of sectors by modelling household assets (see Slemrod, 1983). A logical further development would be to model the income flows generated by these assets.

Now turn to a life cycle approach to measuring income, which is itself not without its problems. The major difficulty, already mentioned is that of valuing capital gains (or losses) given changes in asset prices. Furthermore, there are several reasons why the life-cycle income approach is not a good measure of an individual's perceived welfare at a particular point in time. These include imperfections in the capital market that make it difficult to borrow on future earnings; the inherent uncertainty of the future income pattern for individuals; and the shortsightedness of consumers, who limit their aspirations to what they can afford now out of current money income. Or, to put it in more down-to-earth terms, the knowledge that with government-provided superannuation it is possible to have a certain income twenty years from now has little current welfare value if a person is presently unemployed and unable to qualify for an unemployment benefit.

In summary, a comprehensive measure of income is one that takes account of individual economic rights to acquire preferred goods and services. The problem is to find a method for measuring this concept.

A.2: Income and Economic Welfare

Putting aside the problems of evaluating net savings, the purchasing power of money-income or of an even broader income concept covering an individual's total contribution to gross domestic product, any statistical measure of income can only provide a rough comparison of an individual's satisfaction relative to other individuals. As income is used to acquire houses and cars and television sets and other apparently marvellous inventions (which often need continual maintenance and repairs), there is usually a dawning awareness that the secret of happiness lies not in the multiplicity of possessions but in the paucity of wants.

And having a large income does not necessarily bring a release from the problems of need. This is evidenced by comments by Princess Anne's husband a few years ago "that we are like any other young family with a mortgage to pay" or the Marquis of Tavistock, who when returning an antique Maori head to New Zealand, complained to the newspapers about being "lumbered with" the huge Woburn Abbey estate.

Increasing income is not always a significant way of reducing wants, because reducing wants often does not come down to just having enough income to acquire the latest model car or the fanciest video gear. Much of the time it translates into more esoteric things such as having children who are healthy, beautiful and talented. Or it means having a career that is as exciting or a tennis serve that is as good as someone else's. It can even mean "mundane" things such as getting rid of pimply skin, body odour or some aspect of poor health.

In short, most measures of income and wealth do not really come close to evaluating the significant factors which determine the quality of life or what economists broadly refer to as economic welfare. Further, they do not reflect differences in individual tastes and preferences. Thus, while it may be possible to order relative household income or the relative wealth positions of households, it is not possible to know if these measures also order households in terms of the household's perception of welfare.

In addition, knowing a person's income tells us very little about the costs entailed in acquiring the income - costs which vary between individuals - such as the time taken to get to work and back, the hours spent away from home and family, the extent of mental stress and illness suffered to maintain the income, the extent of feeling imprisoned to an occupation or employer. Clearly, earning a large income and/or having considerable wealth is no guarantee on its own that an individual is loved or able to enjoy life.

Nevertheless, taken to its ultimate conclusion, the argument that income is not a good measure of welfare becomes, for some, a rationalisation for accepting things as they are. This denies the considerable evidence that having a low income correlates with hardship in the form of poor nutrition, poor health, alienation from society, lack of opportunity and many other maladies which are signs of deprivation, if not in an absolute sense, at least in a relative sense. Finally, the extent of the government's budget influence on the economy depends on the constraints of limited factor endowment, the current state of technology and consumer tastes. Income is a unit of analysis which can be applied to sum these disparate effects over the population.

A.3: The Time Dimension and the Formation of a Consistent Model

Three different time elements can be identified in the study of redistribution. First, the common objective of an explicitly redistributive policy is to deal with a short-run crisis, such as providing a subsistence income to an unemployed person or to other persons unable to work. Behind this short-run consideration, which tends to result in budget measures aimed at providing an immediate money-income benefit, lurk the second and third time-frames. The second time-frame is the time reference of household decision-making. The third time-frame relates to the time it takes for a new government measure to result in a new equilibrium, usually a long-run consideration.

Turning to the first aspect of "time", explicit government redistributive policy requires a means of identifying those requiring more income. Most income statistics are measured over a calendar year. A limitation of annual income as a measure for assessing budget incidence is that the effect of budget measures will vary between people who possess capital value and annual income in varying proportions. Another limitation is that an annual income measure may hide those households requiring immediate income support during the seasons of the year when they are unable to earn income.

For an understanding of the time-frame governing household decisions, it is necessary to engage in a study of human behaviour beyond the scope of this thesis. For the majority of household decisions, the appropriate income concept might be found to be permanent income. Underlying the permanent income concept is the assumption that people incorporate a view about their life-time income into their current decisions. The definition of a person's "permanent income" includes an assessment of expected wage income, capital receipts and the probability of survival. Capital receipts refer to bequests and gifts received. General-equilibrium analysis can provide insight into the issue of how a specific change in government policy changes permanent incomes in the long run.

The standard Harberger (HMM) model (which was discussed in Chapter Two and put to one side) defines net saving as zero and assumes a no growth economy where capital and investment remain constant. Under these conditions, the change in the distribution of capital to each sector can be measured. Since most of the general equilibrium models are long-run (because capital can shift between sectors), their treatment of income could be seen as consistent with a life cycle

In interpreting the results of general equilibrium analysis, it must be acknowledged that the perfect capital market assumption plays a key role in generating an equivalence between an individual's expenditure base and lifetime receipts. The effect of this assumption is that individuals can (and because they are rational, they do) borrow and lend freely at an interest rate appropriate to allocating resources efficiently. The assumption of a perfect capital market assists in analysing life cycle issues. Unfortunately, however, it may obscure some of the significant effects of relevance to income support policy. In real life, the ability to borrow and the interest rate available for lending and borrowing may be more a function of an individual's current comprehensive income than of their expected future income. Even when individuals have perfect information, they might not be able to take the desired action if their comprehensive income is below that of others wishing to borrow.

A fundamental question for income maintenance policy is what relevance "permanent income" has for those individuals eligible for government-provided income support. One common belief is that an increased level of income support will result in an increase in capital values because some of the income-support money will be invested rather than spent to meet current needs. While it is possible that in general that individuals respond to increased income by increasing their assets, it seems implausible that the response of low-income individuals would be as marked as for the middle and higher income groups. A more plausible case can be made for the view that the time horizon of households is related to income with those on higher incomes having longer time horizons.

The time-frame relevant to the adjustment to a new equilibrium after a government measure is introduced involves a counterfactual problem. The valuation of the real spending power of individuals once their current income has been adjusted for claims on it by the government and, in turn, for goods and services which the government supplies in return for its levies on individual earnings, requires a view of the ongoing effects of previous government activity. The level of the individual's income in any given year will have been influenced by previous government measures and the influence may have a significant effect on redistributing incomes.

A strength of HMM and SWF models is that they treat the issue of the counterfactual consistently. Instead of aggregating results obtained from a number of partial static analyses, each cast within its own time dimension, total budget incidence is cast within one time dimension. A general equilibrium budget change is the comparison of two equilibria - one before the budget measure is introduced and the other after the economy has adjusted to its introduction. The SWF empirical studies resolve the contradiction between the desire to measure change over calendar time for policy purposes and the fact that the time period for the differential incidence adjustment is unknown by assuming that the important tax and benefit effects on money-income are particularly significant in a calendar time period (probably a year).

Most SWF general equilibrium models for assessing the effects of the budget on income distribution are long run. These models attempt to determine whether recipients of government budget policies benefit when all adjustments to taxing and spending have taken place. The usual approach is to define the problem as one of balanced budget incidence, comparing two comparative static equilibria. In this case, as far as general equilibrium theory is concerned, the actual time it takes to get to a long-run is irrelevant. But in reality, human life is limited, so the time it takes to get a long-run is relevant.

B. INCOME CONCEPTS UNDERLYING EMPIRICAL STUDIES OF BUDGET INCIDENCE

A whole spectrum of income concepts have been applied to the determination of budget incidence, or in the case of some earlier studies, to determining tax incidence. The income measure adopted is determined by the definition of redistribution and the nature of restrictive assumptions which are imposed. This section is devoted to a discussion of some of the main treatments of income in the empirical and quantitative studies of budget incidence.

McLure (1974, p.5) attempted a general statement of the problem underlying the estimation of budget incidence. It "involves determining how the real incomes of various groups, where income includes the benefits of public services, differ from what they would be in the absence of government."

In the McLure analysis, income is a measure of gain, which takes account of the effects of the budget but while the above statement claims to represent the treatment of income in studies of "balanced-budget incidence", a closer look at the literature shows that different budget incidence studies attempt to grapple with different characteristics of the income concept. Not all the income concepts are designed to be consistent with the balanced-budget incidence approach. Also, many researchers have found ways of measuring the benefits of public services by defining an initial income base which includes government.

Implicitly or explicitly, studies of budget incidence attempt to come to terms with up to four main characteristics of the income concept:

- a) Is the measure of income a common denominator which can be used for making a **theoretically consistent comparison** of the pre- and post-budget economic position of an individual or household?
- b) Is the measure a **comprehensive standard** of some defined household or individual "economic position", over a given period? For example, does it cover all the elements of gain which a household considers to be income?

- c) Does the measure enable a **ranking** or ordering of individuals or households in terms of their "economic positions", however defined. In other words, is the measure one which can be adjusted for the effects of different government policies as well as showing the changes in the relative incomes of households?
- d) Does the income measure provide the appropriate base for assessing **effective incidence**, that is, the capacity to pay taxes. For example, the improved economic position of the household from an excellent government-provided education system would show up in (a) above but it might not add directly to the cash income of the household (at least not immediately) so the household's ability to meet current tax demands would not be enhanced.

Different studies have emphasised the above issues in various ways. It appears that the different treatments relate to the methodological approach and, often, an implicit view of the policy question which is being addressed by studies of budget incidence.

B.1: A Selection of Empirical Income Measures

Gillespie (1965 and 1966) whose contribution to the literature was a confident attempt to assess the effects of the expenditure side of the government budget, as well as the revenue side, gave explicit treatment to characteristics a) and b).

Looking at characteristic b) first, Gillespie set out to measure the change in an individual's "economic position". In defining "economic position", Gillespie reasoned that each individual owns a collection of assets (including the capitalised value of labour) and the income flows from these define the individual's economic position relative to that of all other individuals. But, Gillespie felt that the lack of sufficiently detailed data on individual holdings of all assets precluded empirical investigation and chose instead to rely on current income as the reflection of an individual's asset position. His definition of current income includes salaries, rent, interest and transfer payments.

Current income is further distinguished as either "family money-income" or "broad income", the main difference being that "broad income" includes non-money items which are a source of income for some families. Examples of non-money income are food and fuel grown and consumed on the farm and imputed interest of financial intermediaries. Gillespie's "broad income" measure is similar to personal income as defined in the Canadian National Accounts. He aggregates income by family units.

Gillespie's is a comparative static approach, in common with the more formally specified general equilibrium studies. The original income base or the pre-budget equilibrium is "in the abstract realm of pure theory, a private economy ... [which exists p]rior to time "t" [such that] the individual had no method of satisfying his social wants, wants, that is, that can only be satisfied by goods consumed (or, at least, which are available for consumption) in equal amounts by all." (Gillespie, 1966, p.1.)

Then, at time "t", a government is created to provide goods which satisfy individual's social wants. The economy makes a complete adjustment to the introduction of the government at time "t + 1". Gillespie's measure of fiscal incidence is the measure of the change in an individual's "economic position" due to taxes and the benefits from government expenditures (measured in current-money-income terms, as discussed above) compared to the individual's position before the introduction of the government.

To render the money-income concept consistent with what he calls "fiscal incidence" analysis, Gillespie adjusts his empirical measure of current income before the introduction of the government (the pre-budget income distribution) to take into account retained corporate earnings, capital gains income, the unshifted portion of the corporate income tax and the backward shifted portion of social security contributions.

Bishop (1961) argues for an even broader empirical income measure than Gillespie's. "If the burden of all taxes is to be imputed to individuals, all of the income or product on which the burden may fall must also be imputed to individuals". (p.46). This is not so much a question of theoretical consistency or defining an individual's economic

position (a and b above) as a question of whether the income measure provides an appropriate base for assessing effective incidence (d above) for different income earners (c above). Bishop's approach, however, does make an important theoretical contribution in as much as it is a precursor to Harberger's treatment in 1962 of the effect of taxes on both the sources and uses of income. "If account is taken of the full effects of economy-wide taxes, it becomes difficult to distinguish the effects of general taxes on sales from the effects of taxes on factor income". (p.43). Thus, national product rather than personal income should be the income concept for assessing tax incidence.³

However, Bishop favours net national product (which in the United States income accounts includes indirect taxes) as the appropriate income measure rather than gross national product. Gross and net in the United States accounts refers to total product before and after deduction of capital consumption allowances. Bishop ignores capital consumption allowances because "it may be legitimately assumed that in the aggregate capital must be maintained and that the weight of the tax burden relates to how much net product is diverted from other uses".

Meerman (1974) further develops Bishop's use of net national product as the underlying income base, agreeing that the logic of budget incidence analysis requires that all output be distributed to private claimants. In this respect, Meerman's argument is concerned with income characteristic d) (see introduction to Section B above), the expression of an income base wide enough to give an appropriate measure of "effective budget incidence".

In addition, Meerman rekindles some earlier arguments in the literature relating to the theoretical basis for deriving pre-tax income so that it represents a distribution in the absence of government. Studies based on Musgrave et al (1951) followed what Meerman identifies as "the adjusted national income approach" where personal income is the

3. There is an additional question here which Bishop does not address. The Americans have traditionally measured national, rather than domestic output. National output includes the income and products of overseas assets owned by residents while domestic product refers to production within the country only. An important question is which base "bears the burden" of taxation?

pivotal concept. To derive a pre-budget income measure, personal income is then "adjusted" to take into account:

- 1) Those taxes which are assumed to burden factors of production directly such as the unshifted corporate profits tax, unshifted export taxes, the portion of the employer's social security contribution (which is assumed to be paid by the wage earner through reduced wages);
- 2) other income or gains (for example, undistributed profits, capital gains); and then,
- 3) personal transfer payments are subtracted out on the basis that these are non-market incomes which would not exist without the government.

This resulting augmented income measure is referred to by different authors as "adjusted income" or "broad income". As a pre-budget or baseline income distribution, it is designed to exclude any adjustment for the influence of the government. Prior to Meerman, this was interpreted to mean that all taxes which were believed to be shifted to the uses of income (that is, paid by consumers) are excluded. In practice, this means that indirect business taxes and that portion of other taxes which are assumed to be paid by households as final consumers (such as the corporate income tax), would not exist in the absence of the government and are therefore excluded.

Meerman notes that national income is an appropriate measure of all factor income; however, it does not include indirect taxes. Under the United States national income accounting approach, factor incomes sum to national income which is then adjusted to market prices by an adjustment for indirect taxes. National income plus indirect taxes is equal to net national product.

To avoid the problem of including indirect taxes in the pre-budget measure of income, national income could be selected as the appropriate base. Meerman shows, however, that indirect taxes are no different from other taxes inasmuch as they represent the resource claims or purchasing power of the government. Thus, in Meerman's view, net national product

(NNP) is the relevant national income concept because it takes account of such resource claims.

Another way of looking at this issue is from the sources and users sides of the household account. The sources or income side of a household transactions account already includes indirect taxes (they are only paid when the income is spent). When this income is grossed up to total domestic product, an allowance for indirect taxes is explicitly added into the income base to derive the real value of broad income in the absence of the government. From the users side of the household account, spending power is greater in the absence of indirect taxes both because factor incomes would be higher and because market prices are lower.

The conclusion to use net national product at the base makes it more difficult to generate a pre-budget income distribution in quantitative studies where only the income function is specified and where the effects of changes in demand are ignored. As Meerman points out, there is no reason to believe that the pattern of the incidence of indirect taxes as derived from patterns of consumption "would be the same pattern implicit in 'restoring' factor incomes to NNP to get a conceptually more valid measure of total pre-tax income. In short, increasing the factor incomes of various income brackets for the presumed incidence of indirect taxes according to current canons of tax incidence would not be a valid procedure." (Meerman, 1974, p.522)

The SWF general equilibrium studies of budget incidence would have no difficulty with Meerman's conclusion that pre-budget income cannot account for indirect taxes simply by adjusting the uses of income. The Harberger approach and later models would enable account to be taken of the existence of indirect taxes on both factor incomes and aggregate demand (that is, in terms of both the uses and sources of income).

Moon (1977) takes a different angle to the national accounting approach followed by Bishop and Meerman in their discussion of an income measure. Going back to the introduction to Section B, her emphasis is on income characteristics b) and c). Her interest is to derive an income measure which is a comprehensive standard of household (family) "economic position" and which enables ranking in terms of this standard.

In Moon's view, the effectiveness of programmes with redistribution goals cannot be determined unless families can be adequately ranked by level of "economic status". "Economic status" is a concept designed to indicate a family's command over all goods and services. Since families at the same income level may vary substantially in their ability to consume goods and services, Moon finds the traditional money-income measure is inadequate, preferring "broader, yet quantifiable measures of economic welfare".

Thus Moon develops what she considers to be "a comprehensive measure of economic welfare" which captures the yearly potential consumption for families consistent with a life-cycle hypothesis of savings. A family's utility is treated as a function of attainable consumption in both the current and future time periods and is maximised subject to the resources available to it over time.

The present value of an individual's or household's total resources is defined as the stock of assets at the beginning of the present period plus the current non-property income plus the expected non-property income adjusted for the years of life expectancy for the individual and the rate of return on assets. Consumption in any given time period is proportional to the present value of the total resource flow accruing to one individual over the remaining years of life. The exact proportion devoted to consumption in each time period depends on the age of the person, the rate of return on assets, and the form of the utility function.

Moon's theoretical measure of economic welfare (W_t) is defined as:

$$\text{where} \quad W_t = \hat{C}_t = (\hat{H}_t + S_t)$$

t = time period

$\hat{C}_t$ = an "expanded" concept of current potential consumption.

$\hat{H}_t$ = all current net inflows of resources available to the household for consumption (except property income).

S_t = share of net worth available for consumption.

In her theoretical measure of economic welfare, Moon further adjusts household income plus savings to take account of a concept of family needs. Then the current resource component ($\hat{H}_t$) is defined to include: 1) household earnings; 2) other income, including cash gifts from relatives, private pension payments and so on; 3) the net value of the government (including both taxes and expenditures, similar to the concept in this thesis; 4) a measure of intrafamily transfers which are mainly in-kind contributions centred on the provision of accommodation and which have particular relevance for the elderly; and 5) the value of leisure and non-market productive activities.

Moon found that including leisure and other non-market activities in income, created problems of valuation. The income values for these activities are difficult to identify (and quantify) precisely because they do not correspond to market transactions. So, although they quite probably generate economic welfare, it would be difficult to include them in a study which needs to establish the relative measured income positions of people or households.

Moon's is a primarily micro-economic approach viewed within a standard utility function framework. Her particular interest is in applying her measure of economic welfare to an aged family. Moon's main contribution to the economics literature is an empirical measure of annuity and the valuation of in-kind benefits to the aged for programmes such as medicaid. Her contribution to quantitative studies is a more comprehensive concept of the household budget constraint, which takes account of the determinants of income and consumption.

B.2: Income Defined in Redistributive Studies

In the end, the definitions of initial and final income may rest on whether income redistribution is seen as either a **normative** or a **positive** issue. When the analysis of income redistribution is treated as a positive issue, the consideration is to isolate the measurable feature of the concept and then define it in that way. When it is treated as a normative issue, the first consideration is what the purpose of the analysis is and then some concessions must be made to scientific rigour in order to achieve answers.

The choice of an income base and, in turn, the definition of income, comes back to the underlying theoretical approach adopted and the definition of the problem to be evaluated. Behrens and Smolensky (1973) explicitly discuss how income redistribution ought to be defined, presenting four alternative general equilibrium definitions of redistribution. Reynolds and Smolensky (1977) try to adapt Behrens and Smolensky's definitions to measure the redistribution of income in the United States, apparently finding that the general equilibrium problems involved make it difficult to apply any of them as empirical measures.

Behrens, Reynolds and Smolensky (BRS) argue that definitions of redistribution differ because they result from different "counter-factuals". Any measure of redistribution involves comparing a distribution of money-income "before" certain taxes, transfers and other government expenditures with a distribution "after" and this implies breaking into the ongoing interaction of interdependent public and private decisions with some "counterfactual" to measure the distribution of income "before" any changes take place. This is called the "baseline" distribution and is similar to the concept of "initial" income.

Four different approaches for measuring the net distributive effect of the government are distinguished. From these, four different baseline distributions may be derived.

- 1) **The zero government case** excludes all government expenditures and taxes from the baseline (that is, the pre-budget income distribution) and includes all effects of government fiscal activities in redistribution.
- 2) **The Lindahl equilibrium case including transfer payments** is the baseline where non-taxed recipient benefits (transfer payments) are considered to be allocative budget measures and are included in the baseline distribution consistent with the conditions for Pareto-optimality. The view taken in this case is that transfer payments provide benefits to those who pay taxes, rather than to the direct recipients.

- 3) The Lindahl equilibrium case excluding transfer payments from the base line where non-taxed recipient benefits are removed from the baseline distribution and included as the redistributive effects of the government. This is consistent with Lampman's view that redistribution is the receipt of "consumer-power income" by the individuals that does not correspond to their "producer-contribution".
- 4) The Smolensky-Behrens case has as its essential characteristic that the primary distribution is an optimal one in terms of some social welfare function. Or in other words, the government's allocative and redistributive activities are designed to meet some explicit ability-to-pay criterion which is reflected in the baseline distribution.

Turning to cases 2) and 3) above, a Lindahl equilibrium establishes the conditions where the value of benefits received from government spending are equal to the taxes paid (see Chapter Two, Section A.3 for a discussion of the Lindahl equilibrium in relation to Meerman's model). The government's allocative policies (the government-provided collective goods and services) can be distinguished from its redistributive policies (government measures with the explicit aim of changing the existing income distribution).

Briefly, under the Lindahl conditions the allocative activities of the government may be defined as those activities which increase the efficient use of resources. The government is the institutional arrangement where individuals group together to buy collective goods and services, which because they are allocated efficiently, are paid for at "market prices". According to an efficient Lindahl solution, the income value of each collective good to each taxpayer is equal to the product of the marginal rate of substitution (MRS) and the amount of the public good. The difference between the taxpayer's MRS and the tax paid represents the entire redistributive effect of public good. The effects on factor incomes which arise incidentally from the government's allocative activities can then be excluded from the baseline (they are to do with the efficient allocation of resources).

Behrens, Reynolds and Smolensky's concepts of redistribution by no means exhaust the theoretical possibilities, but they illustrate the wide range of interpretations which might be given to the notion of redistribution. Reynolds and Smolensky (1977, p.23) believe that none of the definitions has much operational value from an empirical view. In other words, they are unable to resolve the difficulty of isolating government-generated effects on income distribution from the other on-going economic effects.

The authors believe that of all the options, the zero government budget is an extreme and theoretically inappropriate conceptual experiment, particularly because any observable pre-budget distribution already reflects a host of market adjustments to government behaviour. In practice, some economic analysts seem to assume that the distribution of "pretax" market incomes would be no different if government were zero. This is not a very fruitful interpretation either since government effects are unlikely to be zero.

In contrast, McLure (1974, p.21) argues, that despite its shortcomings, the zero-based budget alternative is the best for studies of budget incidence, mainly because it is easier to implement operationally. Even if the conceptual basis of the three other BRS alternatives discussed above is thought to be stronger, their empirical content is not great. For example, making the second measure of redistribution consistent with a Lindahl equilibrium, depends critically upon knowing the pattern of benevolence in an economy of millions of individuals (because transfer payments are evaluated on the assumption that they benefit those who pay for them, not the recipients). The Smolensky and Behrens fourth redistribution concept fares as poorly. What constitutes an optimum distribution or the "best initial distribution" is, of course conceptually unknown and, therefore, cannot have an empirical representation.

A major difficulty is finding a theoretical construct which consistently treats notions of redistribution, government activities and of income. Meerman (1978) shows how a comparative statics approach may be defined so that the change in income distribution from a change in budget policy can be assessed. His method does not depend on the assumption of a zero government counterfactual (see Chapter Two, Section A). The difficulty with the Meerman approach is that the adjustment is

long-run (capital can move between sectors) and the time period of the adjustment is unspecified.

The burden of the BRS discussion is to argue that it may not be sensible to try to discover the aggregate redistributive impact of government in a given year. Instead, Reynolds and Smolensky's research traces differences in the size distribution of income over a period of some 20 years by comparing income in three different years (1950, 1961, 1970) which is defined to include the benefits and burdens of government at all levels.

Reynolds and Smolensky claim that measuring changes between years makes fewer demands upon the conventional technique than trying to measure the size and nature of redistribution in a single year. Firstly, it obviates the need for a hypothetical counterfactual to measure the "before" distribution (the distribution of money income before taxes and redistributive transfers provided by the government). Conceptually, the final distribution of income is viewed as the simultaneous outcome of both public and private activity even though the calculations are performed in a stepwise sequence which suggests independence. The final distribution in the first year becomes the base for assessing any change in the pattern of redistribution. Secondly, any biases are in the same direction in most years, and thirdly the biases are likely to be of similar magnitude within the range of distributive change in the United States during relatively short time intervals. These two conditions are sufficient to ensure that any measured, sizeable, distributive change by income class will be of the appropriate direction and magnitude.

Despite their reservations on theoretical grounds, Reynolds and Smolensky do discuss the redistribution of income by expenditure and tax categories for each of the three years. The authors argue that in a strictly arithmetic sense, differences between initial and final income inequality in a single year can be attributed to certain taxes or expenditures. Although this kind of disaggregation ignores all indirect behavioural effects due to a budget's effects (that might present an entirely different impression if they were known), it makes for useful speculation so long as the limitations of the comparisons are born in mind. The authors main intent, however, remains to concentrate attention on the changing distribution of final income over the period bounded by the three years studied.

C. THREE INCOME MEASURES BEHIND FOUR STAGES

As shown by the above discussion, defining an income concept appropriate for assessing the influence of the budget on income distribution, presents great complexities. An additional problem is presented because the choice of an initial household-income concept, as discussed in Section B above, is conditional on its use as a standard for so many alternative assessments, especially if the concept is to be adjusted for the effects of government budget policies. It is the common denominator for a theoretically consistent comparison of pre- and post-budget economic positions of the income unit; it is expected to be a comprehensive standard of "economic position" which ranks households by consumer power, the "ability to pay taxes" and economic welfare. Finally, it must also provide a base for assessing effective incidence for individual taxes and government expenditures.

When it comes to finding an empirical measure of a particular income concept or government measure, there are major information problems. On the one hand, there are many cases where the statistics consistent with a given concept are unavailable. On the other hand, there are cases where the theoretical specification of the concept is not adaptable for precise statistical measurement.

Existing definitions of taxable income, adopted by different countries for assessing personal income tax, cannot be defended because they do not consistently define an income concept. The definitions of income assessable for tax are not appropriate because they are the outcome of a long series of legislative acts and judicial decisions which reflect heterogeneous and sometimes conflicting principles and compromises dictated by purely administrative considerations.

An assessment of "the power of the household to consume" in terms of budget incidence, involves a mixed compound. It contains elements of a stock (an individual's disposable wealth at a point in time, the size of the government) elements of a "flow" (the regularly recurrent receipts, such as dividend or interest payments, wages or salaries in the case of an individual or tax revenue in the case of a government) as well as elements which cannot be properly classed in either category (the casual receipts like bequests, gifts or capital gains and so on whose recurrence may be wholly unpredictable).

Figure 3.1 below summarises the stages for measuring budget incidence in regard to how initial income is defined for each one. In all four cases, income is regarded as a proxy for welfare or utility.

FIGURE 3.1

INCOME CONCEPTS UNDERLYING THREE STAGES

<u>Stage</u>	<u>Initial Income or Pre-Budget-Income</u>	<u>Final Income or Post-Budget-Income</u>	<u>Valuation</u>
One	Household Survey: Market Income	Money-Income Ind Direct Budget Transactions	Market Prices
Two	Household Survey: Market Income	Income Valued for all Budget Trans- actions	Market Prices
Three	Bishop: Group Domestic Product	Broad Measure of Income	Market Prices
Four	Simons' Comprehensive Income	General Equilibrium Income	Real Values

Source: See text for derivation.

Stages One and Two may be seen simply as accounting identities where behavioural relationships only play a role when direct statistical measurement is impossible.

Stage One, the direct measurement, refers to the difference between market-place income directly accruing to the household sector and an income measure defined to take account of those budget activities which have an impact on the sources and uses of household income. Stage Two broadens the measurement of final income to incorporate values for the money-income effects of the entire central government income and outlay account.

Stage Three widens the initial income base, assuming along with Bishop and Meerman, that the welfare of persons is related to their country's national product. Unlike Bishop and Meerman's approach, however, consumption of fixed capital is included in the initial income

measure. Because the national income accounts and other statistical sources distinguish the household sector from the company and financial sector, this approach involves considerable imputation and approximation.

Stage Four is a comprehensive measure of income which is defined to be consistent with Simons' comprehensive definition of personal income. Simons' definition differs from Meerman and Bishop because it includes a measure for net accumulation during a period (that is, the change in capital).

As the reader will have surmised from the earlier discussion in the Chapter (see especially Section 8.2), the use of initial income (pre-budget) and final income (post-budget) designations is not entirely accurate. Since the government budgeting process is dynamic, and because there are lags involved with the private sector's response to budget measures, the pre-budget-income distribution will be influenced by earlier budget transactions and the post-budget distribution may not include all current-year budget transactions.

The meaning of the initial income and final income designations differs for each Stage. For Stage One and Stage Two, pre-budget income refers to the national income measure of market incomes earned by the household sector before the money-income values of the current year's payments to the government are deducted and benefits from the government are added. When fully specified as general equilibrium models, the Stage Three and Stage Four pre-budget measures would refer to household income before a small change in government budget policy. The final-budget equilibrium would refer to the equilibrium adjustment to the small change.

D. GROUPING INCOME INFORMATION : THE HOUSEHOLD UNIT

To generalise the results of this assessment of the effects of the budget on incomes, some groupings are required. The choice of a unit of analysis will make a difference to the interpretation of the results and will differ depending on the context in which incidence is analysed. The incidence problem may be viewed as a problem of properly allocating resources by factors (land, labour and capital) or even by social class. This is the nature of the incidence problem analysed by the HMM models. This thesis analyses the problem of incidence in terms of "size distribution of income" which is the grouping of earners by income range. The multi-sector SWF models extend the HMM approach to analyse tax incidence by size group by specifying several household consumption groups.

Income recipients may be further grouped by family relationship, household relationship or treated as individuals. A major consideration in choosing between these units is to define a group which is both an income sharing unit, a consumption unit and the appropriate group to share the benefits from factor ownership. The literature has concentrated on the former two characteristics.

The choice of a unit for assessing the income effects of budget transactions must take account of a variety of factors beside taxation. For example, the relative ability to pay (cash) in income tax may be more a function of individual behaviour than of household or family behaviour, while an individual's economic position may be mainly determined by living arrangements which are a function of family life. Households not only pool income and expenditure, they also pool wealth, in the form of housing. Even when elderly relations or other, perhaps unrelated, members of the household do not share equally in the pooling of income, expenditure and wealth, they do benefit from the household relationship. To treat them as an individual unit would not take proper account of this. In addition, the household is a common denominator for a much wider variety of social groupings than is the family.

Titmuss (1965), found that family relationships had an important part to play in determining taxation arrangements. His work is suggestive that assessments of ability to pay tax be based on the family

unit, rather than an individual, income concept. Because of the nature of tax legislation relating to gifting and estate management, the appropriate unit for the Titmuss analysis would include several generations resident in a number of private dwellings.

There is a variety of views for how to define a household unit. Webb and Sieve (1971) note that the household unit is used in the United Kingdom Family Expenditure Surveys because it is seen as the unit which pools income and shares expenditure. However, they think that family units which consist of single people, related-childless couples or couples with children, is a better representation of both an income and expenditure unit than the private household. They find evidence for this in the behaviour of young adult offspring "who are sharing the parental home before marriage" but who "participate only partially in the budgeting of the rest of the family". Webb and Sieve believe that married children, lodgers and families sharing accommodation should be presumed to be financially independent of the rest of the household.

Oulyer (1973, p.48) says in his analysis of income distribution studies for the U.K. that the "basic unit is naturally the nuclear family of adults and their children". He acknowledges that there is also a question as to how far to include other household members; but he thinks the decision comes down to the extent to which income is shared within the household. If incomes were not shared very extensively, "poverty amongst ... the elderly will be understated by using the household as a unit." He concludes that the best unit is the nuclear family and income transferred outside the nuclear family should be treated as separate sources of income for those additional household members.

Recent debate about the unit for assessing personal income tax has questioned whether even the nuclear family unit represents a group which pools income and shares consumption. The supporting argument is that often even in the best relationships, income or the potential to consume is not shared equally among family members. In addition, given the decline in the proportion of nuclear families in New Zealand and the trend towards single adult and three adult households, the individual may be the fairest unit on which to base policy.

Much policy in New Zealand, has concentrated on family relationships. For example, the domestic purposes benefit is only paid

to a solo parent unit when there is no other nuclear family support (the existence of a *de facto* relationship rules out eligibility for this benefit). Eligibility for other benefits, such as the family benefit and national superannuation, is also defined by family relationships.

Increasingly, however, eligibility criteria for benefits, tax expenditures or rebates have been defined to take some account of private home ownership or in other words to target, the household as the recipient unit. Government measures which target the household include the home ownership rebate and the rates rebate.

In the end, the unit of analysis selected for this thesis was the private dwelling. The private dwelling was chosen because it came closest to representing factor ownership and could be more easily adopted to the methodology of general equilibrium studies. In practical terms, factor ownership comes down to ownership of shares in productive units (companies) and property. The latter two factors may be broadly considered as wealth. There are little data about wealth ownership in New Zealand, but a case can be made that for the majority of people, a home is the major if not the only source of wealth⁴. Thus, the private dwelling or household is the appropriate unit at the base of a study of income redistribution because it is a unit which pools income, expenditure and wealth.

In conclusion, then, for most of the quantitative results in this thesis the private dwelling is the unit of analysis. It is referred to as a household unit. This unit is the same as the unit at the base of the Census and Household Survey. Household units are grouped by household types. Household types are defined by the age and number of adults residing in private dwellings rather than by family units. Single-adult and three-adult households make up a significant proportion of the households. However, both the Household Survey and the Census also collect information on an individual basis. A feature of the way the SAS computer technique (the technique used to analyse the data) operates is that the results can be tabulated in both household units and individual units, when the basic information is specified by both units.

4. Another major source of wealth is superannuation. If wealth could be measured, the present value of a private super scheme may in many cases exceed the present value of a person's home.

E. NEW ZEALAND HOUSEHOLD INCOME DISTRIBUTION

This section applies available New Zealand income data to tabulate the initial distribution of market income by household-market-income deciles and household type. **Initial income** refers to the income concept at the base of the four stages. Initial income in Stage One and Stage Two is market income; for Stage Three it is national income; and, for Stage Four, it is national income adjusted for capital gains. Section E focuses on the distribution of market income, the initial income for Stages One and Two. Section F discusses the derivation income for Stages Three and Four.

Appendix Three describes the four main sources of income data which are collected regularly by the Department of Statistics. The sources are the 1981 Census of Population and Dwellings, the Household Survey, Inland Revenue data published in Incomes and Income Tax and the New Zealand system of National Accounts.

The Household Survey⁵ is the main data source for this thesis. It collects information about household expenditure and other household characteristics which can be adapted to derive initial income distribution as outlined in Figure 3.1 above. There are also sufficient data in the Household Survey to analyse households tax liability and to estimate the consumption of government-provided goods by income group.

Household survey income data can be aggregated up to represent the entire population of private households as reported by the 1981 Census. Section E.1 discusses the Household Survey definitions of income and household composition and the method for aggregating this information to the total population of private dwellings in 1981/82. Household Survey data are then grouped by market income in Section E.2, consistent with Stages One and Two. Section E.3 describes the distributions of persons by household type and some of the characteristics which have significance for the analysis in the thesis.

5. The Department of Statistics' formal title is the Household Income and Expenditure Survey (HIES).

Section E.4 shows several ways in which the results can be expressed and Section E.5 discusses the limitations of market income as a measure of initial income in a study of budget incidence.

E.1: Aggregating Household Survey Information to Cover All Private Households

The Household Survey asks respondents about all sources of income, including regular income and income which comes irregularly. Regular income is income where there is at least one receipt per year over more than one year. This includes income from wages and salaries, self-employment income, rents, interest, dividends, social welfare benefits including national superannuation and the family benefit, other pensions, annuities, maintenance and other regular income. Irregular income includes inheritances; lump sum payments from the Accident Compensation Corporation, social welfare, superannuation and insurance schemes; capital gains; and gambling winnings.

Only regular income is analysed in this thesis. This is because other types of income tend to be too unpredictable to be properly assessed by the small Household Survey sample and secondly, irregular income does not influence current income trends on a regular basis⁶.

The aggregate measure of regular income before the assessment of personal income tax is defined as "total income" in the Household Survey. As well as earned income, this measure includes government transfer payments such as national superannuation and the family benefit.

A private household is determined, for Household Survey purposes, by whether living essentials are shared. A private household can contain a single individual living in a private dwelling with separate housekeeping arrangements. Or it can be a group of persons living in or sharing a private dwelling for most of the reference period who participate (in some measure at least) in consumption of food purchased for joint use by

6. For example, winning the Golden Kiwi will be of obvious benefit to the household involved, but it is a random event and cannot be meaningfully generalised for income maintenance policy.

members, or who, if not dependent upon a household member, contribute some portion of income towards the provision of living essentials for the household as a whole.

If at the interview stage, people occupying a permanent private dwelling could be separated into groups, each achieving independence with respect to the purchase of food and the sharing of meals, then each group is considered a separate private household. Relationships between household members are defined with reference to the head of household.⁷ The head is selected by the household from those members who are at least fifteen years old and who earn a substantial income. The total weekly income of each household is obtained by adding together the income attributed to each earner in the household.

Institutions, which are publicly or co-operatively owned dwellings, are excluded from the Household Survey sample population. People living in institutions or group-living establishments such as boarding houses, hotels, motels and hostels are also excluded from the Household Survey. So are people who are long-stay hospital patients or prisoners. However, children at boarding school are taken into account by including expenditure on behalf of those children in the record-keeping of the parent or guardian.

The 1981/82 Household Survey covered 3,487 households. In this thesis, the 1981 Population Census is used to derive the total private household population in 1981/82. The method used to gross up the Household Survey data is discussed in Appendix Three, Section Two.

Analysis of Census data shows that most of the population lives in private households. Adjusting the data for the 1981/82 Household Survey results in about 95 percent of the population and 98 percent of income taxpayers, being resident in private households. The approximate 5 percent of the population who live in what are referred to in Census terminology as "non-private" households reside in institutions such as boarding houses or public institutions such as hospitals and prisons.

7. A more explicit classification of family relationships is recorded by the 1982/83 and later surveys.

Grossing up the Household Survey data to the 1981 Census results in approximately 1,035,200 private households⁸ in New Zealand in 1981/82. It is estimated that about 3,098,650 people lived in the 1,035,200 private households.

A useful feature of the Household Survey data and the Census is that households can be classified in different ways such as by type of household ownership or household composition, as well as by income group. Grouping households according to their composition, determined by the number of adults and children in the household and the receipt of national superannuation, makes it possible to compare income distributions within fairly homogeneous groups.

The data are grouped by number of occupants in the household with eligibility for the family benefit determining whether occupants are adults or children. The groups are not entirely homogeneous. For example, young (non-national-superannuitant) two-adult households comprise those made up of one parent and one adult child, childless married couples (legal or de facto), two unrelated adults sharing accommodation, or two adults related other than by marriage. However, about 76 percent of young two-adult households comprise married couples.

The Census data are used to adjust the Household Survey data slightly to more accurately represent the distribution of households by income and household type for the entire private household population.⁹ The next Section tabulates this information by income group and household type.

E.2: Distribution of Households By Market Income Group and Household Type

The measure used to tabulate households by income group is market income. Market income includes all the types of income which households earn through paid employment, or through investment or other market-place

8. This figure includes about 30,000 private households derived when Census incomplete (non-specified) data are pieced together to make-up private household (dwelling) units.

9. For an explanation of how the Household Survey data are scaled up to the census private household population see Appendix 3: WEIGHTS.

activities. Market income is composed of wages and salaries, self-employment income, investment income, and other regular income. It does not include income from social welfare benefits or other government-income-support policies. These latter activities are conducted by the government and are not the direct outcome of market forces.

Table 3E.1 shows the number of private households in New Zealand distributed into categories based on market income and household type. The largest household type is the two-adult (non-national-superannuitant) household which accounted for 155,360 households. The household type commonly treated as a representative household, is the two-adult, two-child household. Interestingly, this type is only the second largest of the ten household-type classifications and covers 130,820 households in total.

Table 3E.1

NUMBER OF PRIVATE HOUSEHOLDS: TABULATED BY
DECILE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ pa)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or more Adults		1 Adult with Chld'n	All House- holds
	Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil- dren	With Chil- dren		
(Thousands of Households)											
Less Than \$250	41	8	23	4	3	2	2	-	-	17	103
\$250-(\$3,950)	42	10	33	3	2	2	2	-	-	7	104
\$3,950-(\$9,750)	17	16	23	9	8	9	8	4	3	5	103
\$9,750-(\$13,450)	4	21	14	12	12	15	12	4	4	4	103
\$13,450-(\$16,900)	-	13	10	14	12	21	16	4	7	-	104
\$16,900-(\$20,250)	-	10	8	19	12	19	18	8	7	-	104
\$20,250-(\$24,200)	-	5	5	23	11	23	16	7	12	-	103
\$24,200-(\$29,200)	-	3	5	30	8	15	13	11	16	-	104
\$29,200-(\$36,650)	-	-	4	26	8	14	9	19	22	-	104
\$36,650 and over	-	-	3	14	5	10	11	27	32	-	103
Total	111	90	128	155	81	131	108	86	107	38	1035

Notes: Numbers may not add due to rounding to nearest thousand. Cells with insufficient observations designated (-). Sources: Estimated distribution based on data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

The third largest household type is the two-adult, national superannuitant household (households with at least one national superannuitant). This group accounts for 128,170 households. Three other household types each account for at least 100,000 households. These are: 1) one-adult households receiving national superannuation; 2) two-adult households with-three-children; and, 3) three-or-more-adult households with-children.

Another way of picturing the information in Table 3E.1 is to show the proportion of households in each cell. Table 3E.2 shows the percentage distribution of private households by market income groups (decile) and household type. The largest cells (representing the most households) are for one-adult national superannuitant households in the two lowest income groups.

Table 3E.2

**THE DISTRIBUTION OF PRIVATE HOUSEHOLDS
BY HOUSEHOLD MARKET INCOME DECILES AND HOUSEHOLD TYPE**

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or more Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
As a Proportion of Total Households (%)											
Less Than \$250	4.0	0.8	2.2	0.4	0.3	0.2	0.2	-	-	1.6	10.0
\$250-(\$3,950)	4.1	1.0	3.2	0.3	0.2	0.2	0.2	-	-	0.7	10.0
\$3,950-(\$9,750)	1.7	1.5	2.2	0.9	0.8	0.9	0.8	0.4	0.3	0.5	10.0
\$9,750-(\$13,450)	0.4	2.0	1.3	1.2	1.2	1.4	1.1	0.4	0.4	0.4	10.0
\$13,450-(\$16,900)	-	1.3	1.0	1.4	1.2	2.0	1.6	0.4	0.7	-	10.0
\$16,900-(\$20,250)	-	1.0	0.8	1.8	1.1	1.9	1.7	0.7	0.7	-	10.0
\$20,250-(\$24,200)	-	0.5	0.5	2.2	1.0	2.2	1.6	0.7	1.1	-	10.0
\$24,200-(\$29,200)	-	0.3	0.5	2.9	0.8	1.5	1.2	1.1	1.6	-	10.0
\$29,200-(\$36,650)	-	-	0.4	2.5	0.7	1.4	0.9	1.8	2.2	-	10.0
\$36,650 and over	-	-	0.3	1.4	0.5	1.0	1.0	2.6	3.1	-	10.0
Total	10.8	8.7	12.4	15.0	7.8	12.6	10.4	8.3	10.3	3.7	100.0

Sources: Estimated distribution based on data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households. See Table 3E.1 for number of households. Cells with insufficient observations designated (-).

The bottom row of Table 3E.2 shows the percentage distribution of households by household type.

As can be seen, 15.0 percent of households were two-adult, non-national-superannuitant households. Combining these with the two-adult, national-superannuitant households, results in 27.4 percent of private households comprising two adults (without children). In comparison, households with two adults and two children, comprised only 12.6 percent of the total private household population. Thus, **childless** two adult households were far more "typical" than two-adult, two-children households.

Less than half of the private households in New Zealand (only about 44.8 percent) include children as members. Of those households with children in residence, 68.9 percent also contain two adults. The remaining 31.1 percent comprise either one-adult or three-or-more adults residing with the children.

As can be seen from the final column of Table 3E.2 (which shows the percentage of households in each market-income group), the results are tabulated so that approximately 10 percent of all households fall into each income group. The income ranges, which vary from market incomes of less than \$250 per year to \$36,650 or over, have been specified so that they each contain 10 percent of households by household-market income.

In 1981/82, the average wage for a full-time wage and salary earner was around \$13,350 per year. About 40 percent of all private households had market incomes below this amount. This is despite the fact that there was more than one earner in many of these households.

A large proportion of households in the lower market-income groups are national-superannuitant households, especially one-adult, national-superannuitant households. Nearly 48 percent of the households in the four lowest income groups are one-adult or two-adult, national-superannuitant households. National-superannuitant households make up 58 percent of households in the three lowest income groups and 72 percent of the households in the lowest two income groups.

Table 3E.3 compares the income distribution by the different household types. One-adult, national-superannuitant households and one-adult, households-with-children are most heavily concentrated in the lower-income ranges. Childless two-adult households and three-adult households, with-and without-children are most heavily concentrated in the upper income ranges.

Table 3E.3

THE DISTRIBUTION OF PRIVATE HOUSEHOLDS OF EACH HOUSEHOLD TYPE
BY HOUSEHOLD MARKET INCOME

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or more Adults		1 Adult with Child'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
As a Proportion of the Total Households of Each Type (%)											
Less Than \$250	37.3	9.1	18.0	2.6	3.3	1.6	2.4	-	-	44.5	10.0
\$250-(\$3,950)	37.7	11.5	26.1	2.2	3.1	1.7	1.6	-	-	18.0	10.0
\$3,950-(\$9,750)	15.7	17.7	17.8	6.0	9.7	7.1	7.8	4.5	3.1	13.5	10.0
\$9,750-(\$13,450)	3.8	23.1	10.7	8.1	15.4	11.4	11.0	4.9	4.3	10.4	10.0
\$13,450-(\$16,900)	-	15.0	7.9	9.3	15.2	16.2	15.1	4.4	6.5	-	10.0
\$16,900-(\$20,250)	-	11.7	6.4	12.3	14.6	14.8	16.8	8.9	7.0	-	10.0
\$20,250-(\$24,200)	-	6.2	4.1	14.6	13.4	17.3	15.3	8.5	11.0	-	10.0
\$24,200-(\$29,200)	-	3.0	3.7	19.1	9.6	11.5	11.9	13.1	15.4	-	10.0
\$29,200-(\$36,650)	-	-	2.9	16.6	9.4	10.9	8.2	22.2	20.9	-	10.0
\$36,650 and over	-	-	2.4	9.3	6.3	7.5	9.9	31.8	29.9	-	10.0
Total	100	100	100	100	100	100	100	100	100	100	100

Sources: Estimated distribution based on data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households. See Table 3E.1 for number of households. Cells with insufficient observations designated (-).

If different income measures are used to classify households into income ranges, the distribution of households will change. When market income is the measure used to distribute households, a surprisingly large percentage earn very low market incomes. A more appropriate measure to assess a household's economic position might be total income. Total income comprises market income as well as benefit income (social welfare benefits, including national superannuation).

Table 3E.4 compares the different distributions using two income definitions - **market** or market-place income and **total income**. When the income measure used to group households by income range is total household (regular) income, the distribution of households moves towards the higher income ranges.

Table 3E.4

**COMPARISON OF PERCENTAGE HOUSEHOLD DISTRIBUTION
BASED ON TWO INCOME DEFINITIONS: MARKET INCOME AND TOTAL INCOME^{a)}**

1981/82 Household Income Range (\$ p.a.)	Private Households Grouped By:	
	Range of Market Income (%)	Range of Total Income (%)
Less Than \$250	10.0	0.3
\$250-(\$3,950)	10.0	1.8
\$3,950-(\$9,750)	10.0	21.0
\$9,750-(\$13,450)	10.0	11.3
\$13,450-(\$16,900)	10.0	10.8
\$16,900-(\$20,250)	10.0	11.0
\$20,250-(\$24,200)	10.0	11.1
\$24,200-(\$29,200)	10.0	10.4
\$29,200-(\$36,650)	10.0	11.1
\$36,650 and over	10.0	11.2
Total	100.0	100.0

Note: a) **Total Income** is **Market Income** plus **Social Welfare Benefits**.
Sources: Estimated based on the Department of Statistics Household Survey 1981/82, aggregated for the entire population of private households based on the 1981 Census of Population and Dwellings.

Transfer payments (government-provided monetary benefits) resulted in total incomes of above \$3,950 a year for most households¹⁰. Nevertheless, even when **total income** is the income measure which is applied, 34.4 percent of households are estimated to receive less than the average wage as measured by the Labour Department.

In the end, the choice of **market** income as the initial income concept for Stages One and Two comes down to the question of the best means of illustrating the effects of the government budget. Transfer

10. The lower income groups include self-employed earners who have made a loss in their business, normally a temporary condition.

payments, like taxes, are budget measures. Market income is defined to reflect money-income earned in the market place, excluding the budget.

E.3.b: Distribution of Persons by Household Type

Using households as the income unit gives one perspective on income distribution. Another perspective is gained when income distribution is analysed in terms of the total population of private household occupants. Table 3E.5 compares the percentage of people occupying private households of each type with the percentage of households of that type.

Table 3E.5

COMPARISON OF DISTRIBUTION OF PERSONS AND PRIVATE
HOUSEHOLDS BY HOUSEHOLD TYPE

Household Type	Percentage of Total Persons (%)	Percentage of Total Households (%)
1 Adult - National Superannuitant	3.6	10.8
1 Adult - Other	2.9	8.7
Total Single Adult Households	6.5	19.5
2 Adults - National Superannuitant	8.3	12.4
2 Adults - Other	10.0	15.0
Total 2-Adult Households Without Children	18.3	27.4
2 Adults with 1 Child	7.9	7.8
2 Adults with 2 Children	16.9	12.6
2 Adults with 3 or more Children	19.0	10.4
Total 2-Adult Households With Children	43.8	30.8
Total 2-Adult Households	62.1	58.2
3 or more Adults - No Children	9.4	8.3
3 or more Adults - With Children	18.7	10.3
Total 3-Adult Households	28.1	18.6
1 Adult with Children	3.4	3.7
Total Households with Children	65.9	44.8
All Households	100.0	100.0
Total Number	Persons: 3,098,650	Households: 1,035,200

Sources: Estimated based on the Department of Statistics Household Survey 1981/82, aggregated for the entire population of private households based on the 1981 Census of Population and Dwellings.

For example, as can be seen from Table 3E.5, those people living in single-adult households made up 19.5 percent of private households but accounted for only 6.5 percent of the total number of occupants in private households. On the other hand, the 44.1 percent of households with children accounted for 65.9 percent of all occupants. If **typical family households** are defined as two adults with any number of children, then **typical family households** made up less than a third of the household population and accounted for under 44 percent of all people residing in private households.

As Table 3E.6 shows, there is a fairly direct relationship between market income and household size (see Column E). The higher the income, the greater the number of occupants per household, on average. The average number of occupants per household in the two lowest income groups is only around half the average number in the two highest income groups.

Table 3E.6

AVERAGE NUMBER OF OCCUPANTS AND CHILDREN PER HOUSEHOLD
BY RANGE OF HOUSEHOLD MARKET INCOME

Household Market Income (\$ p.a.)	Private Households		Occupants of Prvt H'holds		Average	Average
	Number (000) A	Distri bution (%) B	Number (000) C	Distri bution (%) D	Number	Number
					of	of
					Occupants Per Household E	Children ^a Per Household F
Less Than \$250	103	10.0	193	6.2	1.9	0.5
\$250-(\$3,950)	104	10.0	179	5.8	1.7	0.3
\$3,950-(\$9,750)	103	10.0	252	8.1	2.4	0.9
\$9,750-(\$13,450)	103	10.0	284	9.2	2.8	0.9
\$13,450-(\$16,900)	104	10.0	334	10.8	3.2	1.3
\$16,900-(\$20,250)	104	10.0	342	11.0	3.3	1.3
\$20,250-(\$24,200)	103	10.0	366	11.8	3.6	1.4
\$24,200-(\$29,200)	104	10.0	353	11.4	3.4	1.1
\$29,200-(\$36,650)	104	10.0	362	11.7	3.5	1.0
\$36,650 and over	103	10.0	433	14.0	4.2	1.2
TOTAL	1,035	100.0	3,099	100.0	3.0	1.0

Note: a) Defined as those eligible for the Family Benefit. Sources: Department of Statistics Household Survey 1981/82, aggregated for the entire population of households based on the 1981 Census of Population and Dwellings.

The average number of children per household, however, does not vary so directly with income (see Table 3E.6, Column F). "Middle-income" households (households with incomes between \$13,450 and \$24,200), have

the most children, on average. The ratio of children per household is below average for the four lowest household income groups and is especially so for the two lowest groups.

As can be seen from Table 3E.7, the average number of earners per household, on average, increases directly with the size of an average household's market income.

Table 3E.7

AVERAGE NUMBER OF EARNERS PER HOUSEHOLD
BY RANGE OF HOUSEHOLD MARKET INCOME

Household Market Income (\$ p.a.)	Average Number of:	
	Salary and Wage Earners	Those w/Wkly Earnings of over \$20 ^a
Less Than \$250	0.07	0.08
\$250-(\$3,950)	0.45	0.63
\$3,950-(\$9,750)	0.90	1.26
\$9,750-(\$13,450)	1.23	1.29
\$13,450-(\$16,900)	1.89	1.46
\$16,900-(\$20,250)	1.63	1.65
\$20,250-(\$24,200)	1.85	1.85
\$24,200-(\$29,200)	1.97	2.04
\$29,200-(\$36,650)	2.30	2.32
\$36,650 and over	<u>2.71</u>	<u>2.84</u>
TOTAL	1.44	1.53
Total Number of Earners (000) 1,502		1,591

Note: a) Definition adopted to exclude those working on a more occasional basis. Sources: Department of Statistics Household Survey 1981/82 aggregated up to the entire private household population based on the 1981 Census of Population and Dwellings.

The trend shown by Table 3E.7 is the result of a variety of factors related to how the data are tabulated and this table must be seen as illustrative only. As with the earlier tables, it is not meant to imply knowledge about cause and effect.

Nevertheless, a comparison of Tables 3E.6 and 3E.7 shows that it was more typical for a private household to include two salary and wage earners in 1981/82 than to include two children of an age to receive the family benefit. In addition, the data illustrated by the tables show

that, on average, high-income households are in that position not only due to high individual incomes¹¹, but also due to having more than one income earner.

E.4: Comparisons of Relative Equality Based on Different Income Definitions

The income distribution will vary depending on whether the income measure is narrowly confined to wage and salary income, is broadened to become assessable income or to include social welfare benefits and so on. This section briefly explores differences in income distributions when income is defined in various ways.

Table 3E.8 shows the shares of different types of income by range of household market income.

Table 3E.8

1981/82 HOUSEHOLD INCOME SHARES COMPARED USING DIFFERENT INCOME DEFINITIONS

Household Market Income (\$ p.a.)	Percent of Total Private Hseholds	Percentage Shares of Income Defined As:				
		Market Income	Divid- end Income	Self- employment Income	Wage & Salary Income	Total Income
Less Than \$250	10.0	-0.1	0.2	-1.4	0.1	2.7
\$250-(\$3,950)	10.0	0.9	2.3	0.0	0.4	3.5
\$3,950-(\$9,750)	10.0	3.8	6.1	4.0	2.6	5.0
\$9,750-(\$13,450)	10.0	6.3	5.1	3.9	6.5	6.4
\$13,450-(\$16,900)	10.0	8.2	7.7	7.1	8.3	8.0
\$16,900-(\$20,250)	10.0	10.0	4.3	7.2	10.8	9.5
\$20,250-(\$24,200)	10.0	11.9	5.4	6.4	13.3	11.0
\$24,200-(\$29,200)	10.0	14.4	2.2	11.6	15.3	13.3
\$29,200-(\$36,650)	10.0	17.7	8.0	15.0	18.6	16.1
\$36,650 and over	10.0	27.1	58.7	46.3	23.8	24.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Million of H'holds 1.035

Amnt Income

Distributed (\$M) 19,242 327 2,441 15,268 21,694

Sources: Income distributions estimated using the Department of Statistics Household Survey 1981/82, aggregated for the entire population of private households based on the 1981 Census of Population and Dwellings.

11. The data also show that average salary and wage earnings per household occupant rise as household income increases.

There are various summary measures which could be applied to assess inequality. One way of illustrating the distribution of income shares is to chart Lorenz diagrams. Lorenz diagrams relate the cumulative share of income to the cumulative proportion of household income groups. These charts do not claim to be more than simple illustrations of some of the material of interest to the reader. Another common measure is the Gini coefficient. Another measure, the coefficient of variation tends to give greater importance to the upper tail of any distribution. In contrast, the Atkinson measure of equality becomes more sensitive towards the bottom end of a distribution. Sawyer (1976) discusses these summary measures and their limitations.

The diagram below uses a Lorenz curve to illustrate the relative equality of three of the income measures shown in Table 3E.8. Total income is closest to the line of equality because it is more equally distributed than market income and dividend income.

CHART 3.1

COMPARISON OF THE RELATIVE EQUALITY OF MARKET INCOME,
DIVIDEND INCOME AND TOTAL INCOME FOR 1981/82
(LORENZ DIAGRAM OF RELATIVE EQUALITY)

Table 3E.9 represents another simple summary of the variation in inequality for different income measures. The percentage of income (measured in different ways) going to those households earning market income below the average wage of \$13,450 is compared with the percentage going to those earning above the average wage. The higher the share of income going to households earning less than \$13,450, the more equal the distribution. As pointed out in an earlier section of the paper, about 40 percent of households receive market income of below the average wage.

Table 3E.9
HOUSEHOLD INCOME SHARES TO THOSE EARNING BELOW AND ABOVE \$13,350
COMPARED USING DIFFERENT INCOME DEFINITIONS FOR 1981/82

Household Market Income Range (\$ p.a.)	Percent of Total Private Hseholds	Percentage Shares of Income for All Private Households				
		Market Income	Divid- end Income	Self- employment Income	Wage & Salary Income	Total Income
Less Than \$13,450	40	11	14	7	10	18
Over \$13,450	60	89	86	93	90	82
	100	100	100	100	100	100

Source: Table 3E8.

As Table 3E.9 shows for 1981/82, none of the income sources distribute anything like a 40 percent share of income to households with market income of less than \$13,450. A very small proportion of self-employment income, only 7 percent, is earned by households in income groups below \$13,450. About 10 percent of wage and salary income and 11 percent of market income is earned by households on less than \$13,450 a year. Even when social welfare benefit income is added to market income to derive total income, the share of total income going to the lowest 40 percent of households is only 18 percent.

The pattern of income distribution takes on different contours when analysed in terms of the number of the occupants of private households. in 1981/82. For example, only 29.3 percent of the 3,098,650 people residing in private households lived in the 40 percent of households which earned market incomes below the average wage.

The proportion of disposable income (that is income adjusted for personal income tax payments) distributed to households earning below \$13,340 is over 20 percent. This is greater than the share of any of the other income definitions illustrated by Table 3E.9. This gives an indication of the redistributive impact of the tax system.

Table 3E.10 illustrates shares of national superannuation and social welfare benefit income to households earning above and below the average wage. While 77 percent of national superannuation income accrues to lower income households, only 56 percent of total social welfare payments are distributed to those households with incomes below \$13,450. A large part of the remaining 44 percent is distributed as family benefit to higher income households. National superannuation is one form of benefit which is distributed in favour of low-income households with only 23 percent of income from this source going to those households with market incomes above \$13,450.

Table 3E.10

HOUSEHOLD INCOME SHARES TO THOSE EARNING BELOW AND ABOVE \$13,350
COMPARED FOR DIFFERENT SOCIAL WELFARE DEFINITIONS

Household Market Income Range (\$ p.a.)	Percent of Total Private Households	Percentage Share of Income Defined As:	
		National Superannuation	Social Welfare Benefit Income
Less than \$13,450	40	77	56
Over \$13,450	60	23	44
	100	100	100

Sources: Estimated from the Department of Statistics 1981/82 Household Survey, aggregated to the total private household population using the 1981 Census of Population and Dwellings.

The above discussion highlights the significance of taxation and social welfare benefits. Since these budget measures are aimed at bringing about a more equitable distribution of income, their inclusion in the initial income measure makes a considerable difference. The market income concept includes personal income taxes but excludes income from social welfare benefits.

One measure of income not included in our comparisons is income from capital. Unfortunately, the 1981/82 Household Survey did not collect information about capital income. One measure of income collected by the Survey that could be a proxy for capital income is investment income. About 27 percent of investment income is earned by households with incomes below \$13,450.

E.4.a: Market Income Distribution

The tables on the following pages illustrate the distribution of market income by income range (decile) and household type. This is the base for the assessment of a final income measure which encompasses the government budget in Stages One and Two. Table 3E.11 shows the total amount of market income accruing to each income range in 1981/82.

Table 3E.11

ESTIMATED AMOUNT OF MARKET INCOME IN 1981/82 BY RANGE OF PRIVATE HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ pa)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or more Adults		1 Adult with Chld'n	All House- holds
	Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil- dren	With Chil- dren		
\$ Million											
Less Than \$250	202	30	188	23	-1	13	-	-	-	109	585
\$250-(\$3,950)	265	47	323	20	12	8	10	-	-	47	749
\$3,950-(\$9,750)	198	123	325	74	69	83	75	52	35	51	1087
\$9,750-(\$13,450)	70	246	255	146	158	186	153	63	69	51	1395
\$13,450-(\$16,900)	-	203	210	223	196	340	265	77	122	-	1728
\$16,900-(\$20,250)	-	195	200	358	228	369	352	165	167	-	2060
\$20,250-(\$24,200)	-	126	143	504	244	516	381	172	280	-	2386
\$24,200-(\$29,200)	-	75	153	789	214	410	355	308	475	-	2881
\$29,200-(\$36,650)	-	-	152	844	258	469	297	646	764	-	3494
\$36,650 and over	-	-	186	666	344	540	534	1399	1627	-	5330
Total	893	1126	2135	3648	1721	2935	2422	2898	3559	357	21694

Note: Empty cells, designated (-) have insufficient observations.

Sources: Estimated distribution based on data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

Table 3E.12 illustrates the varying patterns of income distribution for each household type. The market income of one adult, national superannuitant households is concentrated in the three lowest income groups. This is in contrast to the three-adult households (with and without children) whose incomes are concentrated in the two highest income brackets.

Table 3E.12

DISTRIBUTION OF HOUSEHOLD MARKET INCOME FOR 1981/82
BY PRIVATE HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or more Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
Proportion of the Total for Each Household Type (%)											
Less Than \$250	22.6	2.6	8.8	0.6	-1.0	0.4	0.0	-	-	30.6	2.7
\$250-(\$3,950)	29.7	4.2	15.1	0.6	0.7	0.3	0.4	-	-	13.2	3.5
\$3,950-(\$9,750)	22.2	11.0	15.2	2.0	4.0	2.8	3.1	1.8	1.0	14.2	5.0
\$9,750-(\$13,450)	7.8	21.8	11.9	4.0	9.2	6.3	6.3	2.2	1.9	14.2	6.4
\$13,450-(\$16,900)	-	18.1	9.8	6.1	11.4	11.6	11.0	2.6	3.4	-	8.0
\$16,900-(\$20,250)	-	17.3	9.3	9.8	13.2	12.6	14.6	5.7	4.7	-	9.5
\$20,250-(\$24,200)	-	11.2	6.7	13.8	14.2	17.6	15.7	5.9	7.9	-	11.0
\$24,200-(\$29,200)	-	6.7	7.2	21.6	12.4	14.0	14.7	10.6	13.3	-	13.3
\$29,200-(\$36,650)	-	-	7.1	23.2	15.0	16.0	12.3	22.3	21.5	-	16.1
\$36,650 and over	-	-	8.7	18.2	20.0	18.4	22.0	48.3	45.7	-	24.6
Total (%)	100	100	100	100	100	100	100	100	100	100	100

Notes: Numbers may not add due to rounding to nearest thousand. Empty cells, designated (-) have insufficient observations. Sources: Estimated distribution based on data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

There is some validity in using an income measure which includes social welfare benefits as the base income measure when assessing the effective rate of taxes on households. The effective rate measures taxes as a proportion on household income. Both taxes and social welfare income are included in total income.

Table 3E.13 is arranged so that the differences between average income by income group and household type can be compared for market and total income.

Table 3E.13

AVERAGE HOUSEHOLD MARKET INCOME PER YEAR
BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ pa)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or more Adults		1 Adult with Chld'n	All House- holds
	Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil- dren	With Chil- dren		
Market Income: Thousands of Dollars Per Year											
Less Than \$250	-	-	-	-1	-5	-1	-4	-	-	-	-
\$250-(\$3,950)	2	1	2	2	2	2	3	-	-	2	2
\$3,950-(\$9,750)	6	7	7	7	7	8	8	7	7	7	7
\$9,750-(\$13,450)	12	12	12	11	12	12	12	12	11	12	12
\$13,450-(\$16,900)	-	15	15	15	15	15	15	15	15	-	15
\$16,900-(\$20,250)	-	18	18	19	19	18	18	19	18	-	19
\$20,250-(\$24,200)	-	23	22	22	22	22	22	22	22	-	22
\$24,200-(\$29,200)	-	27	26	27	27	27	27	27	27	-	27
\$29,200-(\$36,650)	-	-	33	33	33	32	32	33	33	-	33
\$36,650 and over	-	-	54	46	67	54	49	50	49	-	50
Total	3	12	9	23	20	22	21	32	31	5	19
Total Income: Thousands of Dollars Per Year											
Less Than \$250	5	4	8	6	-5	6	2	-	-	7	6
\$250-(\$3,950)	6	5	10	6	5	4	6	-	-	7	7
\$3,950-(\$9,750)	11	8	14	8	9	9	9	13	11	10	11
\$9,750-(\$13,450)	16	12	19	12	13	13	13	15	15	13	14
\$13,450-(\$16,900)	-	15	21	16	16	16	16	20	18	-	17
\$16,900-(\$20,250)	-	18	24	19	19	19	19	21	22	-	20
\$20,250-(\$24,200)	-	23	27	22	22	23	23	24	24	-	23
\$24,200-(\$29,200)	-	27	33	27	27	27	28	27	29	-	28
\$29,200-(\$36,650)	-	-	41	33	34	33	33	34	34	-	34
\$36,650 and over	-	-	61	46	67	55	50	51	51	-	52
Total	8	13	17	23	21	22	22	34	33	94	21

Note: Empty cells, designated (-), either earned income below \$500 per year or had too few observations. Sources: Estimated distribution based on data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households. Sources: Estimated distribution based on data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

E.5: Limitations of Market Income as Initial Income

Market income fits nicely with the income concept and the conceptual basis for measuring budget incidence that underlies Stage One. Stage One intends to be no more than a simple statistical-accounting exercise and for this, market income is an excellent base. Market income is consistent with the NZSNA concept of household earnings from market production. It also represents income before payments to the government are subtracted and benefits from government are added.

As the Stage One analysis unfolds, it is possible to see the difference between the distribution of market income and other income defined to include a money-income value for government activity. For example, total income is defined to include the money-income value of government transfer payments. As a comparison of market income and total income in Table 3E.13 shows, total income is greater for the lower income groups than is market income.

Market income is also the initial income base for Stage Two. Stage Two is designed to analyse the distribution of income when income is defined to take account of all government current non-market activity. Again, within the context of what Stage Two sets out to achieve, market income is an acceptable initial income base. Stage Two is not designed to measure behavioral relationships as such. It is simply an accounting exercise where household earnings from market production (market income) are compared with an income measure defined to take account of all government budget activity for the same fiscal year.

But does market income represent the distribution of income when government activities are excluded? Clearly, it does not. For example, included in market income are the salaries of government employees. For these to be considered normal market incomes, it is necessary to assume that the government simply mirrors private sector activity and that the same jobs would have existed in its absence.

Putting aside the specific example of public sector salaries, economic theory suggests that government budget policies have an ongoing influence in the market place. The issue becomes how to isolate the important redistributive effects of a particular budget policy from effects of other ongoing activities. Here, a general equilibrium

approach appears to offer the best potential of analysing the important effects (see Section B).

In the SWF general equilibrium models, "initial" household income is specified as the budget constraint. The emphasis of the SWF models is on the households as consumers. Consumers have an initial endowment of factors, but these do not translate directly into income flows. Instead, these are the basis for specifying the economic effects of taxes.

The models are usually expressed mainly in terms of the factors labour and capital. How values for these expressions are derived varies, but Shoven and Whalley (1984) consider that a "rich" consumer group owns all the capital while a "poor" consumer owns all the labour.

Each of the consumers in the general equilibrium model has an initial endowment of N commodities and a set of preferences resulting in demand functions for each commodity. Market demands are the sum of each consumer's demands. Commodity-market demands depend on all prices, they are non-negative, homogeneous to degree zero (there is no money illusion) and they satisfy Walras Law that at any set of prices, the total value of consumer expenditures (plus savings) equals consumer incomes (less taxes).

The difference between the SWF approach and this study is that the SWF approach is attempting to discover how a particular policy change effects the distribution of income. The initial income distribution itself is not material to the results, only the change in the distribution.

In contrast, this study is first of all concerned to discover what the household income distribution is, and then to analyse which particular government policies caused it to be that way. The question becomes one of whether a study of the distribution of income generated by factor endowments would provide a better insight into the distribution of income. It seems likely that it would be a more comprehensive treatment of households economic positions than provided by the measure of market-income alone. Given the absence of statistical information, the next Section approximates two household income distributions, using information in the Household Survey to get a perspective on household endowments.

F. BROAD MEASURES OF INCOME: STAGES THREE AND FOUR

Governments exist to promote the aims and aspirations of their citizens. Thus, while some budget transactions may impact on corporate entities or land holdings, they will ultimately affect the money incomes of people, through their corporate shareholdings, salaries and consumption or as renters and land owners. According to this view, all of the income costs and benefits of budget transactions ultimately accrue to households. The Stage Three and Stage Four income definitions are premised on this view. This section discusses the derivation of a statistical measure of income consistent with these two definitions.

F.1: Stage Three Initial Income

To assess the economic effects of the entire budget, as depicted in Stage Three, an income measure is required which takes into account all those sources of income at the base of government levies and the value of government expenditure transactions. One current income measure which broadly encompasses the above considerations is gross domestic product. This measure has the added feature of consistency with the national income definitions adopted to analyse budget transactions. The following section uses Household Survey data and SAS (the matrix allocation procedures provided by the Statistical Analysis System), to impute the components of gross domestic product to households.

Gross domestic product (GDP) is the total market value of goods and services produced in New Zealand¹² within a given (year) period. It is an added-value concept and the costs of goods and services utilised in the process of production are deducted. GDP includes consumption of **fixed capital**, which is the amount required during the period to maintain the fixed capital assets intact. In a sense, consumption of fixed capital represents the annualised income stream from ownership of capital, excluding the capital gain. Also included in gross domestic product are **indirect taxes** which are treated by producers as a cost of

12. Households owning the product need not be located in New Zealand. Therefore, taxes and expenditures on these products could have a measureable impact on overseas households.

production (and thus deducted from operating surplus). However, since indirect taxes add to the market price of output, they are added to gross domestic product.

Subsidies are current grants (expenditures) made by central and local government (to private and public enterprises and producer boards) which are intended to ensure a guaranteed price or to enable market prices of goods and services to be held below the costs of production. They are the opposite of indirect taxes and as such are deducted from the measure of GDP. Note that under the NZSNA definitions, only industries may receive subsidies. Current grants made by the government to households or private non-profit services are defined as **transfer payments**.

Figure 3.2 illustrates the version of the GDP account used to calculate Stage Three initial income. Some of the figures have since been revised by the Department of Statistics.

FIGURE 3.2

GROSS DOMESTIC PRODUCT AND EXPENDITURE

Year Ended 31 March	1981 (\$M)	Change (%)	1982 (\$M)	Change (%)	1983 (\$M)
Compensation of Employees	13,100	20.4	15,778	9.5	17,276
Operating Surplus	7,704	21.1	9,332	8.7	10,146
Consumption of Fixed Capital	1,670	12.1	1,872	18.0	2,152
Indirect Taxes	2,343	24.4	2,914	17.9	3,435
Less Subsidies	-355	69.0	-600	28.2	-769
Gross Domestic Product	24,461	19.8	29,296	10.0	32,240
Final Consumption Expenditure					
(A) General Government	4,152	21.0	5,022	12.1	5,632
(B) Private	14,564	16.8	17,011	12.0	19,058
Increase in Stocks	1,404	11.2	1,561	-34.8	1,018
Gross Fixed Capital Formation	4,448	39.7	6,216	19.4	7,425
Statistical Discrepancy	158	145.6	388	-36.9	245
	<u>24,726</u>	<u>22.1</u>	<u>30,198</u>	<u>10.5</u>	<u>33,378</u>
Gross National Expenditure					
Exports of Goods and Services	7,024	18.1	8,292	9.9	9,116
Less Imports of Goods & Services	<u>7,289</u>	<u>26.1</u>	<u>9,194</u>	<u>11.5</u>	<u>10,254</u>
Expenditure on Gross Domestic Product	<u>24,461</u>	<u>19.8</u>	<u>29,296</u>	<u>10.0</u>	<u>32,240</u>

Source: Department of Statistics, October 1984.

Because the information from the Household Survey which is used to impute gross domestic product to households relates to private households only (which account for about 95 percent of the total population), the figures on the consolidated account illustrated by Figure 3.2 need to be adjusted. Roughly, 95 percent of each item will be imputed to private households. However, since residents of private households are more likely to be earning an income than are residents of non-private households, more than 95 percent of several of the macroeconomic aggregates are imputed to private households. For example, more than 95 percent of salary and wages and consumption of fixed capital is allocated to private households.

The Stage Three income measure is derived from the production side of the gross domestic product account.

Figure 3.3 illustrates the values of the components of gross domestic product which are imputed to private households. They are adjusted to reflect the characteristics of the private household population.

FIGURE 3.3

ESTIMATED GROSS DOMESTIC PRODUCT ACCRUING TO PRIVATE HOUSEHOLDS:
MARCH YEAR 1982

<u>Macroeconomic Aggregate</u>	<u>NZSNA (\$M)</u>	<u>Adjustment</u>	<u>Thesis (\$M)</u>
Compensation of Employees	15,778	98%	15,500
Operating Surplus	9,332	96%	8,960
Consumption of Fixed Capital	1,872	99%	1,850
Indirect Taxes ^a	2,914	95%	2,770
<u>Less Subsidies^b</u>	<u>-600</u>	<u>96%</u>	<u>-575</u>
Total GDP to Private Households	<u>\$29,296</u>	<u>-</u>	<u>\$28,505</u>

Notes: a) Includes indirect taxes received by Local Government, the largest source which is property rates. b) Source: This table derived from Figure 3.2 to account for income accruing to private households only.

Compensation of employees, the largest item, is defined by NZSNA to include:

- 1) All cash wages and salaries paid to employees (before the deduction of income tax);
- 2) Contributions made by employers to social security and superannuation schemes in respect of their employees; and,
- 3) Wages and salaries in kind. It excludes wage and salary payments to working proprietors, regarding them as returns to capital or in other words, as a distribution of surplus rather than payment for labour. Also excluded are tool, clothing and car allowances and meal and entertainment expenses. These are regarded as intermediate consumption since they are reimbursements of expenses incurred by employers for business purposes and not for the enhancement of the income of the employees.

Compensation of employees can be derived from Household Survey information. When the Household Survey salary and wage data are scaled up for the Census private household population, a figure of \$15,268 million is derived. Adding \$100 million other regular income (allowances) and the genuine wage and salary component of self-employment income (estimated as \$133 million), brings the total to \$15,500 million. This total is just over 98 percent of the published national income figure for compensation to employees. This is consistent with the fact that there is a higher proportion of salary and wage earners in the private household population than in the non-private household population.

Since there are no data about households' involvement in business, the remaining elements of GDP must be imputed to households.

Operating surplus is defined by NZSNA as the gross output of resident industries at producers' values less the sum of their intermediate consumption. Basically, it is the pre-tax profit of market producers. Gross output is calculated by adjusting total sales for changes in the stocks of finished goods and work-in-progress to derive a value for goods produced. When calculating intermediate consumption,

purchases by market producers are adjusted for changes in the stock of raw materials in order to derive a value for goods used. In practice, there is a limitation to the Department of Statistics calculations because the stock change valuations used are based on business accounting practices and reflect changes in unit prices of goods held in stock, as well as changes in their quantities. The effect of this is that operating surplus includes an element of capital gains or losses arising from fluctuation in prices which do not relate to the production vintage of the goods.

Consumption of fixed capital is the NZSNA figure for the amount required during the period of account to maintain fixed capital assets intact. While in principle consumption of fixed capital should be charged for durable assets owned by central and local government, no such estimates are presently calculated for non-market government producers.

Based on the presumption that both consumers and shareholders share equally in the benefits of the existence of profit-making establishments (consumers benefit because access to goods adds to their "consumption potential" and shareholders gain because ownership of capital enhances their income-earning potential), half of operating surplus is imputed to households on the basis of Household Survey expenditure patterns (using Household Survey data on dividend income) and the other half on the basis of shareholdings. Consumption of fixed capital is imputed based on those who can be identified as owners of capital because of dividend income and those identified by virtue of being self-employed.

Indirect-tax income is imputed to households in relation to their payment of sales taxes, local government property rates and specific taxes (such as alcohol duties) based on the assumption that all the tax is shifted to the consumers of the goods concerned. The remaining indirect taxes are grouped together and imputed to household income groups on the basis of household consumption by household type and income. Subsidy income is imputed (subtracted) from household income on the same basis. These procedures are the mirror image of the procedures carried out to impute indirect taxes (and subsidies) to household income groups. (See Chapters Five and Six).

Table 3F.1 shows the money-income values of the different components of gross domestic product by household market income range based on the above discussion about the basis for imputation of these values. The distributions vary a great deal from one another, but in common with the other measures of income discussed in Section E.3, a much larger share of income accrues to those in the higher income groups than to those in the lower income groups.

Table 3F.1

STAGE THREE : INITIAL INCOME
1981/82 GROSS DOMESTIC PRODUCT BY RANGE OF
COMPENSATION TO HOUSEHOLDS

Household Market Income (\$p.a.)	Compensation of Employees (\$M)	Operating Surplus	Consumption of Fixed Capital	Indirect Taxes	Less Subsidies	Total Gross Domestic Product
\$ Million						
Less Than \$250	7	82	-16	83	16	140
\$250-(\$3,950)	71	369	40	125	18	587
\$3,950-(\$9,750)	430	776	129	185	72	1448
\$9,750-(\$13,540)	1018	553	89	205	49	1816
\$13,450-(\$16,900)	1292	697	131	242	60	2302
\$16,900-(\$20,250)	1670	681	129	286	54	2712
\$20,250-(\$24,200)	2047	704	123	291	64	3101
\$24,200-(\$29,200)	2366	950	202	344	80	3782
\$29,200-(\$36,650)	2878	1181	251	414	68	4656
\$36,650 and Over	3721	2967	772	595	94	7961
TOTAL	15500	8960	1850	2770	575	28505
Proportion of Total (%)						
Less Than \$250	-	0.9	-0.9	3.0	2.8	0.5
\$250-(\$3,950)	0.5	4.1	2.2	4.5	3.1	2.1
\$3,950-(\$9,750)	2.8	8.7	7.0	6.7	12.5	5.1
\$9,750-(\$13,540)	6.5	6.2	4.8	7.4	8.5	6.4
\$13,450-(\$16,900)	8.3	7.8	7.1	8.7	10.5	8.1
\$16,900-(\$20,250)	10.8	7.6	7.0	10.3	9.4	9.5
\$20,250-(\$24,200)	13.2	7.8	6.6	10.5	11.1	10.9
\$24,200-(\$29,200)	15.3	10.6	10.9	12.4	13.9	13.3
\$29,200-(\$36,650)	18.6	13.2	13.6	15.0	11.8	16.3
\$36,650 and Over	24.0	33.1	41.7	21.5	16.4	27.9
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Notes: a) Includes Local Authority property rates. b) Subsidies include Local Authority Subsidies. Source: This is a very rough approximation of a broader measure of income as explained in the text.

Table 3F.2

STAGE THREE : INITIAL INCOME
1981/82 GROSS DOMESTIC PRODUCT (GDP) BY PRIVATE HOUSEHOLD TYPE

	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or more Adults		1 Adult with Child'n	
	Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil-dren	With Chil-dren		All House-holds
\$ Million											
Compensation of Employees	117	886	647	3104	1339	2243	1773	2322	2899	170	15500
Operating Surplus	722	387	1507	1158	792	1156	950	1182	1009	97	8960
Consumption of Fixed Capital	109	84	234	239	163	309	277	207	220	8	1850
Indirect Taxes	106	143	271	441	218	379	310	405	449	48	2770
Sub Total	1054	1500	2659	4942	2512	4087	3310	4116	4577	323	29080
Less Subsidies	12	19	29	82	41	74	96	85	129	8	575
Total Stage Three Initial Income	1042	1481	2630	4860	2471	4013	3214	4031	4448	315	28505
Proportion of Total (%)											
Compensation of Employees	0.8	5.7	4.2	20.0	8.6	14.5	11.4	15.0	18.7	1.1	100.0
Operating Surplus	8.1	4.3	16.8	12.9	8.8	12.9	10.6	13.2	11.3	1.1	100.0
Consumption of Fixed Capital	5.9	4.6	12.6	12.9	8.8	16.7	15.0	11.2	11.9	0.4	100.0
Indirect Taxes	3.8	5.2	9.8	15.9	7.9	13.7	11.2	14.6	16.2	1.7	100.0
Sub Total	3.6	5.2	9.1	17.0	8.6	14.1	11.4	14.2	15.7	1.1	100.0
Less Subsidies	2.1	3.3	5.0	14.3	7.1	12.9	16.7	14.8	22.4	1.4	100.0
% of Total	3.7	5.2	9.2	17.0	8.7	14.1	11.3	14.1	15.6	1.1	100.0

Sources: This is a very rough approximation as explained in the text.

F.2: Stage Four Definition of Income

There are two main reasons for distinguishing a Stage Three and the Stage Four initial income concept. The significance of the Stage Three concept is that it attempts to define an income base consistent with the base of government activity. Stage Four is designed to measure a comprehensive income concept which is theoretically consistent with the concepts underlying the concept of budget incidence. Here the pre-budget household budget constraint would be effected both on the sources of income side and on the uses of income side.

The two main differences between Stage Three and Stage Four initial income are:

- 1) the inclusion of capital gains to make Stage Four a comprehensive income concept; and,
- 2) the treatment of the counterfactual so that a comparison of Stage Four final income with initial income isolates the effects government from other market effects on both the sources and uses side of the economy.

Data limitations preclude the actual measurement of capital gains. More importantly, the Stage Four concept of income cannot to be measured without the use of general-equilibrium techniques. Meantime, an adjusted broad measure of income is derived below for comparison with the other income concepts discussed in this Chapter.

Turning first to the treatment of the counterfactual, it is debateable whether indirect taxes should be included in the original income measure in the same pattern as they are assessed. Indirect taxes are compulsory levies paid to the government by producers in respect of the production, sale, purchase and use of goods and services, and which are treated as an expense of production. The discussion turns on whether the existence of the taxes influence prices pre- or post-budget. This has implications for the results because the imputation of indirect business taxes as income to individuals will alter not only the overall effective rate of taxation (the proportion of income which is paid in

tax), but also the apparent distribution of the money-income effects of the budget by income group.

Subsidies include payments to ensure a return to producers while enabling market prices of goods and services to be held below the costs of production. They have the opposite effect to indirect taxes on market prices and the same arguments about the counterfactual pertain to them.

Although the pre- and post-budget effects of indirect taxes and subsidies may not be the same, they do contribute to the total level of pre-budget income. So they are distributed based on household expenditure patterns and shareholdings of companies.

Turning to operating surplus and the consumption of fixed capital, they could be considered to be the income from household endowments for capital. Thus, the income from ownership of the factors of production contributing to these sources of GDP could be interpreted as accruing to those who are shareholders. Based on this probably extreme assumption, both operating surplus and the consumption of fixed capital are distributed based on the distribution of dividend income as measured by the Household Survey. As shown by Table 3F.3, this assumption results in over half of the value of operating surplus and the consumption of fixed capital being distributed to the upper household income range.

A comparison of the final column of Table 3F.3 with the final column of Table 3F.1 shows that initial income is much less equally distributed to households under the Stage Four conditions than under the Stages Three conditions. Although the Stage Four approach is very rough, the results are further evidence that where the theoretical concept of income distribution becomes more consistent theoretically, the distribution of income appears to be less equal.

Finally, it must be emphasised that both Stage Three and Stage Four initial incomes are only approximations. The calculations are included here to see what differences, if any, wider definitions make to the results.

Table 3F.3

STAGE FOUR: ADJUSTED GROSS DOMESTIC PRODUCT
BY RANGE OF PRIVATE HOUSEHOLD MARKET INCOME

Household Market Income Range (\$ p.a.)	Compen- sation of Employees	Operating Surplus	Consump- tion of Fixed Capital	Indirect Taxes	Less Subsidies	Total Gross Domestic Product
\$ Million						
Less Than \$250	7	18	3	6	2	32
\$250-(\$3,950)	71	206	42	155	38	436
\$3,950-(\$9,750)	430	547	113	313	76	1327
\$9,750-(\$13,540)	1018	457	94	183	39	1713
\$13,450-(\$16,900)	1292	690	143	200	40	2285
\$16,900-(\$20,250)	1670	385	80	199	37	2297
\$20,250-(\$24,200)	2047	484	100	216	39	2808
\$24,200-(\$29,200)	2366	197	40	296	56	2843
\$29,200-(\$36,650)	2878	716	148	343	64	4021
\$36,650 and Over	3721	5260	1087	859	184	10743
Total	15500	8960	1850	2770	575	28505

As a Proportion of Total (%)						
Less Than \$250	-	0.2	0.2	0.2	0.3	0.1
\$250-(\$3,950)	0.5	2.3	2.3	5.6	6.7	1.5
\$3,950-(\$9,750)	2.8	6.1	6.1	11.3	13.7	4.7
\$9,750-(\$13,540)	6.5	5.1	5.1	6.6	6.8	6.0
\$13,450-(\$16,900)	8.3	7.7	7.7	7.2	7.0	8.0
\$16,900-(\$20,250)	10.8	4.3	4.3	7.2	6.4	8.1
\$20,250-(\$24,200)	13.2	5.4	5.4	7.8	6.8	9.8
\$24,200-(\$29,200)	15.3	2.2	2.2	10.7	9.7	10.0
\$29,200-(\$36,650)	18.6	8.0	8.0	12.4	11.1	14.1
\$36,650 and Over	24.0	58.7	58.7	31.0	32.0	37.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: This is a very rough approximation only for illustrative purposes, as explained in the text.

Turning to the analysis of the Stage Four initial income distribution by household type (see Table 3F.4), the largest share goes to childless three-or-more adult households. The share to one-and two-adult, national-superannuitant households is much larger than the share under the Stage Three conditions. On the other hand, the share to single-adult households (with and without children) is much smaller.

Table 3F.4

STAGE FOUR: ADJUSTED GROSS DOMESTIC PRODUCT
BY PRIVATE HOUSEHOLD TYPE

Economic Aggregate	Household Type											
	1 Adult		2 Adults		2 Adults with Children			3 or more Adults		1 Adult with Chld'n		All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With			
	Sup		Sup					Chil- dren	Chil- dren			
\$ Million												
Compensation of Employees	117	886	647	3105	1339	2243	1773	2321	2899	170	15500	
Operating Surplus	1040	143	2419	287	1658	448	349	1998	600	18	8960	
Consumption of Fixed Capital	215	29	500	59	342	92	72	413	124	4	1850	
Indirect Taxes	362	114	659	346	219	241	180	402	219	28	2770	
<u>Less</u> Subsidies	90	22	161	63	44	42	30	84	33	6	575	
Total Stage Four Initial Income	1644	1150	4064	3734	3514	2982	2344	5050	3809	214	28505	
As a Proportion of Total (%)												
Compensation of Employees	0.8	5.7	4.2	20.0	8.6	14.5	11.4	15.0	18.7	1.1	100.0	
Operating Surplus	11.6	1.6	27.0	3.2	18.5	5.0	3.9	22.3	6.7	0.2	100.0	
Consumption of Fixed Capital	11.6	1.6	27.0	3.2	18.5	5.0	3.9	22.3	6.7	0.2	100.0	
Indirect Taxes	13.1	4.1	23.8	12.5	7.9	8.7	6.5	14.5	7.9	1.0	100.0	
<u>Less</u> Subsidies	15.7	3.8	28.0	11.0	7.7	7.3	5.2	14.6	5.7	1.0	100.0	
% of Total Stage Four Initial Income	5.8	4.0	14.3	13.1	12.3	10.5	8.2	17.7	13.4	0.7	100.0	

Source: This is a very rough approximation only for illustrative purposes, as explained in the text.

G. SUMMARY AND CONCLUSION

An income concept that reflects both the concept of gain and the concept of what that gain will purchase is important to defining the economic position of a household. In other words, the initial income measure represents the household budget constraint. If the concept of gain takes account of the households endowments, then the initial income concept can also be a base for assessing the influence of the government's budget on income distribution.

In order to assess the economic effects of the budget, the other characteristic of the initial income measure is that it is based on an explicit view of the effect of government. This probably involves a counterfactual.

Sections E and F have analysed some patterns of income distribution by household income group and household type in New Zealand in 1981/82 based on different income concepts. In each case, the income distribution is far from equal. The different initial income concepts underlying the four different stages are shown by Table 3G.1.

Table 3G.1

INITIAL INCOME DEFINED FOR STAGES OF TAXONOMY
(Figures Relate to March Year 1982)

Household Market Income Range	Amount			Percentage Distribution of		
	Stages One & Two	Stage Three Gross	Stage Four Gross	Stages One & Two	Stage Three Gross	Stage Four Gross
	Market Income	Domestic Product	Domestic Product	Market Income	Domestic Product	Domestic Product
		\$ Million			Percent (%)	
Less Than \$250	-22	140	32	-0.1	0.5	0.1
\$250-(\$3,950)	170	587	436	0.9	2.1	1.5
\$3,950-(\$9,750)	731	1448	1327	3.8	5.1	4.7
\$9,750-(\$13,540)	1212	1816	1713	6.3	6.4	6.0
\$13,450-(\$16,900)	1567	2302	2285	8.1	8.1	8.0
\$16,900-(\$20,250)	1922	2712	2297	10.0	9.5	8.1
\$20,250-(\$24,200)	2291	3101	2808	11.9	10.9	9.8
\$24,200-(\$29,200)	2774	3782	2843	14.4	13.3	10.0
\$29,200-(\$36,650)	3387	4656	4021	17.6	16.3	14.1
\$36,650 and Over	5211	7961	10743	27.1	27.9	37.7
Total	19243	28505	28505	100.0	100.0	100.0

Source: See Text for derivation. For definition of each stage, see Figure 1.2 in Chapter One.

As the initial income concept becomes more complex, the statistical measure of it becomes less robust. The Stage Three and Stage Four definitions must be seen as very approximate. Nevertheless, the evidence is that different economic assumptions make a significant difference and so any analysis of income distribution must be precise about the assumptions it does adopt.

The conclusion from this analysis is that the distribution of initial income becomes less equal as the income concept becomes more theoretically complex. If nothing else, this conclusion is tantilising because it means that the application of further research resources would be justified, if only to see if a more rigorous approach comes up with the same answer.

The difference between the Stage One and Stage Two initial income distribution and the Stage Three initial income distribution is illustrated by Chart 3.2 below.

CHART 3.2
COMPARISON OF THE RELATIVE EQUALITY OF INITIAL INCOME:
STAGE TWO AND STAGE THREE DEFINITIONS

The next chapters are devoted to answering the question whether an income definition which takes account of government expenditure and revenue measures is distributed any differently. The main approach is based on the Stage Two methodology, which as shown in Chapter Three, is mainly an accounting method.

CHAPTER FOUR

THE GOVERNMENT BUDGET : AN INCOME AND OUTLAY ACCOUNT

Chapter Four discusses the concept of the government budget. By definition, the budget should take into account all the fiscal activities of the government. How these activities are taken into account varies a great deal in economic analysis. For instance, there is a considerable difference in the treatment of the budget by quantitative studies of the redistributive effects of the budget and by general equilibrium studies of incidence. Quantitative studies have tended to define the government budget in terms of some existing accounting or statistical statement of tax receipts and expenditures. General equilibrium studies have defined the budget to cover all the taxing activities of government, but have generally ignored other sources of government revenue and most government expenditures.

Section A explores the concept of the government budget. Budget transactions defined in their broadest sense include the government provision of goods and services and the financing of all those activities, where the government or state operates directly to influence factor incomes, prices and consumer demand.

Section B examines the budget concepts specified by quantitative studies and empirical general equilibrium studies of budget incidence. Although the concept of the budget is treated more elegantly by general equilibrium studies, the approach of these studies is much narrower than that of recent quantitative studies.

Section C describes the main sources of information about New Zealand central government budget transactions. The Department of Statistics New Zealand Systems of National Accounts (NZSNA) data are selected as the most appropriate for assessing the influence of the budget on household income distribution.

Section D describes the NZSNA central government accounts in detail. The Section defines the main items of receipts to be assessed in Chapter Five and expenditures to be assessed in Chapter Six.

A. THE CONCEPT OF THE BUDGET

There are five issues central to the classification of government transactions for the purpose of assessing their influence on household incomes. They are:

1) **Policy Context:**

What are the objectives in attempting to assess the budget impact? For example, is the objective to assess short-term income distribution or changes to income distribution in the long-term? This makes a difference as to whether capital, as well as current, government expenditures are included in the budget concept.

2) **Coverage:**

Which revenues and expenditures should be included? The Shoven, Whalley and Fullerton (SWF) models have concentrated on taxes but as argued in Chapter Two, government expenditures also have a money-income value to households.

3) **The Balanced Budget Question:**

Should the analysis assume that the government budget is balanced? If so, how this identity is defined varies according to the concepts underlying the four stages.

4) **Allocation:**

Who benefits from and pays for government budget transactions?

5) **Valuation:**

How are the money-income benefits and costs assessed?

The way in which the five above issues are resolved will shape the methodological approach which is adopted.

A.1: Policy Context

The policy issue examined in this thesis is the immediate effect of the government budget on household current incomes in a given year. Put simply, it addresses the question of who pays for the activities of the government and who gets what in return. This involves the derivation of current income measures which account for government budget transactions, so that the relative income positions of households can be compared with and without the income gains and losses associated with the government's budget activity. In other words, this study attempts to explore the extent to which an income measure which includes an estimate of the money-income value of government activities is distributed differently from household market incomes. At issue is not so much whether the government makes permanent changes to incomes but whether an income concept that takes account of government activities is distributed differently than market-income (the income distribution which is the outcome of private-sector market place activity) in a given year.

To clarify the nature of the problems analysed in this thesis, the discussion of the government's budget is illustrated using the four stages as a means of distinguishing the assumed statistical and economic conditions underlying the results. As discussed in Chapter One, budget policies may contribute to a redistribution of income even when they are intended to achieve other ends. The different policy contexts implicit in the four stages are consistent with this view. Differences in the policy contexts spring from the different underlying hypotheses about how a change in government policy affects the household sector.

The Stage One policy context is the change in the distribution of household money income which comes about when government policies which are intended to directly tax or benefit households are taken into account. Direct taxes on households include direct taxes on income (the personal income tax) and direct taxes on household expenditure ("direct" indirect taxes). Government-provided goods and services which are directly consumed by households include subsidies on the final goods consumed by households, monetary benefits, health, education and other government-provided private goods.

The weakness of the treatment of the budget in Stage One is that the exclusion of certain budget transactions, such as expenditure on collective goods, implies that their effects are neutral in both an accounting and an economic sense. There is no reason why this should be the case. The strength of this treatment is that it identifies households' statutory liability to make payments to the government and households which consume government-provided goods and services, using direct statistical measurements from the Household Survey, the Census and the Census of Health.

Stage Two hypothesizes that ultimately households pay for all government activities and are the consumers of all the goods and services provided by the government. The policy context is to measure the change in income distribution for a current year when all central government non-market activity is taken into account. Stage Three takes the view that if households are ultimately the financial supporters of the government and consumers of government-provided goods, then all the national income and expenditure should be attributed to households.

Stage Four considers the money-income effects of the budget when relative prices, technology and output changes are taken into account. They are assumed to be zero in the Stage One and Stage Three case. It is not possible to isolate only the effects of the government budget on current household money-incomes using a general equilibrium approach but so a necessary assumption in the Stage Four case would be that the most important effects on income distribution take place in the current calendar year.

A.2: Coverage

The government is a tax collector, as well as an enforcement agency and major trading enterprise, which uses its revenues to provide goods and services. In addition, the government undertakes fiscal, monetary, regulatory and institutional functions which influence factor incomes, prices, the level of economic output, consumer demand and so on. Also, the government exercises influence over the behaviour of public trading corporations and local authorities. Thus, it could be argued then those institutions should

be included as part of the budget transactions which are analysed. This is because the activities of these public entities could accentuate or mitigate the central government's own activity.

Ideally, the budget concept at the base of a redistribution study should take all government activities into account. Even though many of these transactions do not have explicit redistributive aims, they may have influences on the economy which lead to a different pattern of household income distribution. The research in this thesis, however, is narrowly focussed on government budget activities only - that is the activities associated with the collection of revenue and the expenditure of that revenue.

Because it is designed to concentrate on only the government policies which have a direct or immediate impact effect on income distribution, the Stage One coverage is the narrowest. Government revenue transactions include personal income taxes and indirect taxes assessed on final expenditure items. Included as government expenditures are transfer payments (social welfare expenditure), subsidies (on income or on the prices of final consumption goods) and government private expenditures (expenditure for which there is a private beneficiary) on health and education. Stage Two coverage extends to the entire central government income and outlay account. With their consistent treatment of the economy, the Stage Three and Stage Four treatments could be designed in principle, to cover all aspects of government activity, econometric and computational resources permitting.

A.3: The Balanced Budget Question

As is the case with income data, the choice of government budget data can vary depending on the level of theoretical complexity of the analysis. The definition of a balanced budget varies in relation to the four stages outlined in Chapter One.

A.3.a: Balanced Budget : Stage One

In the Stage One case, only those government transactions which have a direct or statutory effect on household income or expenditure

are considered. The budget is not balanced in either an accounting or in an economic sense. Stage One is a quantitative study and there is no explicit budget constraint either for the government or households. It relies on the accuracy of published data sources for its logic.

The Stage One approach is similar to earlier approaches (Nicholson, 1964, and Economic Trends) where the intention was to assess the income-redistributive benefits of social welfare policies. The difference is that Stage One has broadened its coverage to all policies which directly benefit households.

A.3.b: Balanced Budget : Stage Two

In Stage Two, the government budget is balanced in an accounting sense. The basic data measure the production and expenditures of the real sector as recorded by the NZSNA Government Income and Outlay account (discussed further in Sections C and D of this Chapter). By definition, this account is balanced and the balancing item is a residual, savings. Excluded from this account are government capital expenditure items, activities carried out by government trading enterprises and local government activity.

The approach in Stage Two is to assume that households are ultimately liable for all payments to the government and are also ultimately the beneficiaries of all government service activities, even if the initial points of impact are companies or other non-human entities. In essence, the Stage Two methodology re-classifies NZSNA national accounting information about central government public account activity in terms of money-income totals for different household types and household income groups.

A.3.c: Balanced Budget : Stages Three and Four

As Musgrave first pointed out (Public Finance, 1959), a budget which is balanced in an accounting sense is not necessarily balanced in an economic sense. For the real economy, different government expenditures and different compulsory levies (taxes and so on) may have different multiplier effects. When a financial sector is added,

the conditions for budget balance could be long-run or extend across different generations of taxpayers. So in the end, the analysis of the economic effects of the budget requires that a particular methodological approach be adopted and the way in which the balanced budget is achieved will be required to be consistent with that approach. A simple Harberger model specifies a budget that is balanced in an accounting and an economic sense. For the balanced budget condition to hold in the Harberger model, there must be full employment, no economic growth, constant investment and no financial sector.

As Meerman (1974), argues (see Chapter Two, Section A), it may be that it is the adjustment of relative prices, technology and output (RPTO) to government budget transactions which has the most significant effect on income distribution. To consider these RPTO effects, a more complex model is required. For most of the SWF models, the budget is balanced such that its change in tax yield plus government net borrowing is equal to the change in government expenditure. Recent versions of the models incorporate financial assets, as Section C.1.e of Chapter Two points out.

A.4: Allocation Effects

The government's allocation role is its role of providing services to households as opposed to its role of stabilising economic activity. Section B, Chapter Three, discussed the various Reynolds and Smolensky (1977) treatments of the government's allocative role. The definition of the government's allocative role makes a difference to the specification of pre-budget income distribution and to the meaning of the government's redistributive activities.

Stage One considers only those forms of government allocation which are designed with the specific objective of providing a service to households. The amount households are required to pay to the government is greater than the cost to the government of providing for these direct services. Arguably, the difference between direct receipts and government direct expenditures in a given year is the

amount extra individuals are willing to pay in income tax because they consider the extra tax a reverse way of supporting government redistributive programmes.

A case can be made, that even government allocation measures which result in government-provided goods being consumed by industry may have an effect (in national accounting terms) on changing the money-incomes earned by households. The mechanism for this is either through factors which influence the source of household income or factors which influence the use of household income. For example, taxes on companies affect households by putting up prices on households' uses of income (the taxes add to product prices) and may also change households' source of income (by leading to a reduction in wages). Benefits (such as subsidies) accruing to companies will also affect the uses and sources of household income (by changing prices or wages). Therefore, Stage Two treats all allocation effects as potentially having a money-income effects which lead to a change in household money income.

A.5: Valuation

The basis for all calculations conducted in this thesis is the household money income effects of budget transactions. A household's income is reduced by its tax liability and increased by the amount of private benefit it receives because of government expenditures. This benefit is valued in terms of what the government-provided good or service costs the government to provide. In other words, the fact that the government provides these goods means that the purchasing power of the household's income is enhanced.

A.6: Conclusion

Section A has outlined the budget concept consistent with the objectives of this thesis. The next Section summarises how the concept is treated in the literature. The Sections C and D discuss the nature of the available budget data in New Zealand.

B. BUDGET CONCEPT IN EMPIRICAL G-E MODELS AND QUANTITATIVE STUDIES

General equilibrium research has focussed on the tax side of the budget. Government expenditures are considered as transfer payments which enhance the incomes of households, increasing their purchasing power for goods produced by the private sector. As Shoven and Whalley (1984 p.1017) candidly state:

"... in a few cases [the SWF] models have been used with public goods in household utility functions, although this complicates tax models."

The original Harberger model (1962) assumes that government provides the same goods and services as the private sector, but finances them through taxes rather than by the market-price mechanism. Public finance literature suggests that this convenient modelling technique is a poor representation of what governments do. For example, the very reason that the government provides services such as defence and police services is because the private sector does not produce these goods. Or if the private sector does produce private equivalents, they may not provide the same collective or public benefit of the government-provided services. In fact, the theory of the firm suggests that a profit-motivated private sector would provide collective goods only as an unavoidable externality to the production of goods for individual or private benefit.

Keller (1980) makes some important innovations to the Harberger approach. He defines a "public household" which has as one of its functions the provision of public (non-rival consumption) goods. The public household provides public goods by transforming private goods like labour and capital into a good such as national defence. The provision of public goods is done subject to a budget constraint which is exogenously determined by a second department of the public sector, called the "fisc". The net receipts of the "fisc" (tax receipts less transfer and subsidies) determine the total level of the "public budget". The "public household" decides on the composition of the basket of public goods within this budget constraint.

A limitation of the Keller approach is that the only objective of the public household is the provision of public goods. The reality is

that governments provide goods and services which may have either private and/or public good characteristics. A strength of the Keller approach is that he also models household preferences for public goods.

Piggott (1980) defines the government sector as one of four consumers. So like the household sector, the foreign sector and the corporate sector, the government has its own demand function. This approach enables Piggott to analyse a greater variety of government activities than previously covered by SWF studies. The government has an income which, in addition to taxes, includes income from the capital services it is deemed to own, the net surplus from public enterprises, the purchasing power it borrows from the private sector and those revenues not paid out as transfers. Its expenditures cover not only public administration and defence, but various other goods and services as well. The problem is that Piggott assumes that the government is the consumer of public administration and defence, rather than the household sector. Thus, Piggott finesses one of the crucial issues of an analysis of income distribution, the question of who benefits from public good.

Recent SWF models have incorporated a budget constraint, while allowing for a budget deficit. In this case, the models define a government debt instrument on the revenue side of the budget. For example, Auerbach and Kotlikoff (1982) define the government budget constraint so that the present value of expenditures equals the present value of revenue less the initial value of debt where financing by money creation is not an option. According to the models, private and government capital are perfect substitutes in portfolios, but government debt is found to crowd out private capital formation.

Introduction of money into the SWF models enables the specification of an unbalanced budget. Pioneering work in this area is represented by the work of Slemrod (1983) and Serra-Puche (1979 Yale Ph.d.). Slemrod has modelled portfolio behaviour with money and debt as available assets. Although Serra-Puche's model has an initially unbalanced budget, it is being expanded to include monetary behaviour.

The models with budget deficits rely on the simulation of a budget constraint rather than differential incidence to measure changes in income distribution. For these results to have any meaning, it is

important to model household preferences for public goods. The value of the change in government purchases can then be included in the calculation of the household's welfare change.

Since the SWF models have thus far largely avoided modelling household preferences for public goods, it is useful to turn to the quantitative studies to see what they do. Gillespie (1965, 1966) combines expenditure analysis with tax analysis in order to determine the redistributational impact of the entire United States and Canadian budgets. The entire budget refers to three levels of government, federal, state and local. To avoid the modelling complications which arise when there is a budget deficit, Gillespie assumes that for all practical purposes that the budget is balanced. Musgrave et al (1974) and Reynolds and Smolensky (1977) also adopt the Gillespie approach of analysing both the tax and expenditure side of the budget. Perhaps because other forms of government revenue are not large in the US and Canada, none of the studies include receipts other than taxes.

Webb and Sieve (1971) suggest that the coverage of the budget concept depends on the concept of redistribution analysed. They would classify the North American studies in the previous paragraph as studies in public finance, although they acknowledge that some expenditures not specifically designated as social policies may benefit households. Nicholason's (1964) analysis for the United Kingdom Central Statistical Office is a narrower study of the net redistributive effect of some taxes and publicly financed social services.

Like the later SWF empirical general equilibrium studies, the quantitative studies find the analysis of government expenditures less straightforward than the analysis of the distributional consequences of taxes. However, unlike the SWF studies, the quantitative studies explicitly address questions of expenditure incidence. As a result, the quantitative studies can analyse the net distributional effects of the budget on household incomes rather than the distributional effects of taxes alone.

C. NEW ZEALAND BUDGET DATA

The most familiar source of data covering central government activity has traditionally appeared in the annual Budget document as Budget Table 2. Budget Table 2 information for 1981/82 and the years immediately preceding and following is illustrated by Figure 4.1 on the following page. Budget Table 2 is designed to show net government cash expenditure classified by function and government receipts classified by major source. It represents the public debt accounting concept of the government's budget cash statement and shows the amount of central government Public Account spending which is financed through borrowing in the year to 31 March.

The Public Account is the main account of the central government's budget transactions as expressed in its annual Budget exercise. The Department of Statistics' NZSNA accounting system attempts to analyse the Public Account information in economic terms.

According to the NZSNA definitions, this information is re-classified into market and non-market production accounts, a government income and outlay account and a government capital finance account.¹ The information is also further classified by function in both the market and non-market production accounts and the gross capital accumulation accounts. Much of the required information about budget transactions could be expected to be in the public domain overseas; however, with the relatively recent development of NZSNA accounts in New Zealand the government account is still being developed.

C.1: The Public Account as Summarised by Budget Table 2

The Public Account, which Budget Table 2 is intended to summarise, is designed to account mainly for the transactions of central government non-trading activities. Major non-trading activities include social welfare, education and health (although each of these Departments may also engage in some trading activity).

1. The capital finance account has not been fully developed at this stage. By 1983, gross accumulation and the finance of gross accumulation were available. Still missing are accounts of net acquisition of financial assets plus net borrowing and net incurrence of liabilities.

FIGURE 4.1

CENTRAL GOVERNMENT EXPENDITURE AND ITS FINANCING : BUDGET TABLE 2 BASIS

(Actual Figures in 1980/81, 1981/82, and 1982/83 Expressed by Amount, \$Million, and as % of Total Spending/Total Revenue)

	1980/81		1981/82		1982/83	
	\$M	% of Total	\$M	% of Total	\$M	% of Total
<u>Net Expenditure</u>						
Administration	786	8.6	914	8.2	833	6.6
Foreign Relations	578	6.3	720	6.4	808	6.4
Development of Industry	797	8.7	1,184	10.6	1,430	11.3
Education	1,292	14.1	1,493	13.3	1,639	12.9
Social Services	2,590	28.4	3,042	27.2	3,744	29.5
Health	1,356	14.8	1,601	14.3	1,766	13.9
Transport & Communications	333	3.6	461	4.1	496	3.9
Debt Services	897	9.8	1,211	10.8	1,492	11.8
Misc. Invest. Transactions	94	1.0	1,164	1.5	1,557	4.5
Subtotal	8,722	95.5	10,790	96.4	12,265	96.8
Misc. Financing Transactions	411	4.5	407	3.6	408	3.2
Net Government Expenditure	9,133	100.0	11,197	100.0	12,673	100.0
<u>Financed from -</u>						
Taxation						
Income Tax	5,299	69.6	6,515	71.0	7,456	70.9
Customs, Sales Tax, and Beer Duty	1,189	15.6	1,634	17.8	1,873	17.8
Highways Tax	189	2.5	212	2.3	233	2.2
Motor Spirits Tax	140	1.8	147	1.6	184	1.7
Other Taxation	234	3.1	291	3.2	352	3.3
Total Taxation	7,050	92.7	8,798	95.9	10,098	96.0
Interest, Profits, and Misc. Receipts	558	7.3	580	6.3	808	7.7
Reserve Bank Payment/Receipt	-	-	-208	-2.3	-391	-3.7
Total Receipts	7,609	100.0	9,170	100.0	10,515	100.0
Deficit Before Borrowing	1,525		2,026		2,158	

Note: Numbers may not add due to rounding. Source: 1984 Budget.

Central government trading activities are mainly conducted by trading departments and government corporations. Trading departments' include the Post Office and the Railways. Their transactions are largely excluded from the Public Account, because the Departments are structured like market-orientated producers to trade according to some concept of profit. It is intended that trading departments cover their expenditure by revenue, showing either a positive or zero cash position by 31 March each year. Public corporations, such as Air New Zealand and the Bank of New Zealand, are structured like private corporations with the New Zealand taxpayer (the owner) as the shareholders.

In most cases, the only expenditure items in the Public Account relating to trading departments or public corporations are additional funds (generally for capital expenditures) voted by Parliament. In the Public Accounts, revenue items reported for these entities include interest earned on capital advanced and a portion of the surpluses of trading departments and public corporations. The amounts actually recorded on the receipts side of the Public Account depend on the statutory arrangement made with each separate public trading body.

Neither the Public Account nor Budget Table 2 are designed for assessing the government's economic influence on the economy. Because the Public Account and Budget Table 2 are cash flow accounts, they do not necessarily represent the actual flows of government sponsored goods and services within the real economy. Some of the limitations of these cash flow treatments are spelled out below.²

- a) Large portions of government income which are excluded from both accounts (such as the surpluses of government companies, trading departments and corporations) have an influence the level of aggregate demand.
- b) There is no consistent treatment which distinguishes between monetary transactions (such as cash advances to the Housing Corporation to finance their loan activities) and real transactions which result in the production of goods and services.

2. See also Buckle, Snively (1979).

- c) The timing of cash expenditures may not reflect the timing of actual central government output. For example, in some years progress payments are made before 31 March for projects which have not been completed. In other years, cash payments may be delayed until after 31 March, even though projects were completed before that date.
- d) Public Account information does not treat unincorporated government trading organisations consistently. For example, information about Lands and Survey farms and New Zealand Forest Service Production and Sawmills is included in the public account while the transactions of the Railways³ and Electricity Division of the Ministry of Energy are outside the Public Account.
- e) Expenditures and receipts (taxes on wealth and gifts) related to financial assets are not treated consistently in the Public Accounts.

C.2: The Department of Statistics NZSNA Treatment of the Public Account

In the New Zealand System of National Accounts (NZSNA), Public Account information is classified within the context of annual (more recently, quarterly) analysis of New Zealand's economic output. As the NZSNA framework is developed, there is potential to analyse government budget incidence effects in relation to different sectors, including the household sector, the corporate sector and the financial sector. At present, use of NZSNA Public Account data enable linkage with other consistent data sources, such as input and output tables, which has the potential of widening the empirical analysis of the government budget. For example, with the input and output tables, it is possible to assess the effects of indirect taxes in greater depth.

A set of self-balancing accounts record central government activity. This comprise a production account, an income and outlay account and a capital finance account.

3. Since 1981/82, Railways has been formed into a government-owned corporation with independent control over its financial assets and liabilities.

Data sources for the analysis of the public account for NZSNA purposes vary with the sources of funding. For those government departments funded directly from the consolidated account,⁴ the prime source of information is the government's computerised accounting system. Data for the education boards, which are indirectly funded from the consolidated account, are extracted from the annual accounts of individual boards. For the hospital boards, the Department of Statistics conducts an annual survey to obtain the necessary data for NZSNA purposes.

Each item of government expenditure, usually valued in cash terms, is classified in a manner consistent with the economic concepts defined by the NZSNA system. In the end, however, the NZSNA can only be as good as the original Public Account information which, because it is also collected for Parliamentary purposes, has considerable limitations for the purposes of economic analysis.

The NZSNA groupings reflect the fact that the New Zealand economy is mixed, both in the sense that total activity is divided between the private and public sector, and that the public sector's activities are divided between production for sale (market activities) and production of services which are not sold (non-market activities).⁵ For NZSNA accounting purposes, government economic activities fall into two categories:

- 1) **market production** (establishments producing goods or services for sale in the market at prices normally designed to cover the cost of production); and
- 2) **non-market production** or establishments which produce government services.

4. The bulk of government expenditure is met from the consolidated account by way of annual appropriations through Parliamentary votes and permanent appropriations. Receipts from taxation, departmental receipts and interest received, and dividends and profits from corporations and government lending organisations are recorded in the consolidated account.

5. Private sector activity is also divided into market activities and non-market (non-profit) service activities.

Figure 4.2 shows central government activities classified by the NZSNA institutional sector system. The central government has establishments which are classified as producer enterprises, financial intermediaries and as within general government. General government is split between market and non-market production depending on whether the goods and services provided are financed by compulsory payments to the government or whether they are financed by a charge similar to a market price.

FIGURE 4.2

**NEW ZEALAND STANDARD INSTITUTIONAL SECTOR
CLASSIFICATION OF CENTRAL GOVERNMENT ACTIVITIES**

- 1.00 Producer Enterprises .
 - 1.30 Government Enterprises
 - 1.31 Central Government owned and/or controlled market producer enterprises.
 - (a) Government owned and/or controlled corporations or companies.
 - (b) Unincorporated government trading organisations.
 - 2.00 Financial Intermediaries
 - 2.10 Central Bank
 - 2.20 Trading Banks
 - 2.21 Central Government
 - 2.30 Insurance and Pension Funds
 - 2.31 Central Government
 - 2.40 Other Financial Intermediaries
 - 2.41 Central Government
 - 3.00 General Government
 - 3.10 Central Government
 - 3.11 Central Government (Excluding Funded Social Security Schemes)
 - (a) Non-market Oriented Goods and Services (Production Group 22).
or
 - (b) Market Oriented Goods and Services (Production Groups 1-21).
 - 3.12 Funded Social Security Schemes
 - 3.13 Post Office Savings Bank
-

Source: Department of Statistics.

This thesis only analyses the transactions relating to classification 3.11(a), non-market central government. This approach assumes that the market operations of the government are self-funding, an assumption not always borne out in actuality.

Not analysed are the household money-income effects of central government producer enterprises which include government owned and/or controlled corporations or companies and unincorporated trading organisations. The government corporations or companies hold and manage their own assets and liabilities, as well as their tangible assets. Examples include Air New Zealand and the Broadcasting Corporation of New Zealand. Unincorporated government trading organisations sell most of the goods and services they produce to the public; however, they may not be structured so as to exercise control over their financial assets and liabilities.

The New Zealand government is also active in the field of financial intermediation. The government's central bank, the Reserve Bank of New Zealand, does not operate independently as does the central bank in the United States, but is directly responsible to the Minister of Finance. Central government trading-bank activity relates to the transactions of its wholly-owned Bank of New Zealand. The State Insurance Company and the Government Life Insurance Office operate insurance and pension funds for the central government. BNZ Savings Bank Ltd and the Development Finance Corporation are examples of other financial intermediaries responsible to the government.

General government activities are defined to include the government's non-market transactions. Not all these activities are funded through the Public Account, however. Among those organisations which may be only partially funded through the Public Account are the Fire Service Commission, the Earthquake and War Damage Commission, the Fishing Industry Board, the National Provident Fund and the Rural Banking and Finance Corporation. The Accident Compensation Corporation is a totally self-funded organisation (classified as 3.12). Although the Post Office Savings Bank carries on many of the activities of a financial intermediary, it provides a number of non-market services which make it unique. For example, it collects television licence fees and motor vehicle registration fees.

Activities classified in Section 3.11 as government services are further classified into two distinct areas:

- a) Services provided by government which are either collective or regulatory in nature and which may not be conveniently or economically sold on the market. These are treated as indivisible goods in many studies of income redistribution and include defence spending, crime prevention and the provision of parks and reserves.
- b) Services which could be 'sold' on the market (and indeed which are sold in foreign countries) but because of government policy are provided on a universal basis and funded from general or specific taxation. Examples include hospital and medical services, education and accident compensation.

The valuation of output of non-market government activities used in the NZSNA differs from that of market activities in that the elements of operating surplus⁶ (or in other words, pre-tax profit) and consumption of fixed capital are excluded.⁷ Given the inherent difficulties in assigning a market value to the gross output of government services which are not sold on the market and the current lack of a suitable method for assessing consumption of fixed capital, the valuation of gross output is recorded as equal to the sum of gross inputs. Usually these inputs are assessed in cash terms.

The NZSNA's biggest limitation (which applies to almost all of the (data about the government's non-market activities) is that the costs of government inputs determine the value of the goods and services provided (produced) by the government. This treatment is convenient for a study of the income effects of the government budget because it automatically

6. Defined as the gross output of resident industries at producers' values, less the sum of their intermediate consumption, compensation of employees, consumption of fixed capital and indirect taxes net of subsidies.

7. Consumption of fixed capital is the measure of the decrease in the value of durable assets due to wear and tear, foreseen obsolescence and the normal rate of accidental damage. A major limitation of NZSNA is that consumption of fixed capital is not charged for the decrease in the value of durable assets owned by central government.

results in tax receipts equating with government spending when the financial sector and behavioral relationships are ignored. Valuing government output at cost presents considerable difficulties, however, when it comes to assessing excess burden effects. The problems involved in valuing government output when there are no market prices is a reason why the analysis of the incidence of government expenditures seems to be more difficult than the analysis of tax incidence.

Another limitation of the NZSNA accounts is that they are sometimes based on data which has not previously been part of the public domain and which may not measure up to tests of accountability. The NZSNA central government income and outlay account is based on accounts of activities which are subject to the scrutiny of Parliament and the Controller and Auditor General. In contrast, private companies produce accounts which are audited independently and companies listed on the sharemarket are further monitored by investment analysts.

NZSNA accounts of the government's non-market activities are the basic government-budget data applied in this thesis. As discussed in this section, the NZSNA data are preferable to the more familiar Public Account (Budget Table 2) data because they attempt to treat government transactions in a consistent economic accounting sense. In addition, the national accounts provide a framework for the integration of all economic national income accounting statistics. Hence, the analysis of government activity can be cast in the context of macroeconomic activity.

Although the national accounts are the basis for the macroeconomic data, this thesis also uses a large number of other data sources to examine the nature of specific government revenues and expenditures. Of particular value on the expenditure side are the annual Estimates of Expenditures. Further tax information is available from the Department of Inland Revenue, Customs and the Post Office. Since much of this information is also used as the basis of deriving the NZSNA aggregates, linking data from these various sources can be carried out in a consistent fashion.

D. THE CENTRAL GOVERNMENT INCOME AND OUTLAY ACCOUNT

Section D discusses the central government income and outlay account. Subsections D.1 and D.2 describe the components of outlay and disbursements. Subsection D.3 discusses things excluded from the government income and outlay account which should be included in a study of budget incidence. Finally, subsection D.4 examines adjustments to the NZSNA in order to evaluate economic effects.

Government activities, as recorded by NZSNA, include market and non-market activities. Although both types of activities affect household income distribution, it is the government non-market activities which are analysed in this thesis. The NZSNA analysis covers expenditure funded from the consolidated account of the public accounts, either directly as in the case of government departments such as Justice and the Treasury, or by transfer funding as in the case of education boards and hospital boards.

The current income and disbursements related to central government Public Account activities are illustrated in Figure 4.3, the Central Government Income and Outlay Account. This account is a self-balancing account where receipts are equal to disbursements. Savings, listed on the disbursement side of the account, is the residual or balancing item; it is a source of finance in the Capital Finance Account.

D.1: Central Government Outlays

Public Account and other information about government non-market transactions can be classified to represent the economic activities of different departments. These economic activities are grouped in the disbursement side on the NZSNA Central Government Income and Outlay Account. For example, the aspects of education which represent final public consumption expenditure are classified as disbursements. Other parts of the education budget are used for capital finance. Section D.1.a describes the main items of disbursements in the current income and outlay account.

In addition, within the NZSNA, there is a framework for disaggregating central government services by functional classification.

FIGURE 4.3

CENTRAL GOVERNMENT INCOME AND OUTLAY ACCOUNT
FOR 1980/81, 1981/82 and 1982/83

Year Ending 31 March:	1981 \$M	% Change	1982 ^a \$M	% Change	1983 \$M
Disbursements					
Final Consumption Expenditure	3,564.8	21.2	4,319.9	11.7	4,824.4
Interest Concessions	53.6	-8.9	64.3	7.9	69.4
Interest Payments - Internal	688.0	14.4	845.5	21.0	1,023.2
- External	256.3	62.4	416.3	23.7	515.0
Royalties & Patents Fees	1.0	-80.0	0.2	-	-
Subsidies	335.4	71.5	575.1	28.3	738.0
Social Assistance Grants	2,810.7	17.9	3,312.8	20.9	4,005.9
Current Transfers to:					
Private Non-Profit-Making Organisations	64.5	25.6	81.0	59.6	113.1
Local Authorities	136.3	34.7	183.6	18.2	217.1
Central Government	98.5	46.0	143.8	3.1	148.2
Others Within New Zealand	2.3	52.2	3.5	8.6	3.8
Rest of the World	19.0	-15.8	16.6	19.3	19.8
Savings	-234.4	71.5	-402.1	55.3	-624.4
Total Disbursements	7,795.3	22.6	9,560.5	15.6	11,051.4
Receipts					
Operating Surplus	9.4	23.4	11.6	74.1	20.2
Withdrawals from Trading Accounts	20.3	-5.0	19.1	138.2	45.6
Property Income - Interest	618.8	10.9	686.0	6.4	729.6
- Dividends	7.4	20.3	8.9	-9.0	8.1
- Royalties	2.7	40.7	3.8	142.1	9.2
Interest Concessions ^b	6.5	16.9	7.6	128.9	17.4
Indirect Taxes - Import Duties	231.2	45.8	337.2	49.6	504.4
- Others	1,516.7	22.7	1,860.4	12.0	2,083.0
Direct Taxes - On Income	5,299.1	22.9	6,514.7	14.4	7,456.5
- On Others	30.3	9.9	33.3	74.2	58.0
Compulsory Fees, Fines & Penalties	33.9	12.1	38.0	42.6	54.2
Current Transfers n.e.c.	18.8	112.2	39.9	68.9	66.1
Total Receipts	7,795.3	22.6	9,560.5	15.6	11,051.4

Notes: a) Numbers in this column do not add exactly due to rounding of some estimates. b) Also included in this category are net casualty insurance claims which were not greater than \$0.1 Million in any recent year.

Source: Department of Statistics (latest available figures in March 1985).

These classifications are similar to the classifications in Table 2 of the Budget. The figures are not comparable, however, because of the more rigorous treatment given to the economic classification of transactions in NZSNA. The functional classification of government expenditure is discussed in Section D.1.b.

D.1.a: Disbursements Defined

This section defines the individual disbursements in Figure 4.3. The final consumption expenditure of central government is current public account expenditure on final goods and services, such as education. Government final consumption expenditure is valued at net input costs, the surrogate for market prices in the non-market sector. The value of the non-market output is understated when compared with that of market output because of the omission of any surplus or any measure of consumption of fixed capital from the non-market account.

Interest concessions are reimbursement by central government to lending authorities, who, following government policy, charge qualified borrowers an interest rate below the normal market rate. The reimbursement is based on the difference between the rate that would have been charged (usually the prevailing market rate) and the actual rate charged. For example, the Housing Corporation gets interest concessions on borrowing from the government.

Internal interest payments are payments on debt to finance government activity which is borrowed within New Zealand including Government securities such as Government Tap Issues, Inflation Proof Bonds, Kiwi Savings Stock and so on. **External interest payments** are payments on debt financed overseas and information about this is found in Table 14 of the Budget, which shows interest on public debt as recorded in Budget Table 13. **Royalties and patents fees** are payments made by the government to use privately-owned materials.

Subsidies are current grants that may be made by central (or local) government to private and public enterprises and producer boards. For a fuller listing of subsidies, see Chapter Six, Figure 6.12. They include payments to ensure a guaranteed price or to enable market prices of goods and services to be held below the costs of production. Under NZSNA definition, only market-production enterprises receive subsidies. Current grants made by the government to households and producers of private non-profit services to households are regarded as current transfers (not as subsidies) and are social assistance grants by definition.

Social assistance grants are similar to the economic concept of transfer payments to households. This category includes all monetary benefits paid to individuals and households including family benefit, unemployment benefits, sickness benefits, national superannuation, the costs incurred by the government for free prescriptions and doctors' consultation subsidies as well as education subsidies to private schools and private non-profit educational authorities. Also included is the grant paid to private hospitals on behalf of individuals.

Current transfers are unrequited transfers of income which do not conform with the definition of items classified in other categories. These transfers, considered to be payments for non-market activities, are made from current government income and add to the current income of recipients. Current transfers are classified according to the type of recipient. The main categories of transfers and examples of the recipients are outlined in Figure 4.4. Recipients of central government transfer expenditures are: 1) Private non-profit-making organisations; 2) Local Authorities; 3) Central Government; 4) Others within New Zealand; and 5) Rest of the world.

FIGURE 4.4

EXAMPLES OF TRANSFER PAYMENTS

Category of Transfer	Example
Private Non-Profit Organisations Serving Households (PNPs)	Grants to Plunket Society, Foundation for the Blind etc.
Local Authorities	Grants to nassella tussock boards, central government contribution to road maintenance
Government Outside the Public Account	Grants to Royal Society of New Zealand
Government Inside the Public Account	Transfers to trust accounts
Others Within New Zealand	Miscellaneous grants not classified elsewhere ^a
Rest of the World	Subscriptions to international organisations; Foreign aid for current expenditure purposes.

a) Primarily from Votes Agriculture and Fisheries, Health and the Forest Service. Source: Department of Statistics.

Savings completes the disbursements side of Figure 4.3. It is the residual in the government income and outlay account. It is a source of finance in the government capital finance account. In recent years, savings has been negative because the central government's current expenditure has been greater than its current receipts.

D.1.b: Functional Classification of Central Government Outlays

As mentioned in the introduction to this section, central government outlays can also be classified by function. Government outlays summarise the aggregate supply of government-provided goods and services. The actual products represented by this summary are many and varied. A number of different forms of income and family support are provided through the Department of Social Welfare. Final education expenditure goes to provide products such as public and private schools, kindergarten, pre-school, correspondence school, teacher training and tertiary education. The products of expenditure on national defence include armies, navies and airforces.

When compiling the government account, the Department of Statistics attempts to disaggregate information about government activities so that it can be classified as closely as possible to national income accounting definitions. Three problems which arise relate to the nature of the budget round and the way in which government departments account for their activities. First, when departments overspend in one area, they may re-classify an expenditure to fit with an appropriation which is underspent. Secondly, the budgeting process has been structured largely as a form of financial management and the classifications relate to how much things cost rather than to what government departments do. Thirdly, an expenditure-conscious government may reduce spending by restricting new programmes. This can result in new functions being classified under existing programmes. Where possible, the Department of Statistics attempts to adjust for these deficiencies.

Figure 4.5 on the next two pages reclassifies the information contained in the disbursements side of Figure 4.3 by function. The right hand column of the Figure outlines the criteria for imputing the expenditures to household income groups in Chapter Six.

FIGURE 4.5

CENTRAL GOVERNMENT OUTLAYS CLASSIFIED BY FUNCTION
1981/82

<u>Function</u>	<u>Amount</u> (\$M)	<u>Sub- Total</u> (\$M)	<u>How</u> <u>Allocated to Households</u> (see Chapter Six)
Agriculture & Fisheries Support Services			
Final Consumption Expenditure			
Education	1.5		Farmers by occupation
Social, Recreational & Research Services	39.4		
Industries	104.5		
Interest Concessions (Rural Bank)	15.5		
Lands & Survey	3.4		
Agriculture & Fisheries	6.6		
	<u>170.9</u>		
Education			
Final Consumption Expenditure	1,260.0		
(less National Library -9.6)			
Social Assistance Grants	104.5		
	<u>1,364.5</u>		
General Benefits			
Final Consumption Expenditure			
General Administration	861.5		)
Defence	587.3		) Distributed by:
Social, Recreational & Research Services	219.4		) households, persons,
Industries	97.3		) income, expenditure,
Royalties and Patent Fees	0.2		) and property ownership
National Library	9.6		)
	<u>1,775.3</u>		
Health			
Final Consumption Expenditure	1,121.9		Per capita health
Social Assistance Grants	314.4		expenditure by age
	<u>1,436.3</u>		
Housing			
Social Assistance Grants			
Home Ownership Rebates	40.0		
Interest Concessions	34.8		Energy: General Benefit
	<u>74.8</u>		rest: Housing Corp
Maori Affairs			
Final Consumption Expenditure			
General Administration	2.0		
Education	3.5		
Social Welfare	3.9		By Maori race
Industries	8.1		
Interest Concessions	<u>4.0</u>		
		21.5	
Social Welfare Benefits			
Social Assistance Grants			
National Superannuation	1,895.8		By Nat.Sup.(Household Survey data identify recipients)

<u>Function</u>	<u>Amount</u> (<u>\$M</u>)	<u>Sub- Total</u> (<u>\$M</u>)	<u>How</u> <u>Allocated to Households</u> (see Chapter Six)
Family Benefit	297.7		) Household Survey data
Domestic Purposes (less Maintenance Receipt)	239.8		) identify recipients
Unemployment Benefit	156.4		)
Sickness & Invalids	104.0		)
War Pensions (includes miners & special annuities)	79.1		)
Widows (includes \$2.7m lump sum on death)	65.4		) Household Survey
Telephone Rentals (\$1.8m) & TV Licence			) data identify) recipients
Subsidies	2.6		
Handicapped Child Allowance	1.4		)
Orphan Benefit	0.9		)
Misc. (Labour Dept, apprentices, etc.)	10.8		)
	<u>2,853.9</u>		
Subsidies	575.1		Agric. subsidies to farmers Expend. on subsidised items General Benefits
Interest			Savings
Internal Payments			
N.Z. Debt Services	786.7		
Share acquisitions in ADB and IBRD	1.2		
Security encashment ADB and IBRD	1.4		
Security encashment IMF	55.0		
International Finance Agreement	<u>1.2</u>	845.5	
External Payments (Overseas Debt Services)	<u>416.3</u>		General Benefit
		1,261.8	
Current Transfers		428.5	General Benefit
Savings		<u>(-402.1)</u>	Household Savings
Total Central Government Current Outlays		9,560.5	

Note: Main Sub-totals as % of Total Expenditure

	<u>Amount</u>	<u>%</u>
Social Welfare Benefits	2,853.9	29.8
General Benefits	1,775.3	18.6
Health	1,436.3	15.0
Education	1,364.5	14.3
Interest (less concessions)	1,261.8	13.2
Subsidies	575.1	6.0
Miscellaneous		
Current Transfers	428.5	4.5
Savings	(-)402.1	(-)4.2
Other	267.2	2.8
Total	<u>9,560.5</u>	<u>100.0</u>

Source: Department of Statistics (latest available statistics in March 1985).

D.2: Central Government Receipts

The income which government uses to finance its expenditure activities is collected in a variety of ways - not just through taxation as implied in much of the budget incidence literature. As is the case with government expenditures, the NZSNA format classifies government receipts: 1) by economic criteria in the income and outlay account (discussed in Section D.2.a); and, 2) by functional classifications (that is, receipts by source as discussed in Section D.2.b).

D.2.a: Receipts Side of the Income and Outlay Account

Referring back to the bottom section of Figure 4.3, this section describes the receipts side of the government's income and outlay account. These receipts mainly comprise payments to the consolidated account of the central government's Public Account. They do not include charges for goods and services provided by government trading departments, although they include the operating surplus of some trading departments. A common characteristic of most of the receipts classified in Figure 4.3 is that they are compulsory payments to the government in the sense that the requirement to make the payment is specified by law or statute.

By far the most important government revenue item is **direct taxes**. In 1981/82, direct taxes were 68 percent of the central government receipts. Direct taxes on income are levies made at regular intervals by central government on both individuals and producers' income from all sources.

Other direct taxes include levies by central government on the financial assets and the net, or total, worth of enterprises, private non-profit organisations and households; and on the possession, or use, of goods by individuals or households. Examples are motor vehicle registration and licence fees paid by households. Excluded are non-recurrent levies in respect of these items such as estate and gift duties.

The second largest receipt item is **indirect taxes**. Indirect taxes are compulsory levies paid to the government by producers in respect of

the production, sale, purchase and use of goods and services, and which producers treat as an expense of production. These taxes are paid by market and non-market production groups to central and local government institutional sectors.⁸ For a full breakdown of indirect tax receipts by NZSNA category, see Figure 5.6.

Property income is the third largest central government receipt. This refers to income from government-owned financial assets earned as interest, dividends and royalties. A major component of this is interest income for money borrowed from the Public Account (primarily by the Department of Energy, the Housing Corporation and the Rural Bank). The receipt item entitled 'interest concessions' refers to an adjustment to account for concessions on money borrowed at below market rates from the Public Account.⁹

Other receipt items include operating surplus, withdrawals from trading accounts, compulsory fees, fines and penalties and current transfers not classified under other headings. **Operating surplus** refers to those particular amounts of the profits of trading departments and government corporations paid into the Public Account according to statutory requirement. **Withdrawals from trading accounts** refer to receipts earmarked for the central government, though collected by trading departments.

Compulsory fees, fines and penalties are payments made by both producers and households which are obligatory and unavoidable. These include court fines, passport fines and motor vehicle change of ownership, if paid by the household. **Current transfers not elsewhere classified** include such things as transfers from school committees to the relevant Education Authorities.

8. Tax is paid by non-market entities include property rates, payments by the central government to local authorities and local authority payment of motor vehicle registration fees to central government.

9. Combined with this item are net casualty insurance claims which relate to the difference between insurance claimed and insurances owed. The small size of this item reflects the fact that the government is not in the business of insuring its property to any large extent. Usual practice is to write off an asset that is lost

D.2.b: Central Government Income Classified by Source

The personal income tax is an extremely important source of central government revenue. This is shown by Figure 4.6 where central government income is classified by source (similar to the classification of government expenditures by function in Figure 4.5). Personal income tax payments made up 61.1 per cent of total central government income in 1981/82.

Figure 4.6 also illustrates the methods used for allocating different taxes to household income group in the final right-hand column. The personal income tax is imputed to households according to those in the household earning an income subject to income tax.

The second most important source of government revenue is the sales tax which accounted for 10.9 percent of revenue in 1981/82. It is allocated to household income groups according to household expenditure on taxable income items.

Property income, the third most important source of government revenue, is not a tax. Mainly, this item comprises interest income earned when money from the consolidated account is loaned to government departments for capital developments. Since the interest is paid out of trading department income, it adds to the cost to the taxpayer of paying for trading department services. As such, it is a tax on all users. To allocate payment of the tax to households, it is treated as a general tax (the opposite of a general benefit). As discussed in Chapter Five, there are several possible ways in which this general tax payment may be spread amongst household income types. For example, it may be a function of household income, the number of household occupants, household expenditure, and so on.

FIGURE 4.6

CENTRAL GOVERNMENT INCOME (REVENUE) FOR 1981/82 CLASSIFIED BY SOURCE

	Amount (\$M)	Sub- Total (\$M)	% of Total	How Allocated to H'holds (see Chapter Five)
Personal Income Tax Payments^a				
Tax Deductions (PAYE)	4,895.0			Personal Income Tax
Income Tax Individuals	<u>1,290.7</u>			Payers
Gross Individuals Income Tax	6,185.7			
Less Refunds	<u>(386.8)</u>			
Individuals Income Tax	<u>5,798.9</u>			
Non-resident Withholding Tax	36.3			
Absentee Income Tax	<u>9.0</u>			
	<u>45.3</u>			
Total Personal Income Tax		5,844.2	61.1	
Sales Tax		1,038.0	10.9	Taxes Effect Expenditures from Household Survey
Property Income				
Interest	686.0			Opposite of General
Dividends	8.9			Benefits - Is a
Royalties	3.8			General Tax.
Imputed Interest Concessions	<u>7.6</u>			Based on Several
Total Property Income		706.3	7.4	Assumptions.
Company Income Tax Payments		703.8	7.4	Imputed Based on Several Assumptions
Other Indirect Tax Payments				
Motor Vehicles Fees	20.4			) Distributed
Motor Spirit Duty	276.2			) According to
Racing Duty	51.0			) Expenditure
Road User Charges	82.5			) Patterns
Stamp Duty	59.2			) Illustrated By
Other ^b	<u>121.0</u>			) the Household
Total Other Indirect		610.3	6.4	) Survey
Import Duties	337.2			)
- Beer	74.3			)
- Cigarettes, Cigars & Tobacco	112.7			)
- Spirits & Spiritous Mixtures	25.1			)
Total Import and Excise Duties		549.3	5.7	)
Miscellaneous Receipts				
Operating Surplus	11.6			) Opposite of
Withdrawals from Trading Accounts	19.1			) General
Compulsory Fees, Fines & Penalties	38.0			) Benefit
Current Transfers	<u>39.9</u>	<u>108.6</u>	<u>1.1</u>	)
Total Central Government Income		9,560.5	100.0	

Notes: a) Includes direct taxes on others. These amounts from Inland Revenue Annual Report for 1981/82. b) An additional \$115.5 in taxes collected outside public account reduces this figure from \$236.4 million (Total Government Income becomes \$9,675.9 million). Source: Departments of Statistics.

D.3: Government Activities Excluded from Income and Outlay Account

By choosing to use the central government income and outlay account as the basis for analysing the influence of the budget, a number of government activities are excluded. In particular, excluded are the activities of: 1) trading departments and government-owned financial intermediaries; 2) government capital formation; 3) the budget activities of local authorities; and 4) extra-budgetary operations, including some economic-management operations not reflected in budget transactions.

D.3.a: Trading Departments

Recent government policies related to the operations of trading departments and financial intermediaries have been labelled as State-Owned Enterprise policies. It appears that the aim of such policies is to separate the government's provision of private-goods from its functions related to the provision public goods. In as much as the government-provided private good commands a market price, the distributional implications of the government providing that good are irrelevant. What is relevant, however, is whether the changes in the structure of State-Owned Enterprises effect household income distribution.

Normally, government-provision of goods is likely to result in some divergence between the market price for the good and what it costs the government to produce. In theory, this is reflected in the statutory payments from government trading departments into the consolidated account.

D.3.b: The Central Government Capital Finance Account

The government builds hydro-electric power plants, highways, Post Offices, new schools and other public utilities. These capital expenditures will influence current household behaviour. Individuals may reduce savings for bequests to the extent that these capital goods can be viewed as ensuring a higher standard of living for future generations. Individuals may also save less because expenditure on capital projects now is viewed as enabling lower tax rates or higher social security benefits in the future. Appendix Four records the NZSNA information

about central government capital formation in 1980/81, 1981/82 and 1982/83.

Capital expenditures are not treated in this thesis. This is because of the decision to focus on redistribution which satisfies income maintenance policies. In other words, an attempt is made to calculate the current money-income values of government expenditures to households. This treatment goes against the literature which argues that households' current decisions are based on a recognition of future income from capital.

D.3.c: Budget Activities of Local Authorities

Perhaps one role of studies of the influence of the budget is the evaluation of economic activities which are financed by compulsory levies rather than by market prices. Based on this definition of the focus of an incidence study, the effects of local government should be analysed in conjunction with the central government. This is the approach adopted in the North American quantitative studies by Gillespie and Musgrave.

D.3.d: Extra-budgetary Operations

Break (1982) discusses two extra-budgetary areas of operation, credit programmes and tax expenditures. Credit programmes are subsidies provided implicitly through an expenditure (such as a subsidy which exists on housing loans when they are provided by the government at below market rates of interest). Tax expenditures refer to government goods delivered through the tax system. For example, the government assists households to consume education by allowing them to deduct school fees and donations. Information about these operations are not usually included in the published accounts of central government activities, either in the United States or New Zealand.

Pope (1981) shows tax expenditures in New Zealand to be quite large in relation to sources of tax revenue. Figure 4.7 (Section D.4.a of this Chapter) includes Pope's estimates of business and personal tax expenditures in 1980 and 1981. Some tax expenditures are treated implicitly in this study through adjustments in personal tax liability using ASSET.

Finally, government economic-management policies not recorded by budget transactions could also have implications for the distribution of income by household. For example, policies to finance the budget deficit would have monetary effects which lead to changes in income, possibly by crowding out investment or through changes in interest rates.

There is no doubt that these extra-budgetary operations could have a significant effect on income distribution. Future studies could take such things into account.

D.4. The Economic Meaning of National Income Accounts

As noted in Section C, the NZSNA definitions are not necessarily consistent with the economic concepts required for a general equilibrium study of budget incidence. Pope (1981) attempts to classify national government accounts data by economic function. The general equilibrium studies take this process a step further by re-specifying national accounts data to be consistent with the conditions of general equilibrium. (see St Hilaire and Whalley, 1983 and Henry et al, 1986).

D.4.a: Pope's Public Sector Dimensions

Pope uses available data to analyse government as a tax collector, as a spender, as a producer, as a provider of household incomes, as a provider of goods and services and so on. Turning to what the government provides, "provision" is applied in a broad sense to cover the fact that the government may provide more than it produces but not less than it finances. He includes, for instance, tax expenditures. Though they are neither production nor strictly speaking, financial payments by the government, they are provided by the government similarly to transfer payments.

Government is treated as providing three general classes of goods and services: 1) non-market goods and services; 2) transfer payments; and 3) marketable goods and services. Non-market goods and services can be further disaggregated into individual and economic welfare goods and services and collective goods. These classifications (based on 1980 and 1981 data) are illustrated by Figure 4.7.

FIGURE 4.7

PROVISION OF GOODS AND SERVICES BY CENTRAL GOVERNMENT
IN 1979/80 and 1980/81

March Year	1980 (\$M)	% Change	1981 (\$M)
Categories			
Collective Goods	1,119	27.3	1,424
Individual and Economic Welfare	1,846	25.0	2,307
Transfers			
A) Current			
a) Social Assistance	2,508	12.0	2,810
b) Other	258	15.1	297
c) i Subsidies	342	-2.1	335
ii Interest Concessions	43	25.6	54
B) Debt Interest	790	14.6	905
C) Financial Transfers			
1) Misc. Investment	4	23400.0	94
2) Misc. Finance	372	10.5	411
D) Tax Expenditures			
1) Personal	475	1.5	482
2) Business	239	54.0	368
Marketable Goods and Services	2,101	17.8	2,475
TOTAL	10,097	18.5	11,962

Sources: Table compiled by Pope, 1981. The data shown were either obtained directly or derived. Categories 1, 2, 3), 3B) and 4, were based on the following Department of Statistics publications: Monthly Abstract of Statistics (May 1981) Appendix II; Monthly Abstract of Statistics (September 1981) Appendix II; Monthly Abstract of Statistics (February 1982), National Accounts Section. For Category 3C): Budget Table 1. For category 3D): Department of Statistics, Income and Income Tax; Report of Task Force on Tax Reform (April 1982) and Goddard (1981).

A starting point of a general equilibrium model focussed on expenditure incidence would be to specify behavioural relationships (such as consumer preferences for collective goods) based on classifications such as Pope's. It is not proposed to build such a model in this thesis. The national account functional classifications of government expenditures are largely applied instead (see Chapter Six) because they can be more easily analysed given the available statistics

D.4.b: General Equilibrium Adjustments to National Accounts Data

For the SWF general equilibrium studies, substantial changes are made to the national accounts to make them consistent with equilibrium conditions. The necessity arises because the detailed information presented in the National Accounts is largely a by-product of the process of assembling macroeconomic aggregates and typically does not aim at consistency in various areas of detail. According to St-Hilaire and Whalley (1983, p.177):

"General equilibrium analysis, perhaps the most widely used theoretical framework for economy-wide microeconomic analysis, is only explicitly recognised in the construction of current national income accounts in the aggregate income-expenditure identity, but not in subaggregate detail."

D.5: The Budget Concept : Conclusion

In summary, with some recent exceptions, the SWF literature models tax incidence rather than budget incidence. Recent work by Keller, Pigott and Whalley incorporates government expenditure on transfers, subsidies, and public consumption. The generalised treatment of government activities by these models, however, fails to observe the various (and myriad) influences of government measures on household money incomes (see Chapter Two, Section C).

This is one reason why this thesis has chosen the methodology of a quantitative study. In this way it is possible to analyse each government income and outlay item. Or in other words, household incomes can be adjusted to take account of government expenditures, as well as receipts.

CHAPTER FIVE

PAYMENTS TO CENTRAL GOVERNMENT BY HOUSEHOLD INCOME GROUP

The private sector pays for government-provided goods and services in several ways. Chapter Five analyses the distribution of payments to the government by household income group and household type.

By far the largest payment to the government is the personal income tax which accounts for 61.1 percent of total central government revenue for March year 1982. Next in importance is indirect taxes (or more accurately, taxes assessed on economic transactions other than income-flows) which provide 23.0 percent of revenue. Only 7.4 percent of central government revenue is from the company income tax. This is less than the 8.5 percent of revenue contributed by other receipts which comprise government property income (mainly interest income) and miscellaneous government receipts.

Figure 5.1 below classifies central government revenue, as defined by the NZSNA central government income and outlay account, into the four main revenue sources.

FIGURE 5.1 : CENTRAL GOVERNMENT INCOME FOR MARCH YEAR 1982
CLASSIFIED BY MAIN SOURCE

Revenue Source	Amount (\$M)	% of Total
A. Personal Income Tax	5,844.2	61.1
B. Indirect Taxes	2,197.6	23.0
Import & Excise Duties etc	1,159.6	12.1
Wholesale Sales Tax	1,038.0	10.9
C. Company Income Tax	703.8	7.4
D. Other Receipts	814.9	8.5
Government Property Income	706.3	7.4
Miscellaneous	108.6	1.1
Total Government Revenue	<u>9,560.5</u>	<u>100.0</u>

Source: NZSNA, Department of Statistics.

This Chapter discusses the nature of payments to the government and the empirical information required to assess their distribution by household type and household income group. It also discusses the incidence of these payments in light of the results of the empirical general equilibrium models surveyed in Sections C and D of Chapter Two.

Chapter Five is divided in four substantive Sections devoted to the four main sources of revenue listed in Figure 5.1. Each section has four main parts which 1) outline the main legal and institutional features of the revenue source under consideration; 2) survey the literature on the incidence of the tax or payment; 3) discuss the method used in this thesis to calculate the money-income value of the payment to government by household income group and household type; and, 4) discuss the quantitative results in light of the methodologies behind each of the four stages.

1. Description of the Statutory Requirements

The interpretation of the statutory requirements for taxes and other payments to the government has empirical and theoretical implications. Knowledge of the tax statutes assists in identifying immediate liability in terms of whether a payment to the government is initiated in the household sector or some other sector. This knowledge is also required to assess the amount of immediate tax liability.

It has become the practice of the empirical economic general equilibrium models to analyse the theoretical concept of a particular tax, rather than the legal and institutional features of the tax. Chapter Two, Section C.1.a. discusses this aspect of the SWF models (see Figure 2.3). For example, the usual theoretical treatment of personal income taxes is to apply a simple marginal tax rate scale on personal (or household) incomes. In reality, the personal income tax is a very complicated tax which comprises a number of tax rebates, exemptions and deductions (not to mention exceptions). By introducing the discussion of each major source of revenue with a description of its legal and institutional features, this thesis identifies some of the gaps in the current research about the economic effects of actual government revenue-earning transactions.

2. The Incidence of Government Receipts

Economic analysis suggests that the value of a tax (or other payment to government) in money-income or resource terms may differ from its statutory liability because of changes in economic relationships as a result of the imposition of the tax. Progress in the study of tax incidence is surveyed in Chapter Two where it is concluded that there are still a number of controversial issues to be resolved. A choice is made to use the framework of a quantitative study in this thesis, rather than a fully-fledged general equilibrium model.

The Stage One approach is designed to analyse the direct effects of the government's collection of revenue. In the language of economic-incidence, this means that Stage One is concerned with the statutory or impact point of the tax or other payment to the government.

The Stage Two approach is designed to apply assumptions about the economic effects of payments to the government based on the general equilibrium literature. Although the general equilibrium literature does analyse the incidence of taxes by household income groups, the main thrust of the research has been to identify the nature of the economic relationships and how they change when a particular tax change is introduced. As discussed in Chapters Two and Four, the revenue side of the government budget is more complex than set out by general equilibrium models such as the HMM (Harberger, McLure and Mieszkowski) and SWF (Shoven, Whalley and Fullerton) models. The HMM models basically treat taxes on two factors (labour and capital) and two products. The SWF general equilibrium incidence models analyse the incidence of a wide range of taxes (giving particularly careful attention to the analysis of the company income tax) but usually ignore other sources of government revenue. Also, the analysis of the incidence of the revenue side of the budget, in terms of household income distribution, requires further development. As a result, some of the underlying incidence assumptions adopted for Stage Two are necessarily rough.

Stages Three and Four would require a formal economic model similar to SWF general equilibrium models to estimate tax incidence based on behavioural relationships. There are two major short-comings of existing SWF models when they are applied to analyse the distributional effects of

between household factor ownership, the derivation of household income, and the effects of budget revenues are not specified by SWF models to focus on the policy issues of income maintenance and income redistribution. Chapter Five discusses the second shortcoming which is that SWF models analyse the effects of an economic concept of a tax rather than the effects of a tax which has been legally imposed.

3. Imputing Payments to Households

Stages One and Two start from the analysis of the observable data about the effects of the revenue side of the budget on household income distribution. The first concern is to use the data to estimate the money-income value of payments to central government by household income groups and household type. The second concern is to discover what insights, if any, are provided by an analysis of observable data which are applicable to the formal general equilibrium analysis of tax incidence. Then, if a Stage Three and Stage Four approach were adopted at some future date, the analysis could be augmented to take account of any significant insights.

The basic source of data for the quantitative research in Chapter Five is the 1981/82 Household Survey. As has been explained in Chapter Three, the data are weighted based on the 1981 Census so that the results can be aggregated to the entire private household population. Subsidiary information is provided by statistics from Inland Revenue published in Income and Income Tax, the Customs Department and the Department of Statistics ASSET and Inter-Industry Sections.

4. Payments to Government by Household Income Groups and Household Type

The conclusion of each major Section in Chapter Five discusses the quantitative results of the Stage One and Stage Two approaches. This thesis extends the research of the 1982 Task Force in Tax Reform and the 1985 Institute of Policy Studies research into the incidence of indirect taxes (see Broad and Bacica, 1985; Scott, Goss and Davis, 1985) to incorporate the analysis the distribution of the company income tax and other government receipts. Also discussed are the possible differences to the results if the methodologies inherent in a Stage Three and Stage Four approach could be applied.

A. PERSONAL INCOME TAX PAYMENTS

Since they contributed over 60 percent of government revenue in 1981/82, personal income taxes are potentially the most important influence on household income distribution. The analysis of the distribution of the personal income tax is also important because the tax is apparently designed to perform the major redistributive job of the government.

The redistributive objective of the personal income tax is intended to be achieved primarily by the schedule of marginal tax rates. The marginal rate scale is designed so that, excluding the effects of exemptions and rebates, average tax rates rise with income. Those on higher taxable incomes not only pay more in absolute terms but also they pay a larger proportion of their total taxable income in tax. In practice, however, the definition of taxable income does not include all sources of income. Further, the actual amount of tax paid may be reduced by exemptions, deductions and rebates. These features of the personal income tax may offset some of the redistributive effects of the marginal tax scale.

A.1: The Statutory Requirement for Personal Income Tax Payment

The act covering statutory liability for income tax - The Income Tax Act 1976 - covers the taxation of income from persons and companies. Income defined as subject to personal income tax can be classified under three main headings: (1) salary and wage income; (2) investment incomes and (3) self-employment income.

In 1981/82, there were 1,711,900 tax returns filed. Of these, 1,268,520 or 74.1 percent of returns were filed by individuals whose main source of taxable income was wages and salaries. In comparison, 17.5 percent of tax returns were filed by individuals whose main source of taxable income was investment income (investment income earners are those who derived a major part of their incomes from national superannuation, dividends, rents and royalties, overseas income, annuities, estate income and interest). Another 8.4 percent were filed by those who mainly earned self-employment income (including partnerships, sole traders and other unincorporated enterprises).

Turning to the components of the personal income tax base, 74.2 percent of income subject to personal income tax is salary and wage income. Assessable profits from self-employment accounted for 8.8 percent of total income; national superannuation accounted for 6.1 percent and interest income (less exempt income) accounted for 4.7 percent. This leaves 6.2 percent of income from other miscellaneous sources including salaries for shareholder employees of companies, rents, royalties, dividends, estate income, unemployment benefit income, earnings related Accident Compensation and income from pensions, superannuation or annuities.

The amount of personal income tax finally assessed depends on a complicated system of rebates, exemptions, and legal exceptions, which differ according to the source of income. Treatment under The Income Tax Act 1976 can differ quite markedly depending on whether the source of income is wages and salaries, self-employed earnings, partnership returns, farmer income or whether the recipients are low-income families. For example, there are more opportunities to deduct expenses incurred while deriving investment income or self-employed income. Another difference is that provisional tax is paid twice a year on an estimate of annual self-employment and investment earnings. In comparison, pay-as-you-earn (PAYE) deductions are made from salaries and wages when they are paid out and remitted by employers to the government on a monthly basis.

The personal income tax receipts received by the government in a given financial year do not relate directly to income earned in that particular year. This is because returns are filed after the financial year is finished.¹ If there is any difference between PAYE tax deducted or tax provisionally paid and the actual tax owed, an adjustment or "square up" is made. If there is an overpayment, the taxpayer will receive a refund or credit against future tax. If insufficient tax was paid, there will be further ("terminal") tax to pay.

1. Salary and wage earners file their returns by 7 June following the completion of the financial year on 31 March. Self-employed and other provisional taxpayers file by 7 September when they are required to pay one-third of the amount of tax liability assessed. They pay the remainder, plus any terminal tax from the year before, on 7 March, nearly a full year after the completion of the financial year.

Salary and wage earners are assessed on their total taxable income earned in the year just completed, less any deduction for expenses and special exemptions. Rebates and the (PAYE) taxes already paid are deducted from the tax assessed to give either a refund or further tax to pay. A majority of salary and wage earners receive refunds of overpaid tax. Refunds can arise as a result of exemptions and rebates (since these are claims which are not covered by the Tax Code Declaration) or because the wage earner was employed for part of the year only. In contrast, a self-employed taxpayer is likely to pay the lowest rate of provisional tax that is legally possible and then make a larger terminal tax payment.

The graduated tax scale and marginal tax rates applies to all forms of personal income. Figure 5.2 shows the rates of income tax payable for the year commencing 1 April 1981 on each dollar of taxable income.

FIGURE 5.2

THE PERSONAL INCOME TAX SCALE
(Applicable between 1 April 1981 and 1 October 1982)

Income Range	Rate per Dollar
\$	£
Up to 5,500	14.5
5,500 to 12,600	35.0
12,601 to 17,600	48.0
17,601 to 22,000	55.0
Over 22,000	60.0

Source: 1980 Budget.

"Taxable income" is the definition of income to which the marginal tax scale is applied. "Assessable income" is the balance of "total earned income" after deduction of employment-related expenses and exclusion of income which is specially designated to be exempt from tax. "Taxable income" is "assessable income" less further "special exemptions". This confusing array of definitions arises because of the history of changes to the income tax structure. Although the tax is basically assessed on sources of income, features of it are designed to promote certain uses of income as can be seen from the list of exemptions, special exemptions and rebates on the next few pages.

FIGURE 5.3 : EXEMPT INCOME IN 1981/82

-
- (i) Social welfare benefits except for National Superannuation and the unemployment benefit when the recipient has no dependent children;
 - (ii) A certain portion of interest and dividend income (depending on the prevailing legislation). In 1981/82, the first \$200 interest and dividend income^a was exempt from taxation;
 - (iii) Maintenance and alimony;
 - (iv) Educational bursaries and scholarships.
-

Note: a) Dividends paid from tax-free reserves are not considered to be assessable income. Source: 1982 New Zealand Official Yearbook.

Figure 5.3 above lists the types of income which were exempt from the personal income tax in 1981/82. Besides income exemptions, there are also expenditures which may be deducted from taxable income called "special exemptions". The special exemptions available in 1981/82 were for life insurance and superannuation contributions. These exemptions are summarised by Figure 5.4 below.

The basic liability for personal income tax is obtained by applying the appropriate tax rate scale to taxable income. Then rebates are deducted from the total tax payable. Figure 5.5 on the following page lists the rebates allowable for the 31 March 1982 income year.

FIGURE 5.4 : EXEMPTIONS FOR LIFE INSURANCE AND SUPERANNUATION IN 1981/82

<u>Income Tax Exemption</u>	<u>Amount of Exemption</u>
Life insurance, personal accident and sickness premiums paid for self, wife or children, and superannuation	The amount paid or contributed up to an exemption of - \$800 if a member or an employer-subsidised superannuation fund for the whole year with proportionate increases if a member for only part of the year. \$1,000 in other cases.

Source: 1982 New Zealand Official Yearbook.

FIGURE 5.5 : REBATES ALLOWED IN 1981/82 TAX YEAR

Rebate	Amount
Children's	Children under 15 or still at school and who derive income may personally claim a rebate of \$78.
Wife/husband (spouse)	\$156, decreases by 20 cents for each dollar by which spouse's income exceeds \$520. Where spouse's income exceeds \$1,300 - no rebate allowable.
Low income family	Allowable to the principal income earner in a family with a child for whom the family benefit is paid. Also available to solo parents and widows with a child. The rebate is \$468 a year where the combined income of both spouses is less than \$9,800 per year, and decreases by 12¢ for each dollar of income over \$9,800 and is thereby extinguished when income reaches \$13,700.
Housekeeper (under certain circumstances)	Limited to the smaller of 40 cents for each complete dollar of payments made or \$156.
Dependent relative	Limited to the smaller of 40 cents for each complete dollar contributed to support a relative; or \$60.
Back pay	6 cents per \$1 of back pay received which relates to a previous income year.
Overtime	10 cents per hour for every hour of qualifying overtime worked.
Shift	40 cents for each qualifying shift worked.
Young family	Allowable to principal income earner in a family with at least 1 child under 5 years of age. The rebate is \$468 where the sole or principal income earner derives less than \$13,700 per annum. Rebates decrease by 12 cents for each dollar of income over \$13,700 per annum and is extinguished when the income reaches \$17,600.
Special Home, Farm, or Fishing Vessel Ownership Account	45 cents for each \$1 of annual savings increase in Special Home, Farm, or Fishing Vessel Ownership account. Maximum rebatable savings are: Home ownership - \$3,000 per year (rebate \$1,350) Farm ownership - \$5,000 per year (rebate \$2,250) Fishing vessel ownership - \$5,000 per year (rebate \$2,250)
Home vendor mortgage interest	20 cents for each \$1 of net interest received in respect of a "Home Vendor Mortgage", subject to a maximum rebate of \$500. This rebate is in substitution for, and not additional to, the relevant interest exemption which would otherwise be available.
School fees and charitable donations	50 cents for each dollar of payments made up to \$350. Maximum rebate \$175.
Property rates or Chatham Islands Dues	Up to \$25 in respect of rates paid to a local authority or dues paid to the local council on an owner-occupied residence.
Interest on first home mortgage	The lesser of \$1,000 or 50 percent of qualifying mortgage interest paid by an owner-occupier of a first home. The rebate is allowable in respect of the first 5 years of ownership and occupancy.

Source: 1982 Yearbook.

A.2: The Incidence of the Personal Income Tax

The mainstream view about the incidence of the personal income tax is that it lives up to its popular label as a direct tax. That is, the tax is paid by the person legally liable, reducing that person's income by exactly the amount of tax assessed. In the jargon of tax incidence, it is a tax which stays where it is put and is not shifted. Or to put it another way, the apparent and the effective incidence of the personal income tax are the same. An examination of the empirical research into the personal income tax, however, shows that analysis has not addressed some of the features of the tax which may have significant distributive effects.

The conditions which must be fulfilled for the personal income tax incidence to be evaluated are very restrictive if the Harberger general equilibrium model is applied. The persons earning the taxed income must be fairly similar to one another in terms of ability; there must be full employment; no factor mobility, and, the tax must be assessed on all forms of personal income. These conditions are not exactly fulfilled in practice because, for example, taxpayers have widely varying abilities and skills; there is unemployment; the common Australian-New Zealand labour market means that the size of the labour force can change in response to tax changes; and the tax is not assessed on all forms of personal remuneration.

McLure's (1971) research suggests that if the condition of no factor mobility is relaxed and the personal income tax is a general tax on factor labour in both (all) industries, then the tax is borne by labour, regardless of either its mobility or that of capital (see Section B.2.b., Chapter Two). This suggests that the common Australian/New Zealand labour market is not necessarily grounds for changing the assumption that the personal income tax is not shifted.

But while both Australia and New Zealand have a personal income tax, it is not the same in both countries. So, in reality it seems likely that the international mobility of New Zealanders would have an effect on the incidence of taxation for domestic New Zealand households.

As Bhagwati (1982) puts it, citizenship without obligation to pay

income tax is the same as "representation without taxation". A consideration of public finance theory suggests that an assessment of additional tax payments by local residents to support overseas citizens should take into account the cost of government-provided goods funded from taxation such as education.

It is also questionable whether the personal income tax could be considered a general tax on one factor. While the marginal tax scale is common to all taxpayers, the definition of taxable income is not. For example, the practice of remunerating employees with tax-free allowances is quite widespread. However, the actual remuneration package, commonly covering low-interest housing finance, motor vehicles, travel, entertainment and so on, varies from employer to employer and for individual employees working for the same employer. Tax-free forms of remuneration are less evident in the public sector, and this creates distortions with subsidiary industrial consequences. Individuals may move to jobs which appear relatively more attractive because of tax-free allowances which increase their personal remuneration, but not their tax. One reason some employees move between industries is because labour is not homogeneous. As people move between jobs, employers will adjust their remuneration policies to attract the quality of employees they desire. The ability of employers to make these adjustments, will depend on their ability to change their productive capacity. Employees' success in shifting the personal income tax away from themselves depends on the elasticity of demand for the goods they produce and the elasticities of substitution between different types of labour and capital involved in production. If these immensely more complex relationships were specified in existing general equilibrium models, they could show some shifting of the personal income tax.

Another influence on the incidence of the personal income tax is the distinction made for tax purposes between gains of an income nature (dividends, interest income) and those of a capital nature (increases in property values). With few exceptions, only the former are assessable for tax. Under competitive conditions, the individual will accumulate tax-free endowments depending on the relevant elasticities of demand and substitution and this could lead to some of the tax being shifted.

The general equilibrium SWF empirical results are usually derived by applying formulas for marginal taxes at an increased rate for each higher household group. Most general equilibrium models apply these formulas on the implicit assumption that the personal income tax is not shifted substantially from households. In the recent literature, the response of factors, prices and outputs is not modelled as precisely as, for example, the response to a change in a tax on capital.

Fullerton et al (1978), Piggott and Whalley (1982, 1984) capture the progressivity of the personal income tax by treating the personal income tax as a separate linear function of income for each household income group. A limitation of this treatment is that each household faces a marginal tax rate that is unchanging even if simulations of a policy change show a redistribution of income. A significant modelling improvement is that by Slemrod (1983), who has endogenized the marginal tax rate. In his model, households make portfolio choices on the basis of the real after-tax rate of return to each asset, as well as its riskiness. Taxable income is determined on the basis of the assets that are selected by the household. An approximation of tax tables is then applied to compute the household's taxable income.

Piggott (1983 p. 8, 9) treats the personal income tax in some detail in his general equilibrium model of the Australian economy. As in New Zealand, the tax unit is not the household (the unit at the base of most of the analysis) but the individual. The average taxable income of each household is estimated from the household's total income, taking account of personal allowances, exemptions such as that of owner-occupied housing, and various other deductions. Then the taxable income of the principle income earners is approximated by multiplying the taxable income by the average proportion of household income earned by the main income recipient. The marginal tax rate for principle earners is then calculated for each model household from the legal tax rate schedule. Piggott uses this rate to analyse the behaviour of consumers towards such "tax-distorted choices" as the purchase of owner-occupied housing services, and in a model variant where leisure is given explicit recognition (the "labour-leisure choice"); he finds that the personal income tax is very redistributive with those in the highest income brackets paying the largest share of tax.

In summary, existing analysis of the personal income tax does not consider some significant legal features which could lead it to be shifted from its original impact. For example, the incidence of the tax could differ among taxpayers with income from different sources; advances along the lines of the Slemrod research could provide answers here. Despite the above reservations, the Stage One and Two approaches, which are the basis for the quantitative work on this thesis, assume that the personal income tax is not shifted.

A.3: The Empirical Calculation of Personal Income Tax Payments By Household Income Group

The New Zealand Department of Statistics analyses the personal income tax structure using "A Simulation System for Evaluating Taxation" (ASSET). Since this is the basis for the analysis of the personal income tax in this thesis, this section briefly outlines how the ASSET model derives the amount of tax paid by households (see also Broad, 1982).

ASSET has been designed so that users may interact with the computer processing. ASSET is intended to assist those giving policy advice in forecasting the effects of changes in various income tax instruments. It is based on information about individual taxpayers so that the taxpayers are classifiable by the main rebates each can claim. The tax liability for each taxpayer is known from the application of the appropriate annual tax schedule. Based on projections of income levels and hours worked, tax estimates can be prepared which simulate the impact of changing incomes and tax schedules over time. Instead of projecting income levels, this thesis uses the levels as estimated by the 1981/82 New Zealand System of National Accounts.

One of the important features of the ASSET model is that it models the personal tax schedule in considerable detail. The detail of the modelling goes beyond that of the overseas studies surveyed by this thesis. The Household Survey can be used to derive statutory liability for personal income taxes. The advantage of using Household Survey data is that it allows the liability for personal income taxes to be assessed in terms of household income groups and by type of household. Because of the information collected by the survey, it is possible to describe in detail the distribution of eligibility for rebates and exemptions.

Household Survey data for household incomes (disaggregated into principal earner and spouse) property rates, life insurance premiums and superannuation schemes are incorporated into ASSET. Income analysed covers wages and salaries, self-employment income, investment income, social welfare benefits (some are taxable) and other regular income (such as rental income).

A limitation of the Household Survey is that it does not seek specific information about income taxes. As a result, ASSET is based on an application of the tax law, rather than actual Inland Revenue data describing taxpayers. Since it is not based on actual tax payments, ASSET does not take into account avoidance or evasion of taxes. Inland Revenue data, which does cover actual tax payments, is not a suitable basis for ASSET because it provides too little detail about the characteristics of taxpayers, is not able to be analysed by household and it does not give as complete coverage, since those earning below \$11,500 were not required to file returns in 1981/82.

A.3.a: ASSET Derivation of Taxable Income

The first step in the estimation of the amount of tax paid by households is the derivation of assessable income by household. To assist, the Household Survey questionnaire asks for information about sources of income consistent with the legal definition of assessable income. Exempt income (noted in Figure 5.3) is excluded from the calculation of assessable income. The ASSET model is applied to determine the amount of a household's eligibility for allowable expenses and exemptions. These are subtracted from assessable income to yield taxable income.

ASSET ignores the different timing of tax payments for different sources of income (for example, it ignores the pattern where self-employed earners pay provisional tax in September and terminal tax in the following March). Income data are synchronised so that they are all evaluated at the average earning rates of the base year. The PAYE concept is extended to all income sources. Tax liability is calculated for the income level prevailing in a particular period as if that level of income was received for a full year. The PAYE concept is also

extended for all allowances. For instance, rebates which are in fact allowed only as end-of-year adjustments to the amount of tax paid, are spread throughout the year in which they are effective.

Data on employment-related expenses claimed for tax assessment purposes are collected by Inland Revenue from tax returns. Unfortunately, these Inland Revenue data do not provide sufficient information to aggregate individual earners claiming expenses into household units and the Household Survey does not request sufficient information so that actual employment-related expenses by households can be known.

To derive a money-income value of employment-related expenses, two cases were tested for this thesis. This was an innovation of the ASSET model which simply applies the \$52.00 standard deduction to every household. Case 1, (the Standard Case for the ASSET model) assumes that employment-related expenses are the minimum standard deduction which amounts to 2 percent of employment income with a maximum of \$52 (employment income covers wages, salaries, National Superannuation, and the taxable forms of the unemployment benefit). Case 2 derives a coefficient for each income group based on the latest Incomes and Income Tax data. The coefficient measured is the relationship between employment-related expenses, income level and occupation. This is then applied to calculate employment related expenses according to the occupation of respondents in the Household Survey and then merged into the tax data file.

Data on the amount of household expenditure on life insurance, personal accident and sickness premiums and superannuation schemes by household is available from the Household Survey. ASSET applies this information to calculate taxpayer eligibility for an exemption for life, sickness and accident insurance, as well as superannuation (see Figure 5.4). Another expenditure which reduces taxable income is the fee for having a tax return prepared. However, while the Household Survey does record expenditure for tax consultants, the ASSET model does not take this tax exemption into account for 1981/82.

In summary, the ASSET model derives taxable income by adding together assessable income and subtracting employment-related expenses and an exemption for insurances and superannuation. The next step is to

determine the actual amount of tax paid per household.

A.3.b: ASSET Calculation of Tax Liability

The basic tax liability is obtained by applying the appropriate tax rate scale to taxable income. Figure 5.2 shows the scale that is applicable for the 1981/82 year. The final tax liability is calculated by subtracting tax rebates (if and when applicable). Eligibility for the spouse rebate, the low-income family rebate and the young family rebate can be determined from the Household Survey.

Note that ASSET does not take account of all the rebates specified in Figure 5.5. The only rebateable expenditure currently surveyed by the Household Survey is property and water rates paid to local authorities. In 1981/82, this rebate was allowed to owner-occupiers paying rates. The value of some rebates such as the spouse rebate, can be imputed to households based on Household Survey data about the characteristics (age, income and so on) of the occupants of households. The school fees and donations rebate can be estimated from households' expenditures on donations and school fees as recorded by the Household Survey. Household Survey data are insufficient to calculate rebates for housekeeper/child care and support for dependent relatives. The first-home mortgage interest rebate can be roughly estimated (see Broad and Bacica, 1985, p.39).

Unless specified otherwise, the rebates are ascribed to the principal earner. Data collected by the Household Survey enables the identification of the principal income recipient as the earner with the largest income. It is not always possible for taxpayers to claim all of the rebates for which they are eligible. Especially in the case of low income earners, taxpayers may be eligible for rebates greater than the amount of their tax liability. If the taxpayer's basic tax liability is extinguished before all the rebates have been taken up, the remaining rebates are of nil worth.

The income to be used for calculating the abatement of the spouse rebate is the income of the spouse in his/her own right. The interpretation of this which is recognised by the Inland Revenue Department is total income less:

- (i) Social Welfare benefits, except where taxable;
- (ii) Housekeeping money;
- (iii) Board paid by children living at home;
- (iv) Maintenance and alimony; and,
- (v) Income before marriage.

Intra-family transactions are excluded from the Household Survey, which means items (ii) and (iii) are not known and have not been incorporated in the approach followed by this thesis. Further, since the date of marriage is not known, it is not possible to adjust income for (v). The Household Survey does record information about social welfare benefits and maintenance and alimony. Thus, to calculate the money-income value of the spouse rebate, only items (i) and (iv) are subtracted from total income to yield a spouse's 'income in own right'.

Eligibility for the low income family rebate (household with income of less than \$13,700 a year caring for children) and the young family rebate (principal income less than \$17,600 and caring for a child under 5) can be determined using the Household Survey data. The amount of tax paid per household is found after these rebates, as well as the spouse rebate and the property rates rebate, are subtracted from the basic tax on taxable income.

A.4: Conclusion : The Distribution of Personal Income Tax Payments

When the tax scale and the exemptions and rebates are calculated to determine statutory liability as discussed above, the personal income tax appears to be an extremely progressive tax. The bottom 50 percent of households are liable for only 16.5 percent of the tax while the top 10 percent of householders are liable for 32.2 percent of the tax. The discussion below looks first at these results and then analyses them in light of other approaches.

A.4.a: Quantitative Results

The percentage distribution of the personal income tax by household type and household market income group is illustrated by Table 5A.1. Households are grouped by market income into deciles (10 percent of private households fall into each range). The upper decile of households has a statutory liability for 32.2 percent of personal income tax while the lowest decile is only liable for 0.9 percent of personal income tax.

Table 5A.1

PERCENTAGE OF 1981/82 PERSONAL INCOME TAX PAID
BY HOUSEHOLD MARKET INCOME GROUP AND HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds*
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
Percentage of \$5,552 Million Personal Income Tax Liability											
Less Than \$250	0.5	0.0	0.4	0.0	0.0	0.0	0.0	-	-	0.0	0.9
\$250-(\$3,950)	0.7	0.0	0.7	0.0	0.0	0.0	0.0	-	-	0.0	1.6
\$3,950-(\$9,750)	0.8	0.4	1.0	0.2	0.1	0.1	0.1	0.1	0.0	0.1	2.8
\$9,750-(\$13,450)	0.4	1.0	1.0	0.5	0.4	0.4	0.4	0.2	0.2	0.2	4.6
\$13,450-(\$16,900)	-	0.9	0.9	0.9	0.7	1.2	0.9	0.2	0.3	-	6.6
\$16,900-(\$20,250)	-	1.0	1.0	1.5	1.0	1.5	1.4	0.6	0.6	-	8.7
\$20,250-(\$24,200)	-	0.7	0.7	2.1	1.1	2.5	1.8	0.6	1.1	-	10.7
\$24,200-(\$29,200)	-	0.5	0.9	3.7	1.1	2.1	1.8	1.3	1.9	-	14.0
\$29,200-(\$36,650)	-	-	0.9	4.4	1.5	2.7	1.7	2.8	3.4	-	17.9
\$36,650 and over	-	-	1.3	4.3	2.6	4.0	3.7	7.5	8.4	-	32.2
Total	3.4	5.2	8.9	17.4	8.6	14.6	11.9	13.5	15.9	0.7	100.0

Notes: Cells with insignificant observations designated (-). The table is designed so that 10 percent of all households fall in each income range.
Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

Turning to a discussion of the analysis by household types, two-adult households without national superannuation income were the household-type generally liable for the greatest percentage of the personal income tax. This household type accounted for 15.0 percent of households and included 10 percent of occupants of private households but paid an estimated 17.4 percent of personal income tax in 1981/82.

Note that the results in this thesis are tabulated in matrix form to show the different patterns of distribution for each household type and income group. For example, in Table 5A.1, an interesting result is the large proportion of tax contributed by national-superannuitant households in the three lowest income groups. In interpreting these results, it should be kept in mind that while every care is taken to insure that the

individual cell values are as accurate as possible, they are not as accurate as usually expected of official statistics. The analyses should be seen as qualitative estimates by relative distributions between different types of households rather than providing definitive estimates.

Table 5A.2 shows that the average money-income value of liability for the personal income tax increases with household income. This is true for all households and for the different household-type classifications. Both this Table and Table 5A.1 suggest that liability for personal income tax is progressive in the sense that on average those on higher income are liable for more of the tax, both in absolute amount and in percentage-share terms, than those on low incomes.

Table 5A.2

1981/82 PERSONAL INCOME TAX: AVERAGE AMOUNT PER HOUSEHOLD PER YEAR
BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults .		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
\$000 Per Year Per Household											
Less Than \$250	.7	.1	1.1	.1	.1	.2	-	-	-	-	.5
\$250-(\$3,950)	1.0	.1	1.3	.3	.3	.3	.1	-	-	-	.9
\$3,950-(\$9,750)	2.6	1.3	2.7	1.0	.6	.6	.5	2.2	.8	.7	1.6
\$9,750-(\$13,450)	5.0	2.8	4.2	2.2	1.9	1.8	1.8	2.6	2.1	2.6	2.6
\$13,450-(\$16,900)	-	4.1	5.3	3.5	3.5	3.3	3.3	3.8	2.7	-	3.8
\$16,900-(\$20,250)	-	5.8	6.9	4.6	4.9	4.6	4.6	4.8	4.5	-	5.0
\$20,250-(\$24,200)	-	7.6	7.9	5.4	6.0	6.4	6.5	5.2	5.3	-	6.1
\$24,200-(\$29,200)	-	11.0	11.0	7.3	8.6	8.4	8.4	6.7	6.7	-	7.9
\$29,200-(\$36,650)	-	-	14.0	10.0	12.0	11.0	11.0	8.8	9.0	-	10.0
\$36,650 and over	-	-	26.0	17.0	30.0	24.0	20.0	16.0	16.0	-	18.0
Average (\$000)	1.8	3.4	4.1	6.6	6.2	6.6	6.5	9.2	8.8	1.2	5.7

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census to represent the total population of private households. Cells with insufficient observations designated (-).

Table 5A.3

THE PROGRESSIVITY OF THE 1981/82 PERSONAL INCOME TAX:
DIFFERENT "EFFECTIVE RATE" DEFINITIONS COMPARED

Household Market Income (\$ p.a.)	Average Household Personal Income Tax as a Proportion of Household Income Defined as:		
	Market Income (%)	Total Income (%)	Total Expenditure (%)
Less Than \$250	-250.0	9.6	8.6
\$250-(\$3,950)	54.0	12.0	12.0
\$3,950-(\$9,750)	23.0	15.0	15.0
\$9,750-(\$13,450)	22.0	19.0	22.0
\$13,450-(\$16,900)	25.0	22.0	26.0
\$16,900-(\$20,250)	27.0	25.0	30.0
\$20,250-(\$24,200)	28.0	26.0	34.0
\$24,200-(\$29,200)	30.0	29.0	39.0
\$29,200-(\$36,650)	31.0	30.0	41.0
\$36,650 and over	36.0	36.0	61.0
Overall Average	31.0	27.0	35.0

Sources: Personal income distribution estimated using the Department of Statistics ASSET, 1981/82 Household Survey.

Progressivity refers to the extent to which a tax increases with income. In assessing it, a number of different concepts may be applied. Table 5A.3 measures the progressivity by relating the amount of personal income tax to market income, total income and total expenditure. Another term for the Table 5A.3 relationships is "effective rates of income tax". When a definition of market income is applied, the liability for the personal income tax is regressive for the bottom two deciles of households. Those with market incomes of less than \$250 paid more in income tax than they earned by working in paid employment. Those earning between \$250 and \$3,950 paid 54.0 percent of their market income in tax. The degree of progressivity (in the effective rates) is greater when personal income taxes are measured as a proportion of total income or as a proportion of total household expenditure.

A.4.b: Developments to the Analysis of the Personal Income Tax

As Section A.2 discussed, the decision to model the personal income tax as though it is not shifted may mean that some significant economic

and behavioural effects are ignored. Before concluding this Section, it is worth focussing on how the results might differ if these were taken into account.

Evidence that the personal income tax may be shifted in New Zealand is provided by Buckle (1981). He suggests that when employees bargain for higher wages, a basis for their bargaining position is the known or expected amount of increased tax which results from movement into higher marginal tax brackets with increased wages.

To assess the extent to which the personal income tax is (or is not) paid by those legally liable for it requires the specification of a number of relationships not presently modelled in the literature attempting to empirically assess personal income tax incidence. These include such things as the relationship between households and companies and the response of companies to a tax on the wages and salaries they pay. If the personal income tax is not paid by those directly liable, then it could be shifted to shareholders through dividend payouts, other shareholder-employee remuneration, or lower share prices and capital gains. It could also lead to changes in output and employment. And of course, it could lead to price changes for goods sold to local and overseas consumers.

As Fullerton et al (1982) point out, researchers investigating tax incidence based on general equilibrium models still have not "reached a consensus on the value of the few 'key' elasticity parameters. First among these is the elasticity of labour supply". Their examination shows that the results of tax incidence studies are very sensitive to this parameter. The results of such models would be improved if there were labour supply functions by age, income, marital status (depending on the tax code) and demographic area.

Moreover, the models of tax incidence and ASSET make very little distinction between the way in which the tax code is administered to salary and wage earners and the way in which it is administered to other forms of personal income. Another behavioural effect ignored by the models is the evasion of tax. The probable net effect of these deficiencies in the modelling of the personal income tax is that the share of the tax personal income tax paid by the higher-income groups is over stated.

B. INDIRECT TAXES

After personal income taxes, the next largest source of central government revenue is indirect tax. Taxes classified as indirect by the New Zealand system of National Accounts (NZSNA) include wholesale sales taxes, excises, customs and import duties, service charges, and regulatory (permission-to-use) taxes.

Indirect taxes may be distinguished from direct taxes. The person (or enterprise) legally liable for an indirect tax is not seen to be the entity paying the economic cost of the tax, while the entity legally liable for a direct tax is the same entity seen to bear the economic cost of the tax. If the classification of direct and indirect was ever based on a theoretical concept, it was a partial equilibrium view. As shown in Chapter Two, both "direct" taxes on factors and "indirect taxes" on goods and services can incur economic costs that are borne by entities other than those legally liable to pay the tax. Another way of classifying indirect taxes is as taxes that are initially assessed on producers' costs, in contrast to direct taxes which are initially assessed on household and company income.

Figure 5.6 on the following page shows indirect taxes, classified by NZSNA, and the amount of revenue collected from them in 1980, 1981, 1982 and 1983. The Department of Statistics (1983, p.50) makes the following points about the NZSNA classification of indirect taxes:

- (a) "The distinction between the payment of an indirect tax and the payment for goods and services provided by government is based on the compulsory and unavoidable nature of the indirect tax. Also, for government revenue to be classified as income from the sale of goods and services there must be a clear link between the payment and the provision of the specific goods and services; and
- (b) Only producers pay [are liable for] indirect taxes. A number of payments, such as motor vehicle registration fees, are made directly by both producers and households. In this case, the amount paid by households is not classified as an indirect tax and is excluded.³ However, householders as occupiers of their own dwellings are considered to be producers, and therefore rates, stamp duty and other compulsory levies associated with their property, are indirect taxes."

3. Motor vehicle registration fees paid by households are included as direct taxes.

FIGURE 5.6

INDIRECT TAXES BY NZSNA CATEGORY
(Market and Non-Market Government Activity)

Year Ending 31 March	1980 \$M	% Change	1981 \$M	% Change	1982 \$M	% Change	1983 \$M
Indirect Taxes Received by Central Government							
Earthquake & War Damage							
Commission Premiums	33.11	13.0	37.40	28.9	48.20	15.3	55.59
Energy Resources							
Levy ^a	18.58	5.8	19.65	23.1	24.19	66.3	40.22
Excise Duty on:							
- Beer	58.16	10.5	64.28	15.6	74.33	100.6	149.14
- Cigarettes, Cigars & Tobacco	100.77	-2.4	98.39	14.6	112.74	9.6	123.58
- Spirits and Spirituuous Mixtures	18.46	6.2	19.60	28.2	25.12	5.4	26.47
Fire Services							
Commission Levy	37.52	10.0	41.28	17.2	48.40	43.1	69.24
Foreign Travel Tax ^b	9.29	-	-	-	-	-	-
Heavy Traffic Fees ^c	0.31	6.5	0.33	-	-	-	-
Import Duty	212.25	9.0	231.33	45.8	337.20	7.3	361.79
Intn'l Departure Tax	6.30	97.6	12.45	15.5	14.38	2.4	14.72
Land Tax	10.73	8.0	11.59	191.4	33.77	1.8	34.38
Lottery Duty	5.48	16.2	6.37	7.4	6.84	1.6	6.95
Meat, Game and Fish							
Inspection Fees	0.01	1000.0	0.20	-	-	-	-
Mileage Tax ^c	0.51	-86.3	0.07	-71.4	0.03	-33.3	0.02
Motor Spirit Duty, ^d	265.01	-1.9	260.05	6.2	276.20	14.8	317.20
Motor Vehicle Fees ^e	18.50	4.4	19.31	5.6	20.39	83.0	37.31
Racing Duty	42.75	7.7	46.06	10.7	50.99	11.9	57.04
Road User Charges	51.23	33.5	68.37	20.7	82.53	17.5	96.95
Sales Tax	624.10	31.7	821.67	26.3	1038.02	16.7	1211.75
Stamp Duty	30.46	29.9	39.58	49.8	59.28	-7.6	54.80
Other ^f	37.28	26.6	43.46	38.8	60.34	25.5	75.73
Total Central Govt	1580.82	16.7	1841.45	25.6	2312.95	18.2	2732.88
Indirect Taxes Received by Local Government							
Rates	386.31	24.5	461.70	21.4	560.69	17.3	657.58
Petrol Tax	17.88	12.5	17.75	1.0	17.92	3.1	18.47
Other	13.43	15.0	16.93	35.0	22.85	14.8	26.24
Total Local Govt	417.59	23.7	496.34	21.2	601.47	16.8	702.29
Total Indirect Taxes	1998.41	18.2	2337.79	24.7	2914.28	17.9	3435.17

Notes: a) Introduced 1 January 1977. b) Introduced 1976; replaced by International Departure Tax from 1 July 1979. c) Replaced by Road User Charges from 1 April 1978. d) Additional Duty introduced 23 May 1975. e) Comprise Motor Vehicle Registration, Licence and Change of Ownership Fees paid by producers. f) Includes Domestic Air Travel Tax. Source: Department of Statistics, NZSNA.

FIGURE 5.7

1981/82 INDIRECT TAXES CLASSIFIED BY MAIN SOURCE

	NZSNA \$M	Adjustment %	Amount Paid By Private Households	
			\$M	\$M
1. Wholesales Sales Taxes	1038.02	95		986
Direct			706	
Intermediate			280	
2. Import Duties, Excise Duties and Other	1,159.56	95		1,101
Specific Taxes ^a	590.83		558	
Import Duties	337.20		320	
Other Indirect Taxes	231.53		223	
Non-Market Indirect Taxes	<u>2,197.55</u>	<u>95</u>		<u>2,087</u>
Market Indirect Taxes ^b	115.37			
Total NZSNA	2,312.95			

Notes: a) Includes Energy Resources Levy, Domestic Air Travel Tax, Motor Spirits Duty, Motor Fees Payments, Tobacco and Alcohol Duties, Racing and Lottery Duty. b) Includes Earthquake and War Damages Commission Premiums (\$48.20 million), Fire Services Commission Levy (\$48.40 million) and some other (\$18.77 million) which are "taxes" to finance central government market activity (as opposed to its non-market activity). Source: NZSNA, Department of Statistics.

B.1: The Statutory Incidence of Indirect Taxes

For the purposes of this study,⁴ indirect taxes are divided into two main groups: (1) wholesale sales taxes, and (2) import, excise duties and other. Both of these groups include some taxes which can be directly allocated and some taxes which can only be allocated by adopting assumptions about their economic effect. The former are called "direct" indirect taxes and are assessed on goods intended for retail sale directly to consumers. The remaining indirect taxes fall on intermediate goods used in the production of final goods (such as taxes on business machines and road user charges) and are thus referred to as "intermediate" indirect taxes. The values for indirect taxes analysed in this thesis are shown by Figure 5.7 above.

4. A study (partly based on research already underway for this thesis) of the incidence of indirect taxes was conducted by Broad and Bacica (1985) because of Treasury interest in the effects of a value-added "goods and services" tax. Since Broad and Bacica focussed on indirect taxes, some of the procedures for calculating the money income value of indirect taxes paid by households were refined beyond those discussed in this section.

B.1.a: The Statutory Incidence of the Wholesale Sales Tax

Of the various indirect taxes, the wholesale sales tax provides the single most important revenue source, accounting for 10.9 percent of total central government revenue. The wholesale sales tax is assessed on the wholesale stage of distribution, usually at an ad valorem rate varying from 10 percent to 60 percent. When implemented in 1933, the wholesale sales tax base was fairly broad. By the early 1970s, the tax base had narrowed because the number of goods exempt from the tax had increased progressively.

During the 1970s attempts were made to raise more indirect tax revenue. Policies to widen the wholesale sales tax base (to tax goods such as alcohol, tobacco, home appliances, ice cream, boats, caravans, and household cleaners, to name only a few) brought about a marked growth in sales tax revenue. Between March 1978 and March 1981, sales tax revenue rose by over 100 percent. Despite this, the wholesale sales tax base for 1981/82 is still very narrow, comprising less than 25 percent of private consumption expenditure. The general principle followed by policymakers in deciding to add items to the tax base is whether they are considered to be "luxuries" or discretionary expenditures "not having educational, health, or lifesaving uses". This selection, of course, involves a value judgment since tastes in luxuries differ.

Government agencies do not keep records of wholesale sales tax receipts classified by the goods on which the tax is assessed. A rough impression of the different sources of wholesale sales tax can be gained by examining Figure 5.8 (on the following page) which shows a breakdown of wholesale sales tax receipts⁵ by licensed wholesalers (classified by main commodity sales) for the 1981/82 financial year.

5. Note that the total wholesale sales tax collected by Customs is slightly more (\$1,061.6 million as opposed to \$1,038.0 million) than that measured by the Department of Statistics. This is probably explained by timing differences, but also the Customs figures may include some excise taxes.

FIGURE 5.8

SALES TAX RECEIPTS BY LICENSED WHOLESALERS
1981/82 Financial Year^a

Commodity	Sales Tax Receipts		Licensed Wholesalers	
	Amount \$(M)	%	No.	%
Confectionery and ice cream	15.7	1.5	232	2.6
Alcoholic liquor, soft drinks and cordials	156.2	14.7	407	4.5
Petroleum products	30.1	2.8	37	0.4
Tobacco manufacturers	28.4	2.7	13	0.1
Cosmetics and Toiletries	38.4	3.6	233	2.6
Photographic film, cameras - photographic and optical equipment	10.1	1.0	54	0.6
Tyres and tubes (manufacturers only)	15.8	1.5	8	-
Travel goods	3.9	0.4	162	1.8
Printed matter and stationery	29.3	2.8	910	10.1
Jewellery, watches and clocks	16.4	1.5	661	7.3
Marine engines and accessories	3.2	0.3	78	0.9
Machinery and general engineering products including machine tools	54.0	5.1	1,654	18.3
Household articles and appliances, ornaments including hand tools	74.9	7.1	1,025	11.3
Office machines and appliances	12.6	1.2	96	1.1
Batteries (manufacturers only)	2.3	0.2	9	0.1
Television receiver, radio and telecommunication equipment, sound recorders and reproducers	40.0	3.8	232	2.6
Sound recordings	9.1	0.8	91	1.0
Motor vehicles other than motorcycles	310.9	29.3	202	2.2
Parts of motor vehicles	85.2	8.0	631	7.0
Motor cycles including parts	14.8	1.4	55	0.6
Trailers and caravans	3.6	0.3	183	2.0
Aircraft	0.2	-	12	0.1
Firearms and ammunition	1.1	0.1	37	0.4
Toys and games	6.4	0.6	284	3.1
Boats	3.9	0.4	413	4.6
General merchandise	28.4	2.7	752	8.3
International departure tax	14.4	1.3	204	2.3
Other electrical goods	5.1	0.5	188	2.1
Exports	neg	-	26	0.3
Souvenirs	0.3	-	52	0.6
DATT	8.5	0.8	95	1.0
Cleansing Preparations	neg	-	9	0.1
CNG	neg	-	3	-
Misc. - Unallocated	38.4	3.6	-	-
Total	1,061.6	100.0	9,048	100.0

a) Excludes tax paid at wharf on imports by non-licensed taxpayers. Source: Customs Department.

There were less than 10,000 licensed wholesale sales taxpayers in 1981/82. The exact amount of sales tax collected for specific items cannot be determined from Figure 5.8 because the sub groups are quite broad. It appears, however, that the major source of wholesale sales tax revenue is sales of motor vehicles. This commodity group accounted for 29.3 percent of the sales tax receipts analysed. Another point that emerges from Figure 5.8 is the concentration of the tax in the manufacturing sector. There is no wholesale sales tax on services.

The Customs Department estimates that goods purchased directly by private consumers make up roughly 60 percent of the wholesale sales tax base. When the Household Survey and ASSET are used with tax rates to estimate the distribution of "direct" wholesale sales taxes, about two-thirds of total wholesale sales taxes can be explained. The remainder of the sales tax base comprises business inputs such as plant and machinery components, motor vehicles and parts, computers, and raw materials. Taxes on these items are considered to be "intermediate" wholesale sales taxes.

B.1.b: Statutory Incidence of Import, Excise Duties and Other Indirect Taxes

After the wholesale sales tax, the next largest source of indirect tax is import duty. Import duty is assessed on a range of items (about 2,500), but as is the case with the wholesale sales tax, there is little information about the amount of revenue collected from each item. In 1981/82, the law regarding import duties was set out in the Customs Tariff (1978 revision). According to the 1982 New Zealand Yearbook, tariff rates were set "with the intention of according domestic industry a reasonable level of protection against competing imports". The rates also vary according to the country where the goods originate. Some import duties are "direct" (in the sense that they are levied on final goods) but most are "intermediate" (levied on intermediate goods).

Specific taxes is a designation used in this thesis to cover taxes assessed for a specific purpose. Most can be specifically linked with an item of household expenditure that is surveyed by the Household Survey and which is identical to the base for the tax. There are seven indirect taxes which have a specific function and which can be directly imputed to households based on actual expenditures reported by the Household

Survey. These include the energy resources levy, the domestic air travel tax, the portion of motor spirits duty and motor vehicle fees paid directly by households as producers, tobacco, alcohol, lottery, and racing duties.

Other indirect taxes tend to be "intermediate" taxes mainly comprising the portion of motor vehicle fees and charges paid by businesses, road user charges and stamp duty. Road user charges are assessed on all heavy motor vehicles and non-petrol-powered vehicles which transport goods at a cost that varies according to their nominated gross weight, their axle configuration and the distance they travel. Stamp duty is payable on documents, executed in New Zealand or elsewhere, affecting property situated, or to be situated in New Zealand. The rates of stamp duty vary for each type of document and are recorded in Figure A5.1 in Appendix Five.

B.2: Incidence of Taxes on Expenditures

The usual assumption is that indirect taxes are entirely shifted to the prices of final goods. Since those on low incomes tend to spend a larger proportion of their income on goods and services, it is usually argued that indirect tax payments are greater for them and the tax is regressive.

New Zealand policymakers have tried to avoid some of the regressive effects of the tax by applying indirect taxes on a selected array of what they consider to be luxury or non-necessary goods. Nevertheless, there are two reasons why this policy still results in a regressive indirect tax structure. First, even "luxuries" may be purchased by those on low incomes (sometimes low-income households may spend more on them than high-income households). Second, if the economic effects of indirect taxes are assessed, general equilibrium analysis suggests that (part of) the tax could be shifted from the taxed products to untaxed products.

In considering the effects of a selective tax, the HMM results suggest that consumers of the tax-free product could pay a portion of the tax depending on the elasticities of substitution between products and factors in production and the demand elasticities of final products. The consumers of the untaxed product could bear some of the burden of an indirect tax levied on a product they do not consume because

the rise in price of the taxed product could result in changes in consumer demand and factor shares which lead to increases in the price of the untaxed product. The supply and demand response is likely to vary for different indirect taxes. For example, excise duties are assessed on goods (such as cigarettes and alcohol) for which demand apparently is not responsive to price rises.⁶

In the SWF literature, most indirect taxes (primarily sales taxes) are treated on the demand side of the model. Consumer demand is determined by maximizing individual utilities subject to their income constraints. The prices used in these exercises are the cost covering prices of producers, plus any final output taxes, including sales tax, excise tax, tariffs, and so on, applied to the commodities demanded.

"Intermediate" indirect taxes are represented in the specification of intermediate activities in SWF models through the use of an input-output matrix. Prices are set by the zero profit rule and intermediate indirect taxes are included in the producer price of the using industry.

Although the SWF models apparently treat indirect taxes in a very detailed way, the published results are not precise as to how payments of these taxes are distributed by household type or income group. Piggott (1980a) finds that "final output taxes" (sales taxes, excises, tariffs, motor vehicle taxes etc.) have no significant influence on the distribution of income. However, while he publishes the effective rates of these taxes on different commodities, he does not publish results showing how this translates into a money-income payment by household income groups.

In the derivation of the quantitative results for this thesis, all indirect taxes are assumed to be 100 percent shifted to households through prices of the final goods they consume. In the Stage One case, only "direct" indirect taxes are considered. Stage Two considers "intermediate" indirect taxes as well.

6. There is continuing debate in the responsiveness of demand to price changes for these items, but one study suggests that no conclusive measure of price responsiveness can be assessed from available evidence in New Zealand (Easton and Kay, 1983).

B.3: Imputing Indirect Tax Payments to Households

The method for imputing wholesale sales taxes to households is discussed in Section B.3.a and the imputation of other forms of indirect taxes is discussed in Section B.3.b. This section also discusses the quantitative results of the analyses of individual indirect taxes.

B.3.a: Wholesale Sales Tax Payments Imputed to Households

To impute "direct" wholesale sales taxes to households, household expenditures on final goods subject to wholesale sales tax are identified from the Household Survey. Rates of tax applicable to each item in the Household Survey commodity classification were provided by the Customs Department. Retail markups are from the Department of Statistics Inter-Industry files or based on data accumulated for the 1981 Task Force on Tax Reform. Information about markups is applied to derive the wholesale value of the taxed item, tax inclusive. The tax rates are then used to calculate the amount of tax paid by each household.

Where Customs regulations refer to **specific** (rather than **ad valorem**) tax rates, **ad valorem** equivalents are prepared by estimating the cost structure of the commodity. Since this is basically a study of first round effects only, the tax is calculated on purchases of new goods and any tax capitalised on second-hand goods is ignored.

As mentioned earlier, the information recorded about the actual wholesale sales tax collected is very rough. Thus, the calculations of payments of the tax based on household expenditure cannot be checked. It appears that the amount of the tax paid directly by households could be over-estimated by this thesis. For example, the results show that nearly 70 percent of the wholesale sales tax is paid directly by households but Customs' rough guess was 60 percent. Also, the calculations for this thesis show that wholesale sales taxes on tobacco and alcohol are the most important "direct" indirect taxes paid by households; however, Customs' information suggests that motor vehicles are the largest source of wholesale sales taxes. Table 5B.1 is an estimate of the average amount of wholesale sales tax directly assessed on expenditures made by households. The amounts of tax paid on 10 major expenditure groups are analysed by income group (for a listing of what each column contains, see numerical code listing under the table).

Table 5B.1

AVERAGE DIRECT WHOLESALE SALES TAX PAYMENTS FOR 1981/82
PER PRIVATE HOUSEHOLD BY RANGE OF HOUSEHOLD MARKET INCOME
(Cost in Money-Income Terms, \$s Per Annum Per Household)

Household Market Income (\$ p.a.)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	Total ^a
Average \$ Per Year Per Household											
Less than \$250	0	0	9	13	2	15	70	17	6	7	160
\$250-(\$3,950)	77	0	9	16	1	20	110	18	4	10	250
\$3,950-(\$9,750)	96	0	15	23	2	20	190	31	10	16	440
\$9,570-(\$13,450)	85	0	19	26	3	40	230	26	12	13	520
\$13,450-(\$16,900)	93	0	23	34	4	27	240	38	17	18	590
\$16,900-(\$20,250)	130	4	31	36	4	30	310	38	21	21	760
\$20,250-(\$24,200)	81	2	31	40	6	34	300	52	25	21	720
\$24,200-(\$29,200)	73	0	36	42	7	52	390	53	33	22	880
\$29,200-(\$36,650)	170	9	52	47	6	44	480	74	35	29	1100
\$36,650 and over	330	6	63	55	7	56	610	79	35	30	1400
TOTAL	110	2	29	33	4	33	290	43	20	19	680

Codes to Numerical Columns

1. New Cars & Motorcycles	6. Home Appliances & Furnishings
2. Other Vehicles	7. Tobacco & Alcohol
3. Vehicle Maintenance	8. Personal Supplies
4. Food	9. Recreational Equipment
5. Home Maintenance & Fuel	10. Household Equipment & Supplies

Note: a) Total includes all wholesale sales taxes directly allocated and comprises some items not included in previous ten columns. Source: Estimates derived from Household Survey information on household expenditures, Customs information on tax rates and margins from the inter-industry study, weighted to the aggregate population from the 1981 Census of Population and Dwellings.

As recorded in Table 5B.1, it is estimated that an average household paid \$680 directly in tax for goods assessed wholesale sales tax (see "Total" column). For an average household, the largest "direct" wholesale tax payment is for wholesale-based taxes on tobacco and alcohol (see Table 5B.1, Column 7). In 1981/82, an average of \$290 was spent on this tax or nearly 43 percent of the total amount of wholesale sales tax paid per year by an average household. Since household expenditure on alcoholic beverages is under-reported, the amount of tax estimated to be paid per household could also be under-reported. The second major source of revenue from wholesale-based taxes is new cars and motor-cycles, which accounted for nearly 15 percent of the total amount of wholesale sales tax paid by an average household (see Column 1).

The general pattern is for the average amount of wholesale sales tax paid to increase with household income. This pattern applies particularly well to wholesale-based taxes on food, fuel, tobacco and alcohol. It does not appear to apply to new cars and motor-cycles or to vehicle spare parts. Although in both these cases the highest income group pays the most tax, the distribution of tax payments is multi-modal.

As Table 5B.2 shows below, the 10 percent of households in the highest income group are estimated to pay the largest share of direct wholesale sales taxes. The share for the highest household income group is 21.1 percent compared with the lowest income group's share of 2.3 percent. Two-adult households without children and three-adult households, both with and without children, are the household types which pay the largest shares of indirect taxes.

Table 5B.2

PROPORTION OF TOTAL DIRECT^a 1981/82 WHOLESALE SALES TAX PAID
BY RANGE OF HOUSEHOLD MARKET INCOME AND PRIVATE HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
Proportion of the Total for All Households (%)											
Less Than \$250	0.4	0.1	0.6	0.2	0.1	0.1	0.2	-	-	0.6	2.3
\$250-(\$3,950)	0.7	0.1	1.6	0.2	0.3	0.1	0.1	-	-	0.3	3.6
\$3,950-(\$9,750)	0.8	0.8	1.2	0.5	0.6	0.8	0.7	0.3	0.3	0.3	6.4
\$9,750-(\$13,450)	0.2	1.4	0.9	1.2	1.0	1.0	0.6	0.4	0.7	0.2	7.6
\$13,450-(\$16,900)	-	0.8	1.0	1.2	1.1	1.9	1.2	0.3	0.9	-	8.6
\$16,900-(\$20,250)	-	0.9	1.0	2.4	1.1	1.9	1.7	1.0	0.9	-	11.2
\$20,250-(\$24,200)	-	0.5	0.8	2.3	0.9	1.9	1.5	1.2	1.5	-	10.5
\$24,200-(\$29,200)	-	0.4	0.4	3.9	0.8	1.6	1.4	2.1	2.3	-	12.9
\$29,200-(\$36,650)	-	-	0.2	3.2	0.8	1.5	1.0	4.7	4.2	-	15.8
\$36,650 and over	-	-	0.6	2.2	0.9	1.4	1.4	7.8	6.8	-	21.1
TOTAL	2.4	5.3	8.4	17.3	7.6	12.1	9.8	17.9	17.5	1.7	100.0

Note: a) Includes wholesale sales tax directly assessed on consumer goods but not that assessed on intermediate goods. Sources: Money-income value and taxes estimated using data from the Department of Statistics Household Survey 1981/82 aggregated for the population of private households based on the 1981 Census of Population of Dwellings. The appropriate tax rate derived using margins spelled out in the 1981/82 input/output tables.

As their market incomes rise, households consume more in absolute money terms and pay a greater amount of "direct" wholesale sales tax. When "direct" wholesale sales tax payments are said to be regressive, the assessment is based on the effective tax rate when the tax is taken as a proportion of income. As shown by Column A, Table 5B.3 the wholesale sales tax directly assessed on households takes an increasing proportion of income as their market incomes decrease. In this case, the tax is regressive in the sense that it reduces the incomes of lower income households in greater proportion than it does higher-income households.

Table 5B.3
DIRECT WHOLESALSALES SALES TAX PAYMENTS FOR 1981/82 BY PRIVATE HOUSEHOLDS
AS A PROPORTION OF HOUSEHOLD INCOME AND EXPENDITURE
BY RANGE OF HOUSEHOLD MARKET INCOME

Household Market Income (\$ p.a.)	Percentage of:		
	Market Income A	Total Income B	Total Expenditure C
Less than \$250	-72.0 ^b	2.7	2.5
\$250-(\$3,950)	15.0	3.4	3.2
\$3,950-(\$9,750)	6.2	4.2	4.1
\$9,570-(\$13,450)	4.4	3.8	4.3
\$13,450-(\$16,900)	3.9	3.5	4.1
\$16,900-(\$20,250)	4.1	3.8	4.5
\$20,250-(\$24,200)	3.2	3.1	4.0
\$24,200-(\$29,200)	3.3	3.2	4.3
\$29,200-(\$36,650)	3.3	3.2	4.3
\$36,650 and over	2.9	2.8	4.8
TOTAL	3.7	3.3	4.2

Notes: a) Includes wholesale sales tax directly assessed on consumer goods;
 b) Negative signifies that indirect tax payments exceeded household market income. This is possible because some households may have earned losses and their expenditure would have been financed through dis-saving. Sources: Tables IE.1, 5B.2 and the Department of Statistics Household Survey.

Column B shows the effective rates of wholesale sales tax based on total income (defined to include social welfare benefits). The wholesale sales tax does not appear to be quite as regressive when total income is the base instead of market income. When measured as a proportion of household expenditure, the direct wholesale sales tax appears to be proportional or even slightly progressive.

About a third of wholesale sales tax is collected from assessments of intermediate goods. Companies and other businesses are liable for wholesale sales taxes assessed on cars purchased for business use and business machines. It is likely that these taxes are passed on to households, although the extent the statutory taxpayers are able to do this by raising prices depends on their market power. This research assumes that intermediate wholesale sales taxes are passed on in their entirety to final goods. Based on this assumption, the intermediate portion of the wholesale sales tax is imputed to households in relation to their total expenditure as reported by the Household Survey.

B.3.b: Specific Taxes, Import and Excise Duties and Other

Specific taxes are divided into two groups, "non-gambling" and "gambling". The five "non-gambling" taxes include the energy resources levy, the domestic air travel tax, motor spirits duty, motor vehicle fees and tobacco and alcohol duties. Table 5B.4 illustrates some of the main distributive characteristics of the five, non-gambling, specific taxes.

Table 5B.4
SPECIFIC TAX PAYMENTS BY HOUSEHOLD MARKET INCOME IN 1981/82

Household Market Income (\$ p.a.)	\$ Per Year Per Household (\$) A	Distri- bution ^a (%) B	As a Proportion of Household: ^b		
			Market Income (%) C	Total Income (%) D	Expenditure (%) E
Less than \$250	160	3.2	-72.0	2.7	2.5
\$250-(\$3,950)	220	4.5	13.0	3.0	2.9
\$3,950-(\$9,750)	340	7.0	4.8	3.2	3.2
\$9,750-(\$13,450)	390	8.1	3.4	2.9	3.3
\$13,450-(\$16,900)	440	9.0	2.9	2.6	3.0
\$16,900-(\$20,250)	520	10.8	2.8	2.6	3.1
\$20,250-(\$24,200)	530	10.9	2.4	2.3	3.0
\$24,200-(\$29,200)	610	12.7	2.3	2.2	3.0
\$29,200-(\$36,650)	730	15.0	2.2	2.2	2.9
\$36,650 and over	920	18.9	1.8	1.8	3.0
TOTAL	490	100.0	2.6	2.3	3.0

Notes: a) Distribution refers to share of total specific taxes of \$503 million paid by each group. b) Columns C, D and E are "effective rates" of specific tax. Sources: Estimated using data from the Department of Statistics Household Survey 1981/82 aggregated for the population of private households based on the 1981 Census of Population of Dwellings. The appropriate tax rate applied to a tax base derived using margins spelled out in the 1981/82 input/output tables.

As shown by Table 5B.4, specific tax payments affect household income groups similarly to direct wholesale sales taxes. In absolute terms, households pay more in specific taxes the higher their incomes (see Column A of Table). However, low income households pay a larger proportion of their market income in specific taxes than do higher income households (see Column C). The degree of regressivity is reduced when the measure of income includes social welfare benefits (see Column D). Finally, when specific taxes are measured in relation to household expenditure, they are close to being proportional. As Column E shows, households pay about 3 percent of their average expenditure in specific taxes at each income level.

Lottery and racing duty are imputed to households based on information about these expenditures collected by the Household Survey. Table 5B.5 shows some of the significant relationships for lottery duty and racing duty.

Table 5B.5
LOTTERY AND RACING DUTY PAID FOR 1981/82 BY PRIVATE HOUSEHOLDS
BY HOUSEHOLD MARKET INCOME

Household Market Income (\$ p.a.)	Lottery Duty				Racing Duty ^a			
	Total \$000	% of Total Tax (%)	Av Per House- hold (\$)	Av Per Per- son (\$)	Total \$000	% of Total Tax (%)	Av Per House- hold (\$)	Av. Per Per- son (\$)
Less than \$250	272	4.2	3	1.4	1249	2.6	12	6.5
\$250-(\$3,950)	380	5.8	4	2.1	1876	3.9	18	10.0
\$3,950-(\$9,750)	280	4.3	3	1.1	1623	3.4	16	6.4
\$9,750-(\$13,450)	471	7.2	5	1.7	5281	10.9	51	19.0
\$13,450-(\$16,900)	539	8.3	5	1.6	4454	9.2	43	13.0
\$16,900-(\$20,250)	726	11.2	7	2.1	5283	10.9	51	15.0
\$20,250-(\$24,200)	886	13.6	9	2.4	6644	13.9	64	18.0
\$24,200-(\$29,200)	801	12.3	8	2.3	5831	12.0	56	17.0
\$29,200-(\$36,650)	1063	16.4	10	2.9	6244	12.9	60	17.0
\$36,650 and over	1080	16.6	10	2.5	9914	20.5	96	23.0
TOTAL	6500	100.0	6	2.1	48400	100.0	47	16.0

Note: a) Assuming that 95 percent of racing duty was paid by private households could understate the contribution from non-private households such as prisons where off-course betting is one of the few money-making occupations available. Source: Distributions based on expenditure patterns in the Household Survey.

The remaining indirect taxes imputed to households are import duties and other indirect taxes. There has probably been more analysis of the economic effects of import duties in New Zealand than of any other tax. Vigorous debate has focussed on the employment effects of these taxes, but there has been little rigorous attempt to relate these effects to household income groups. In this thesis, import duties and other taxes are treated in the same way as the intermediate wholesale sales taxes. They are imputed to households in relation to their total expenditure as reported by the Household Survey.

B.4: Conclusion: The Distribution of Indirect Taxes

B.4.a: Quantitative Results

Table 5B.6 summarises the distribution of indirect taxes by income group.

Table 5B.6

1981/82 INDIRECT TAXES^a BY HOUSEHOLD INCOME GROUP

	A	B	C	D	E	F	G	H
Household Market Income (\$ p.a.)	Direct Whole- sale Sales Tax \$M	Spec- ific Taxes \$M	Racing and Lottery Duty \$M	Stage One "Direct" Indirect Taxes Amnt \$M	Dist (%)	Inter- mediate Indirect Taxes \$M	Stage Two: Total Indirect Taxes Amnt \$M	Dist (%)
Less than \$250	16	16	2	34	2.7	32	66	3.1
\$250-(\$3,950)	26	22	2	50	3.9	40	90	4.3
\$3950-(\$9,750)	45	35	2	82	6.5	53	135	6.5
\$9570-(\$13,450)	53	41	6	100	7.9	61	161	7.7
\$13450-(\$16,900)	61	45	5	111	8.8	74	185	8.9
\$16900-(\$20,250)	79	54	6	138	11.0	87	225	10.8
\$20250-(\$24,200)	75	55	7	137	10.8	92	229	11.0
\$24200-(\$29,200)	91	64	7	162	12.8	104	266	12.7
\$29200-(\$36,650)	112	76	7	195	15.4	126	321	15.4
\$36650 and over	149	95	11	255	20.2	154	409	19.6
TOTAL	706	503	55	1264	100.0	823	2087 ^b	100.0

Notes: a) See text, Chapter Five for treatment of indirect taxes. b) The total amount of indirect tax payments recorded by the 1981/82 Central Government Income and Outlay Account was \$2,197.6 million. The amount of \$2,087 million is 95 percent of this, representing the population residing in private households. Sources: See Tables in Section B, Chapter Five.

Columns A, B and C of Table 5B.6 comprise taxes which can be imputed directly to households using Household Survey data about final expenditures which are subject to indirect taxes. The amount of tax distributed to households is calculated by adjusting the expenditures for the usual retail margins and applying the percentage tax rate to the wholesale value of the expenditure. It is assumed that the total money-income amount of any indirect tax is passed on to final expenditures made by the household sector.

Column D of Table 5B.6 sums all the tax distributed directly to households in relation to Household Survey expenditure patterns. It is the same as the direct measure of indirect taxes referred to in Stage One of the income taxonomy developed in Chapter One. As Column E shows, each of the five deciles in the upper market-income groups are estimated to pay more than 10 percent of indirect taxes defined as Stage One indirect taxes.

Column F shows the amount of "intermediate" indirect taxes by household income group. These taxes are imputed to household income groups in proportion to their share of household expenditures. "Intermediate" indirect taxes are then added to Stage One "direct" indirect taxes (Column D) to arrive at the total of all indirect taxes paid by private households into the central government income and outlay account (Column G). This is the definition of indirect taxes which is applied to Stage Two of the income taxonomy set out in Chapter One.

According to both the Stage One and Stage Two approaches, the share of indirect taxes paid by household market-income groups is very similar. Like Column E, Column H shows that each of the five upper market-income groups is estimated to pay a share of indirect taxes greater than the share of households (10 percent) in each group. In both cases, the 10 percent of households in the highest income group (earning over \$36,650 per year) are estimated to pay about 20 percent of all indirect taxes. An impression that could be gained from Table 5B.6 is that indirect taxes are redistributive. Nevertheless, when indirect taxes are taken as a proportion of market or total household income, they do not appear to be so redistributive. This can be seen from a comparison of Charts 5.1 and 5.2 on the next page.

CHART 5.1

THE SHARES OF INDIRECT TAX PAYMENTS BY HOUSEHOLD
INCOME DECILE IN 1981/82

Chart 5.1 is a graphic means of illustrating the conclusion that those in the higher income groups pay the larger shares of indirect taxes. For the three groups of taxes recorded by the Chart, the 10 percent of households in the lowest-income group paid a share of taxes equal to less than 5 percent. In contrast, the 10 percent of households in the upper income group paid around 20 percent of each type of indirect tax. However, when the indirect taxes are taken as a percentage of total income (see Chart 5.2) the picture changes. In contrast to the personal income tax, indirect taxes take a smaller proportion of total income as household income rises.

CHART 5.2

COMPARISON OF EFFECTIVE RATES OF INDIRECT AND DIRECT TAX
(Amount of Tax as a Proportion of Total Income for Household Income Group)

Table 5B.7 shows the distribution of indirect tax payments by household type. Households with three or more adults are estimated to pay the biggest share of this tax. They represent 8.3 percent of households but paid 15.8 percent of indirect taxes in 1981/82. In comparison, one-adult, national-superannuitant households pay a small share of indirect tax. They account for 10.8 percent of the private household population but are only estimated to pay 3.0 percent of indirect tax.

When the effective rate of indirect tax is analysed in relation to household market income (see next to bottom row of Table 5B.7), the position of the national-superannuitant and single-parent households appears worse than for other household types. Single-parent households are estimated to pay an average of 20.0 percent of their market income in indirect tax, single-adult, national-superannuitant households pay 17.3 percent, and two-adult national superannuitants pay 15.0 percent. In contrast, indirect taxes are estimated to equal less than 12 percent of market income for the other household types.

Table 5B.7

1981/82 STAGE TWO INDIRECT TAXES: ESTIMATED DISTRIBUTION BY HOUSEHOLD TYPE

Household Type											
1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n		All Households
Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil-dren	With Chil-dren			
<hr/>											
<u>Total Indirect Taxes</u>											
Amount (\$M)	62	111	181	349	164	271	221	330	360	38	2087
Percentage Distribution	3.0	5.3	8.7	16.7	7.9	13.0	10.6	15.8	17.2	1.8	100.0
<hr/>											
<u>Comparative Figures</u>											
Distribution of Households (%)	10.8	8.7	12.4	15.0	7.8	12.6	10.4	8.3	10.3	3.7	100.0
<hr/>											
<u>Total Indirect Taxes as a Percentage of:</u>											
Market Income (%)	17.3	10.5	15.0	9.7	9.9	9.6	9.6	12.0	10.8	20.0	10.8
Total Income (%)	6.9	9.9	8.5	9.6	9.5	9.2	9.1	11.4	10.1	10.6	9.6

Note: See Appendix Table A5B.1 for breakdown into amounts of individual taxes.
Sources: Summarised from Tables in Section 8, Chapter Five.

The effective rate of indirect tax is more nearly proportional when the basis for the comparison is total income (see bottom row of Table 5B.7). In round terms, most household types paid an average of 9 or 10 percent of their total income in indirect taxes. The exceptions are one-adult, national-superannuitant households, with an estimated average effective rate of 6.9 percent and childless three-or-more adult households, with 11.4 percent.

B.4.b: Taking Account of Economic Effects of Indirect Taxes

SWF general equilibrium models are eminently suited to analyse the economic effects of an indirect tax structure like New Zealand's with all of its variety. Most of the components for such analysis (including national income accounts, input/output matrices, disaggregated by several production and household groups) are specified as the core of SWF models. But before these models could be applied to address the issues raised in this thesis, further development of the behavioural equations, especially where they relate to household behaviour, is required. In the absence of these developments, it has been necessary to resort to the assumption that indirect taxes are 100 percent shifted to household expenditure. So rather than measuring the economic incidence of the indirect tax structure, this thesis research identifies the expenditure base of indirect tax assessments.

A starting point for analysing the economic effects of indirect taxes in New Zealand would be to use the Household Survey data (now available for a ten year period) to perform an econometric estimation of long-run demand elasticities. To date, the work in this area has been largely confined to rough estimates of elasticities for eight main commodity classifications which are applied in the Victoria University Research Project on Economic Planning Joanna model.

The conclusion which emerges from the RPEP work (see especially Nana and Philpott, 1985, and Wallace and Philpott, 1982) is that indirect taxes are not 100 percent shifted to household expenditure. In the simplest formulation, indirect taxes also lead to changes in disposable incomes. Since indirect taxes are a growing source of government revenue, further work to discover their incidence by household type and incomes would be valuable.

C. THE COMPANY INCOME TAX

Companies in New Zealand are taxed in a different way to individual taxpayers. The main differences are that:

- a) A company does not get any of the special exemptions or rebates which the individual taxpayer may claim.
- b) A company does not get the interest exemptions.
- c) Dividends received by a company incorporated in New Zealand are exempt from income tax.
- d) The rate of income tax is different.

Companies have many advantages (including limited liability) which makes them peculiarly suitable for modern forms of economic activity. They are able to undertake investment, at less personal risk for the shareholders; and they have more power than several unaligned individuals.

The base of the company tax is generally historical cost profits. Taxable income is broadly defined as net operating income, plus the increase in the nominal value of stocks, less depreciation (based on the historical cost of assets) less nominal interest payments. Capital profits are generally excluded from the tax base, necessitating complex rules to distinguish between capital and current receipts. Interest on debt is a deductible expense.

A feature of the company income tax legislation in 1981/82 is the variability in tax treatment of incorporated entities. Resident New Zealand companies pay a different rate of tax from non-resident companies. In addition, differing methods of assessment apply to overseas shipping companies, life insurance companies and certain types of mining companies. Moreover, because of a variety of tax concessions (including in some cases the ability to write off capital expenditure when it is incurred), the average rates of tax paid by businesses vary depending on whether a business is incorporated and depending on whether the business operates a farm, a fishing boat, a forest, a factory, or something else for which it receives a tax concession.

Figure 5.9 records the latest Department of Statistics information about company returns. Companies that pay little tax record low amounts of assessable income and appear in the lower income brackets, even though they may have large turnover or assets. For example, 27.9 percent of company tax returns reported net losses but this same group received 21.3 percent of the income from dividends and accounted for 25.1 percent of the total depreciation claimed. This suggests this group has substantial assets even if it does not pay income tax in the loss year.

FIGURE 5.9
COMPANY TAX RETURNS DISTRIBUTED BY AMOUNT OF 1980/81 ASSESSABLE INCOME

Amount of Assessable Income	<u>Returns</u>	Assessable Income <u>Before Losses</u>		Ordinary Divi- dends Received		Income Tax <u>Assessed</u>		
	No.	% of Total	(\$M)	% of Total	(\$M)	% of Total	(\$M)	% of Total
0 - 199	21098	26.1	2.0	0.1	63.4	17.4	0.2	0.0
200 - 3999	10431	12.9	21.6	1.0	11.2	3.1	6.1	0.8
4000 - 13999	5284	6.5	47.2	2.2	8.1	2.2	17.4	2.3
14000 - 79999	5086	6.3	187.1	8.6	21.2	5.8	71.2	9.5
80000 & Over	2489	3.1	1681.7	76.8	122.3	33.5	653.6	87.4
Current Net Loss	22589	27.9	-	-	77.8	21.3	-	-
Assessable Income before Losses	13849	17.2	246.6	11.3	60.8	16.7	-	-
Total	80826	100.0	2186.2	100.0	364.8	100.0	748.5	100.0

Source: Department of Statistics, Incomes and Income Tax of Companies, 1980-81

C.1: The Statutory Incidence of the Company Income Tax

Under the present system, New Zealand companies pay a flat rate of 45 percent tax on their taxable profits and non-resident companies pay 50 percent. As discussed in the introduction, a large number of concessions and incentives exist, some of which are paid to companies as tax rebates (negative company income tax). Because of these concessions, the average tax for most companies is below 45 percent.

The company tax for proprietary companies provides shareholder-employees with an opportunity to derive an income from salary, dividends,

or interest (taxed at a marginal rate up to 60 percent) and income from the company (taxed at a flat rate of 45 percent). The small business taxpayer may choose to split the company income between family, shareholders, and into different classes of income to obtain the maximum tax benefit.

Under the 1982 income tax provisions, dividend income derived by companies is not liable to income tax. However, some forms of dividend income derived by individuals are liable to ordinary income tax, the dividends are taxed both as company income before distribution, and then as personal income. A number of means exist to avoid this "double taxation", including specified preference shares and payments of dividends to companies rather than individuals, although when the companies at some stage declare dividends they will be taxed as personal income. Revenue from the tax on dividends for 1981/82 is not high because nearly two-thirds of all the dividends distributed are tax free.

Listed below are other taxes that apply to companies. None are very important sources of revenue.

- a) Bonus Issue Tax - is a special tax of 17.5 cents in the dollar on the bonus issues made from income sources and is levied on the company. Shareholders receive these issues tax-free.
- b) Excess Retention Tax - is payable by privately-controlled New Zealand investment companies if the investment company does not pay a dividend equal to at least 40 percent of its tax-paid profits and 100 percent of its dividends from other companies. A refund of excess retention tax paid will be made if, in a later year, the investment company declares a dividend greater than the amount needed for that year. The tax is assessed at a rate of 35 cents in the dollar.
- c) Non-Resident Withholding Tax - is assessed on investment income earned by non-residents at rates varying according to double-tax agreements with other countries. Dividends paid to non-residents are subject to a non-resident withholding tax of up to 30 percent of the gross income. A withholding tax of up to 15 percent is payable on interest, royalties, and "know-how" payments.

As the above section has shown, the company income tax is tediously complex. Out of this complexity, two main themes may be identified. First, as is the case for the personal income tax, it is income, not capital, which is taxed. Secondly, the way in which the tax is assessed varies considerably depending on the activities a company is involved in.

C.2: The Incidence of the Company Income Tax

In New Zealand, (in fact, in most countries) the company income tax is not a very large source of government revenue. And yet the general equilibrium literature has focused on the company income tax. The share of the revenue from this source is in no way commensurate to the proportion of general equilibrium research which has been devoted to its incidence.

A reason for the preoccupation of general equilibrium research with the company tax is that economists are more divided about its incidence than they are about the incidence of other taxes. There is a large division as well between the theorists and practitioners. On the one hand, the evidence of general equilibrium analysis is that at least some company income tax is paid out of profits. On the other hand, a study by Catt (1965), found that managers of New Zealand firms maintain that they did not pay the tax out of reduced profits. The wording of the four possible responses to Catt's questionnaire, however, is not precise enough for drawing conclusions about how much company tax is shifted.

There are differing conclusions from a number of econometric studies of company tax incidence and general equilibrium studies, so the issue remains controversial. At one extreme, Krzyzaniak and Musgrave (K-M, 1966) attempt quantitatively to determine the incidence of the corporation income tax by focusing upon the influence of the U.S. corporation income tax on the rate of return using multiple regression techniques and a profit behaviour model for the years 1935 to 1959 (excluding the war years). Their results indicate that tax shifting was more than 100 percent.

At the other end of the spectrum, Gordon (1967) developed a model of company markup pricing behaviour to measure the incidence of the company income tax. He concludes "that between 1925 and 1962 companies in the

United States suffered the full burden of the company income tax". This result supports Harberger's (1962) empirical study of US corporate taxes in 1953 to 1957 which shows that the corporate sector's burden was between 90 and 100 percent of tax.

In his analysis of the results from the K-M and Gordon studies, Cary Brown (1974) argues that the conclusion probably lies between the K-M results and Gordon's, suggesting that perhaps Harberger's (1962) theoretically determined figure of 50 percent shifting may eventually be shown to be correct. The econometric studies do not conclusively disprove assumptions by Musgrave et al (1951) about the incidence of the corporation income tax. According to Musgrave's standard case, 55 percent of company tax is shifted to shareholders, 33 percent to consumers and 12 percent of company tax is shifted backwards to wage earners.

New Zealand relies more heavily on trade than the United States and the proportion of company tax which is imported and that which is exported is likely to be a more significant factor. As McClure Jr (1964) concludes: "It can be seen that the tax borne by residents of the taxing region equals the amount of tax only where supply is infinitely elastic or demand is perfectly inelastic" (p.203). Nevertheless, because of the difficulty of estimating the relative elasticities of supply and demand and the quantities bought and sold in each trading market, it is assumed in this thesis that the amount of company tax shifted overseas is exactly equal to the amount shifted from overseas to New Zealand.

The company income tax is represented in the HMM and SWF models as a tax on the income from capital in each sector or industry. Computational techniques of the SWF models enable a number of industries to be analysed. Disaggregation by industry provides the ability to evaluate specific capital subsidies such as regional development grants and subsidies on borrowing to nationalised industries.

It is usually assumed by the SWF models that no change in corporate financial policy is induced by the tax. As is the case with most taxes specified by the SWF models (the chief exception being the personal income tax), the effective and marginal tax rates are assumed to be equal. Some, including Fullerton and Gordon (1983) have experimented

with different average and marginal tax rates because of empirical considerations that imply a divergence between average and marginal rates, at least in the short run.

Different SWF models have elaborated on different aspects of company tax incidence. Some have developed dynamic (steady-state) counterparts to Harberger's two sector model. More recently, there have been attempts to specify a financial sector to examine the effects of the corporate income tax on portfolio allocation and dividend payouts. As Fullerton et al (1983, p.4) conclude in their survey of this literature: "... the results of these studies indicated a substantial range of answers on incidence of the corporate income tax ...".

In short, while the recent models have incorporated some significant refinements, the question of the incidence of the company income tax still remains controversial. To make things more difficult, the literature does not focus on the effects of the tax on household incomes and the results here are unclear.

In the absence of conclusive results, this thesis follows the technique of other quantitative research and adopts several assumptions about company tax incidence. A limitation of this approach (common also to most empirical incidence research) is that it treats the company tax as though it is homogeneous. This is in contradiction to one of the conclusions from the discussion of the statutory effect of the New Zealand company tax. It is not a homogeneous tax.

C.3: Methodology for Imputing Company Income Tax to Households

The view taken in Stage One is that only direct payments by households are measured. Since company taxes are directly assessed by the corporate sector and not the household sector, they are ignored in the calculations.

In Stage Two, however, the view that is taken is that the company income tax is paid by the household sector, which is ultimately responsible for the payment of all taxes. To account for the different theoretical incidence results, company tax is imputed to household income groups according to six different sets of assumptions.

Case 1 : Half distributed by investment income/half by household expenditure (this is the Standard Case in this thesis and is based on Cary Brown's compromise that 50 percent of the company tax is shifted and 50 percent is paid by the company);

Case 2 : 100 percent distributed by household expenditure (based on the K-M results of 100 percent shifting);

Case 3 : A third of the tax distributed by wages and salaries, a third by dividend income, and a third by household expenditure (this case based on Musgrave's 1951 article);

Case 4 : 100 percent distributed by dividend income (this case based on Harberger and Gordon results showing 100 percent paid out of capital);

Case 5 : Half distributed by dividend income and half by investment income (this is based on same literature as Case 4 but different interpretation of owners of capital);

Case 6 : Half distributed by dividend income/half distributed by expenditure income (this based on same conclusions as Case 1 but different data about the owners of capital).

Table 5C.1 compares distributions based on the different assumptions underlying the six cases.

Table 5C.1

DISTRIBUTION OF COMPANY TAX BY INCOME GROUP:
COMPARISON OF INCIDENCE ASSUMPTION

Household Market Income (\$ p.a.)	1/2 Invt Income		1/3 Wages & Salary 1/3 Div'd Income		1/2 Divnd Income & Income &	
	1/2 H'hld Expend. (Case 1)	H'hld Expend. (Case 2)	1/3 H'hld Expend. (Case 3)	Divnd Income (Case 4)	1/2 Invt. Income (Case 5)	1/2 Div'd Income & Expend. (Case 6)
Percent Distribution (%)						
Less Than \$250	2.1	3.9	1.4	0.2	0.3	2.1
\$250-(\$3,950)	5.2	4.8	2.5	2.3	4.5	3.6
\$3,950-(\$9,750)	9.1	6.5	5.1	6.1	9.6	6.3
\$9,750-(\$13,450)	6.9	7.4	6.4	5.1	5.9	6.3
\$13,450-(\$16,900)	8.1	9.0	8.4	7.7	7.4	8.3
\$16,900-(\$20,250)	8.2	10.4	8.5	4.3	5.4	7.4
\$20,250-(\$24,200)	8.8	11.1	9.9	5.4	6.1	8.2
\$24,200-(\$29,200)	10.4	12.7	10.1	2.2	6.0	7.4
\$29,200-(\$36,650)	12.9	15.4	14.0	8.0	9.5	11.7
\$36,650 and over	28.3	18.8	33.7	58.7	45.3	38.7
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Source: See text for derivation.

CHART 5.3

RELATIVE EQUALITY OF THREE COMPANY TAX INCIDENCE
 ASSUMPTIONS: LORENZ DIAGRAM 1981/82

Chart 5.3 is a graphic illustration of the disparity in distribution that results from the different incidence assumptions shown by Table 5C.1. Case 2, where it is assumed that the company income tax is passed totally onto the prices of final household expenditures, is closest to the line of equality. This means it is the least redistributive case because those in the low income groups are assumed to pay a greater share of the company tax than they do under the other assumptions that are adopted. Case 4, where it is assumed that the company tax is paid out of shareholders' funds (it reduces profits by 100 percent), is the least equal distribution. It is also a rather "wobbly" distribution reflecting the fact that those with company shareholdings (who in turn receive dividends) tend to be concentrated both in the highest income group and among the more elderly members of the population. The elderly members earning dividend income tend to be concentrated in the five lower income groups.

Table 5C.2

DISTRIBUTION OF COMPANY TAX BY HOUSEHOLD TYPE:
COMPARISON OF SIX INCIDENCE ASSUMPTIONS

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
Percent Distribution (%)											
Company Tax (Case 1)	9.2	4.2	18.2	12.8	9.1	11.1	8.2	14.6	11.1	1.5	100.0
Household Expend. (Case 2)	3.5	5.0	8.7	16.4	8.1	15.3	11.5	12.9	16.3	2.3	100.0
1/3 Wages & Salary 1/3 Div'nd Income 1/3 H'hold Expend. (Case 3)	5.3	4.1	13.2	13.2	11.8	11.6	9.0	16.7	13.9	1.2	100.0
Dividend Income (Case 4)	11.6	1.6	27.0	3.2	18.5	5.0	4.0	22.2	6.7	0.2	100.0
Dividend Income & Investment Income (Case 5)	13.7	2.7	27.5	7.1	13.1	6.1	4.6	18.4	6.2	0.6	100.0
1/2 Div'nd Income 1/2 Expenditure (Case 6)	7.6	3.3	17.8	9.8	13.3	10.1	7.8	17.5	11.5	1.3	100.0
Comparative Distributions											
Households	10.8	8.7	12.4	15.0	7.8	12.6	10.4	8.3	10.3	3.7	100.0
Occupants of Households	3.6	2.9	8.3	10.0	7.9	16.9	19.0	9.4	18.7	3.4	100.0

Source: Distributions derived based on Department of Statistics 1981/82 Household Survey information. See text for explanation of six Cases.

Table 5C.2 compares the distributions of company tax by household type based on the six cases applied in this thesis. When analysed by household type, there is considerable variation. Chart 5.4 (on the following page) graphs the differences in shares for the Standard Case (Case 1), and extreme Cases 2 and 4.

HART 5.4

DIFFERENT COMPANY TAX INCIDENCE ASSUMPTIONS BY HOUSEHOLD TYPE

Note: Straight line across bars represents share of population residing in household type.

C.4: Who Pays Company Income Tax in New Zealand?

As Table 5C.3 shows, according to the Standard Case (Case 1), the upper decile of households pays over 28.3 percent of the company income tax. However, the shares of the company tax paid by several of the other household income groups are remarkably similar at between 8 and 10 percent. For the lower income groups, this is partly explained by the contribution to the tax made by one- and two-adult national-superannuitant households.

Table 5C.3

DISTRIBUTION OF COMPANY TAX PAYMENTS BY PRIVATE HOUSEHOLDS (CASE 1*)
BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ pa)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
As a Proportion of The Total For All Households (%)											
Less Than \$250	0.6	0.1	0.6	0.1	0.1	0.1	0.1	-	-	0.4	2.1
\$250-(\$3,950)	2.0	0.3	2.2	0.2	0.1	0.1	0.1	-	-	0.2	5.2
\$3,950-(\$9,750)	2.9	0.9	2.8	0.4	0.4	0.4	0.4	0.4	0.2	0.4	9.1
\$9,750-(\$13,450)	0.7	0.7	1.9	0.8	0.6	0.7	0.5	0.5	0.4	0.2	6.9
\$13,450-(\$16,900)	-	0.6	1.8	0.9	0.8	1.2	0.8	0.4	0.5	-	8.1
\$16,900-(\$20,250)	-	0.7	1.7	1.3	0.7	1.5	1.1	0.5	0.5	-	8.2
\$20,250-(\$24,200)	-	0.5	1.1	1.5	0.7	1.5	1.6	0.8	1.0	-	8.8
\$24,200-(\$29,200)	-	0.2	0.8	2.6	0.8	1.1	1.1	1.1	1.2	-	10.4
\$29,200-(\$36,650)	-	-	1.3	2.4	0.6	2.0	0.8	2.6	3.0	-	12.9
\$36,650 and over	-	-	4.0	2.7	4.4	2.4	1.7	8.2	4.2	-	28.3
TOTAL	9.2	4.2	18.2	12.8	9.1	11.1	8.2	14.6	11.1	1.5	100.0

Note: Case 1 is the Standard Case in this thesis. It assumes half of the company income taxes distributed by interest income and half distributed by the pattern of household expenditure. Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

A lesson for policymakers from the discussion in the previous section and borne out by Table 5C.3 is that it is not just the assumptions about who pays the tax by income that are important. Also important are the assumptions about how the tax is distributed by household type.

Nevertheless, while the six cases for distributing the company tax produce different results, the distribution of total payments to government is not very sensitive to these differences. Table 5C.4 (below) applies the six different company tax assumptions to calculate the distribution of total payments to central government. The most noticeable difference is for the households in the highest income group. Appendix Table A5C.1 analyses the company tax assumptions by household type, showing that the cases are only significantly different for national-superannuitant households.

Table 5C.4

COMPARING DISTRIBUTIONS OF TOTAL 1981/82 PAYMENTS TO GOVERNMENT
USING SIX CASES FOR COMPANY TAX

Household Market Income (\$ p.a.)	Company Tax (Case 1)	H'hold Expend. (Case 2)	1/3 Wages & Salary 1/3 Div 1/3 H'hld Expend. (Case 3)	Div Income (Case 4)	1/2 Div Income & 1/2 Invt. Income (Case 5)	1/2 Div Income & 1/2 H'hld Expend. (Case 6)
Percent Distribution (%)						
Less Than \$250	1.7	1.8	1.7	1.6	1.6	1.7
\$250-(\$3,950)	2.7	2.7	2.5	2.5	2.7	2.6
\$3,950-(\$9,750)	4.4	4.2	4.2	4.1	4.4	4.2
\$9,750-(\$13,450)	5.7	5.7	5.7	5.6	5.6	5.6
\$13,450-(\$16,900)	7.4	7.5	7.4	7.4	7.3	7.4
\$16,900-(\$20,250)	9.2	9.4	9.2	8.9	9.0	9.2
\$20,250-(\$24,200)	10.7	10.8	10.7	10.4	10.5	10.6
\$24,200-(\$29,200)	13.4	13.5	13.3	12.7	13.0	13.1
\$29,200-(\$36,650)	16.7	16.9	16.8	16.4	16.5	16.7
\$36,650 and over	28.1	27.5	28.5	30.4	29.4	28.9
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Sources: For derivation, see text of Chapter Five.

In conclusion, application of the different assumptions about the company income tax in this thesis indicates that there is a range of distributions possible based on the vast (but inconclusive) evidence about company tax incidence. Despite the range of possible company tax distributions, the distribution of total tax payments by household is not greatly affected. Therefore, if the focus of tax incidence research is the economic effects of taxation in relation to households, further refinements of the treatment of company taxes are not likely to make a great deal of difference to the results.

D. OTHER GOVERNMENT RECEIPTS: GOVERNMENT PROPERTY INCOME AND MISCELLANEOUS

D.1: Statutory Description of Other Government Receipts

A source of government revenue which is as important as the company income tax is **government property income**. In 1981/82, this item was equal to \$706.3 million and made up 7.4 percent of central government receipts. In the main, this receipt item comprises interest charged by trading departments for loans to acquire property or new capital equipment. In the past, these interest charges have been below average market rates. With the more recent government-policy emphasis on setting charges consistent with market rates, it is likely that government property income will grow much faster than the company income tax in the future.

Other government receipts (OGRs) also comprise **miscellaneous receipts** of \$108.6 million. These receipts include: operating surplus (\$11.6 million); withdrawals from trading accounts (\$19.1 million); compulsory fees, fines and penalties (\$38.0 million); and current transfers (\$39.9 million).

D.2: The Incidence of OGRs

A way of conceptualising OGRs is as the tax equivalent of collective goods (similarly, indirect taxes are the tax equivalent of subsidies). Collective goods provide a non-excludable benefit to the public. Other government payments are a non-excludable source of government revenue. Most OGRs come about because a government trading department makes an operating surplus from charging users more than the cost of providing the service or as a statutory requirement imposed on government trading entities which results ultimately in the reduction of taxpayers' money income. This argument may seem like a rather simplistic approach to treating the varied items included as other payments to the government, but it is no more simplistic than treating the company income tax as a tax on income from capital. Further study is required to analyse the economic effects of OGRs. Meantime, the important question is to discover how sensitive the results are to different assumptions about the incidence of OGRs.

Similarly to government collective expenditures, eight different cases are applied to analyse the distribution of OGRs. Table 6B.1 (page 287) reports the eight assumptions and the resulting distribution by income group. Pages 286 to 292 spell out the rationale for each of these assumptions in some detail. The cases are as follows:

- Case 1: Households consume government traded goods (and thus pay OGRs) in the same proportion as they spend their income on other private goods (this is the Standard Case);
- Case 2: OGR payments are related to household disposable income;
- Case 3: Households' OGR payments are related to their market income;
- Case 4: Households pay OGRs in relation to their total income;
- Case 5: Households' burden of OGRs is related to their capital, income - in the absence of information about households ownership of capital, property rates are used as a proxy for this;
- Case 6: OGRs are distributed in relation to the personal income tax;
- Case 7: The share of OGRs is directly related to the share of households in each income group or in other words each household pays the same amount of OGR; and,
- Case 8: Each person pays the same amount of OGR.

D.3: Imputing the Money-Income Value of OGRs to Households

OGRs are not included in the income measure adopted for Stage One. This is because, with the possible exception of some fees, fines and penalties, households are not directly liable to pay them. OGRs are included in Stage Two on the assumption that households eventually pay for the operation of central government, even if the legal base for the payment is some other corporate or trading entity.

It is by no means a straightforward exercise to identify which households pay OGRs or the money-income value of their payments. The Standard Case assumes that households consume government traded goods in the same proportion as they spend their income on other private goods. According to this case, 95 percent of the value of government property income and miscellaneous receipts is imputed to households in accordance with the proportion of private expenditure in each household group classified by income and household type.

D.4: Conclusion: The Distribution of OGRs and the Sensitivity of Results

On average, \$750 was paid per household in OGRs in 1981/82, according to the Standard Case (see Appendix Table A5D.1). In all eight cases, the average amount paid per household tends to increase with income.

Table 5D.1

COMPARING DIFFERENT ASSUMPTIONS: OTHER GOVERNMENT RECEIPTS

Household Market Income (\$ p.a.)	Assumption Most Beneficial to Low-Income Groups (Case 6: Personal Income Tax)				Assumption Most Beneficial to High-Income Groups (Case 7: No. of H'holds)			
	A	B	C	D	E	F	G	H
	Oth Govt Recpt	Other Govt Revnu	Total Govt Revnu	% Distri- bution	Oth Govt Recpt	Other Govt Revnu	Total Govt Revnu	% Distri- bution
	\$M	\$M	\$M	%	\$M	\$M	\$M	%
Less Than \$250	7	130	137	1.5	77	130	207	2.3
\$250-(\$3,950)	12	214	226	2.5	78	214	292	3.2
\$3,950-(\$9,750)	22	352	374	4.1	77	352	429	4.7
\$9,750-(\$13,450)	36	462	498	5.5	77	462	539	5.9
\$13,450-(\$16,900)	51	656	656	7.2	77	605	682	7.5
\$16,900-(\$20,250)	67	762	829	9.1	78	762	840	9.2
\$20,250-(\$24,200)	83	882	965	10.6	77	882	959	10.6
\$24,200-(\$29,200)	108	1113	1221	13.5	78	1113	1191	13.1
\$29,200-(\$36,650)	139	1402	1541	17.0	78	1402	1480	16.3
\$36,650 and over	249	2386	2635	29.0	77	2386	2463	27.1
Total	774	8308	9082	100.0	774	8308	9082	100.0

Sources: Columns A and E based on Table 6B.1. Derivation of Columns B and F from results in Chapter Five (the Section E of this Chapter). Columns C and G are calculated by adding together the two previous Columns and D and H are the percentage distributions of C and G respectively.

Table 5D.1 compares the effect of the two extreme assumptions about OGRs (Case 6 and Case 7) on the distribution of total government receipts. A comparison of Columns D and H shows very little variation in the distribution of total payments. In both cases, the distribution of total government revenue turns out to be fairly progressive with those in the highest income decile paying by far the largest share.

In summary, very little is known about the money-income value of households' payments for OGRs. To include them in this thesis, several assumptions were tested and it was found that the final distribution of total payments was not particularly sensitive to the different assumptions.

E. CONCLUSION: THE DISTRIBUTION OF PAYMENTS TO GOVERNMENT BY HOUSEHOLD INCOME GROUP

The section briefly summarises the distribution of payments to the government. First, it considers the quantitative results. Then it concludes with a brief discussion of how these compare with other relevant literature.

E.1: Quantitative Results : Stages One and Two

Quantitative results are derived based on both the Stage One and Stage Two approaches. Stage One is designed to evaluate the distribution of taxes paid directly by households. It is an accounting approach and does not concern itself with questions such as possible economic effects which lead households to change their behaviour. Table 5E.1 shows the distribution of Stage One payments by income group.

Table 5E.1
STAGE ONE : 1981/82 GOVERNMENT DIRECT PAYMENTS BY HOUSEHOLD INCOME GROUP

Household Market Income (\$ p.a.)	Personal Income Taxes	"Direct" Indirect Taxes	Total	% of Total Stage One Taxes
\$ Million				
Less Than \$250	50	34	84	1.2
\$250-(\$3,950)	89	50	139	2.0
\$3,950-(\$9,750)	156	82	238	3.5
\$9,750-(\$13,450)	255	100	355	5.2
\$13,450-(\$16,900)	366	111	477	7.0
\$16,900-(\$20,250)	483	138	621	9.1
\$20,250-(\$24,200)	594	137	731	10.7
\$24,200-(\$29,200)	777	162	939	13.8
\$29,200-(\$36,650)	994	195	1189	17.4
\$36,650 and over	1788	255	2043	30.0
TOTAL	5552	1264	6816	100.0

Source: Estimated based on the 1981/82 Household Survey aggregated to the private household population based on the 1981 Census.

Stage Two adopts assumptions about the economic effects of payments to the government from the tax incidence literature. The standard assumptions applied are as follows:

- A) **The personal income tax:** This tax is assumed to be borne by the individual legally liable for the tax;
- B) **Indirect taxes:**
- 1) "Direct" indirect taxes are assumed to be 100 percent shifted to households as the final consumers of taxed goods and services and are imputed based on the Household Survey information about their expenditures;
 - 2) "Intermediate" indirect taxes are assumed to be shifted to households in relation to their total expenditure;
- C) **The company income tax:** The Standard Case assumes that 50 percent of the company income tax is shifted to consumption and paid by households in relation to their total expenditure and the remaining 50 percent is paid by debenture holders and shareholders of companies;
- D) **Other government receipts:** The Standard Case assumes that households pay these taxes in relation to their expenditure on final goods and services.

Table 5E.2 below shows the amounts of 1981/82 payments to central government by household income group. Column F is the distribution of total payments to households by household market-income decile.

Table 5E.2

**STAGE TWO: DISTRIBUTION OF TOTAL GOVERNMENT PAYMENTS
BY HOUSEHOLD INCOME GROUP IN 1981/82**

Household Market Income (\$ p.a.)	A Personal Income Tax	B Indirect Tax Payments	C Company Income Tax (Case 1)	D Other Govt. Receipts (Case 1)	E (A+B+C+D) Total Payments	F % of Total E
\$ Million						
Less Than \$250	50	66	14	30	160	1.8
\$250-(\$3,950)	89	90	35	37	251	2.8
\$3,950-(\$9,750)	156	135	61	51	403	4.4
\$9,750-(\$13,450)	255	161	46	55	520	5.7
\$13,450-(\$16,900)	366	185	54	69	674	7.4
\$16,900-(\$20,250)	483	225	55	81	844	9.3
\$20,250-(\$24,200)	594	229	59	86	967	10.7
\$24,200-(\$29,200)	777	266	70	98	1211	13.3
\$29,200-(\$36,650)	994	321	86	119	1520	16.7
\$36,650 and over	1788	409	189	145	2531	28.1
Total	5552	2087	668	774	9082	100.0

Sources: Estimated based on the Department of Statistics 1981/82 Household Survey aggregated to the private household population based on the 1981 Census of Population of Dwellings. See earlier Sections in Chapter Five for derivation of each tax distribution. Appendix Table A7.4 shows the percentage distribution of payments.

CHART 5.5
GOVERNMENT PAYMENT SHARES BY HOUSEHOLD INCOME DECILES:
STAGES ONE AND TWO COMPARED

As Chart 5.5 shows, the different approaches adopted by Stage One and Stage Two do not result in any significant variation in the distribution of total payments to the government. Chart 5.6 shows that there is more variation in the distributions of individual payments.

CHART 5.6
1981/82 PAYMENTS TO THE GOVERNMENT:
THE SHARES OF FOUR MAIN ITEMS BY HOUSEHOLD INCOME DECILES COMPARED

CHART 5.7

EFFECTIVE RATES FOR TOTAL
PAYMENTS TO THE CENTRAL GOVERNMENT IN 1981/82

When the effective payment rate is calculated, total payments appear to be roughly proportional. Chart 5.7 illustrates the effective rates using total income and adjusted gross domestic product (see Chapter Three for derivation) as the bases for effective rate calculations. If total income is the base, the effective rates are also fairly proportional by household type (see Chart 5.8 on the next page). Not unexpectedly there is more variability in the effective rates when the base is market income.

E.2: Comparison of Results With Other Research

A comparison of the New Zealand results of other research shows a remarkable similarity in the distribution of tax payments by household. Two common patterns emerge in the results of Gillespie (1965, 1966), Musgrave et al (1974), O'Higgins and Ruggles (1981 June and September), Pechman and Okner (1974) and Reynolds and Smolensky (1977). They are: 1) the share of payments to the government increase with income (with the highest income group paying by far the largest share); and 2) taking total payments as a proportion of total income, results in a roughly proportional effective rate across income groups. The quantitative results for New Zealand discussed differ from the results of the above overseas studies in two main ways. First, the share of central government revenue contributed by the upper income is greater than overseas. Secondly, the effective rates of payment increase more sharply with income.

CHART 5.8

AMOUNT OF CURRENT GOVERNMENT PAYMENTS
BY HOUSEHOLD TYPE IN 1981/82

Total Payments as % of:	95.0	44.2	71.8	42.4	46.1	45.1	44.7	46.6	43.2	53.6
Market Income										
Total Income	38.0	41.4	40.5	41.9	44.4	43.4	42.4	40.1	40.4	30.0

Source: See text Chapter Five for derivation. Amounts of total payments

CHAPTER SIX

GOVERNMENT SPENDING BY HOUSEHOLD INCOME GROUP

Chapter Six analyses the size distribution of government spending. It discusses the attribution of the money-income value of government-provided goods and services to households and the empirical measurement of expenditure incidence. The main sections of the Chapter are devoted to an estimation of the money-income value of central government current non-market expenditures in 1981/82 by household income groups and household types.

Major central government non-market expenditure functions are expenditure on social welfare benefits (including national superannuation), general expenditures, education, health, interest and debt, and subsidies. Expenditures which can be directly allocated, mainly social welfare, health and education, account for nearly 60 percent of total 1981/82 non-market spending by the central government.

Figure 6.1 below lists the main subtotals of government expenditure ranked by percentage contribution to total expenditure.

FIGURE 6.1:
TOTAL CENTRAL GOVERNMENT NON-MARKET EXPENDITURE IN 1981/82
(Current Government Outlays as Measured By NZSNA Classified by Function)

	<u>Amount</u> (<u>\$M</u>)	<u>% of Total</u>
A. Social Welfare Cash Benefits	2,853.9	29.9
B. General Expenditures	1,775.3	18.6
C. Health	1,436.3	15.0
D. Education	1,364.5	14.3
E. Interest (less concessions)	1,261.8	13.2
F. Subsidies & Miscellaneous		
Subsidies	575.1	6.0
Miscellaneous	293.6	3.1
Total Non-Market Expenditure	<u>9,560.5</u>	<u>100.0</u>

Source: Table 4C.2, Chapter 4.

This introductory section discusses the theoretical and empirical literature on the incidence of government expenditure. Then Sections A through F estimate the household money-income value of central government expenditures by household market-income group and household type. Government expenditures are classified according to six main functions: expenditure on social welfare, general (indivisible) government expenditures, health, education, debt financing, and subsidies and miscellaneous. Section G, the concluding section, looks at the distribution of total expenditures by household income group. It discusses the results in relation to Stages One through Four as set out in Chapter One.

1: HMM and SWF Treatment of Government Expenditure

It is unquestionable that there is a need for an analysis of expenditure incidence. In some cases (such as social welfare spending), distributional considerations are an important motivation underlying decisions to appropriate funds for particular government expenditures. In others, such as health expenditure, there may be no explicit recognition of the distributional implications of the appropriation decision, but the policy choice will have an effect on income distribution nonetheless. Only by knowing how public spending affects private incomes will policymakers be in a position to design expenditure programmes to meet distributional goals. Ideally, an economic model of these effects would also be constructed so that the costs of expenditure programmes in terms of the economic inefficiency of achieving distributional objectives could be assessed.

To date, HMM (Harberger, Mieszkowski, McLure) and SWF (Shoven, Whalley, Fullerton) studies have given credence to the above view, but have given only slight attention to modelling government expenditure behaviour. McLure (1972a, 1974b), who has written more than most on the theory and methodology of estimating expenditure incidence, cautioned those undertaking further developments (1974b, p.44):

"...estimating the distributional impact of government spending is inherently an extremely complicated undertaking. To be done correctly, it must be based upon detailed analysis of input

requirements for the public provision of services, conditions of private demand (including complementarity and substitution between public and private goods) and conditions of supply (including factor mobility, intensity and substitution) as well as the distribution of benefits. This implies that the greatest payoff is likely to come from analysis of particular programs and that broadbrush treatment of the distributional impacts of all programs is likely to result in gross (broad-brush?) oversimplification."

The SWF response is to treat government as one of several industries in the economy which vies with the private sector industries for resources (factors) to provide the same goods and services as the private sector. Fullerton et al (1978) treat the government sector in some detail, using a multi-sector model. Government purchases of inputs are derived from a Cobb-Douglas demand function, defined over producer goods, which holds expenditure shares constant across these items. Since the general equilibrium approach requires that the government budget be balanced, government real expenditures are assumed to equal tax receipts plus government net borrowings less transfers (see Fullerton et al, 1978, p.30).

By treating government-provided goods (and services) as though the same goods would otherwise be privately supplied, the market allocation of the goods does not change with the government's provision of them. Thus, the effect of the existence of government-provided goods on the sources of income side of the equation can be ignored. This assumption is relaxed for transfer payments, however, which are treated like negative taxes.

While the Fullerton approach meets with McLure's requirements of a detailed analysis of inputs for the public provision of services, it disregards some of the most important characteristics of government-provided goods. In particular, a feature of some government goods is that they are not traded in the private market place and so Fullerton's definition of government as just another enterprise does not do full justice to the government's non-market activities. It does not adequately capture the demand for public goods, nor does it capture the value of the non-private component of government-provided goods. Another

limitation which the Fullerton approach holds in common with the other SWF models is that it does not specify implicit marginal tax rates which are a feature of many income transfer programmes.

The next two sections further observe the complexity of assessing the distributional effects of government spending, even given the less-theoretically ambitious approach adopted for this thesis. Section 2 discusses the methodology for estimating the money-income value of individual government expenditures. Section 3 explores adjustments to available government expenditure data required to evaluate the economic concepts and definitions appropriate to a study of expenditure incidence. Finally, Section 4 outlines the approach for imputing a value for expenditures to private household groups.

2: Valuation of Money-Income Effects

There are fundamental difficulties involved in the valuation of the direct money-income effect of a government budget transaction. This chapter follows Meerman (1978) and calculates the money-income value in terms of the cost of providing the government good or service. Acceptance of the Meerman (1978) argument that benefits be valued in terms of their actual monetary cost to the community, is consistent with the approach taken to value the cost of tax to households in money-income terms. It overcomes many of the difficulties associated with taking tastes into account and the valuation problems which arise when preferences for (government-provided) goods are expressed through the political system instead of through the price mechanism.

However, this approach to estimate the distribution of the money income-value of government expenditures fails to take explicit account of three other potentially important effects. These effects are **externalities**, **excess burden** and the **income elasticity of marginal utility of income**.

Externalities arise when the production or consumption activities of one party (such as the government) are intended to affect another party (the user of health services), but also affect the production or utility function of a third party. For example, a firm's productivity is

enhanced because of the government-provided medical treatment for a sick employee. When the utility of the third party increases as a result of the externality (in the example the firm's productivity increases), then an external benefit or economy is said to exist. If the utility of the third party falls, an external cost (or diseconomy) exists.

Externalities present massive measurement problems and cannot be easily incorporated in quantification exercises. First, the process of identification of externalities is imprecise (intelligent children may benefit more from social contact at school than from individual teaching attention, but may think otherwise). Secondly, once the externality has been identified, it is difficult to assign it a money-income value. Despite problems like these, a research project could be undertaken based on a survey of externalities identified by taxpayers and the results linked with the research in this thesis.

Excess burden is the difference between the value to the recipient of a government-provided good or service and the cost to government of supplying it. This concept has already been discussed in relation to tax but it has some different features when related to government expenditures. An excess burden exists for a government expenditure when the cost to the government of providing goods and services or subsidising prices is greater than the value of the service or the subsidy to the recipient.

In assessing excess burdens, it must be taken into account that if the government-provided good was instead brought in the private market place, it would be obtained out of tax-paid income. Thus, its value to the recipient would be its cost of production in the private market place as well as tax foregone. This value will rise with income because of rises in marginal rates of personal income tax.

A strength of the Shoven, Whalley, Fullerton (SWF) general equilibrium models is that they can be designed to measure both excess burden and economic incidence effects. Piggott and Whalley, amongst others, have measured the excess burden of subsidies. A difficulty with designing models to focus on the excess burden of government-provided goods, such as social welfare benefits, is that there may be no private-good equivalent provided by the market place.

The third important effect which is excluded when the money-income value of government expenditure is calculated at cost, is the **income elasticity of the marginal utility of income**. Aaron and McGuire (1970) found that incidence results crucially depend on assumptions made concerning the individual utility functions which are chosen. In most cases, including this study, the underlying assumption about individual utility is implicit rather than explicit. When benefits are valued at the cost to government of providing the good, it is implicitly assumed that the marginal utility of income is constant across income classes (and household types).

Maital (1973) addresses the question of whether there is evidence in support of a particular index of the income elasticity of marginal utility and finds that the elasticity of marginal utility with respect to income in twelve developed countries ranged from a low of 1.04 (in the United Kingdom) to a high of 3.84 (in the Netherlands). If the elasticity of marginal utility with respect to income is greater than 1.0, then it may be inferred that the marginal utility of income declines more than proportionately with income. Furthermore, it can be inferred from this that the dollar value of benefits from a given public outlay must rise more than proportionately with income. Although it is clear from the above that the elasticity of the marginal utility of income with respect to income is unlikely to be constant (1), it is not clear what the approximate value is for New Zealand. Again, this would make an interesting research exercise to conduct in relation to the taxonomy developed in this study.

For reasons spelled out in Chapter Three, this thesis evaluates the effects of the government budget in terms of household money income. This choice is made on the assumption that money income is a measure which reflects households' relative economic positions, taking account of welfare considerations and the policy aim of maintaining current incomes. Evaluating expenditures in terms of the cost of providing them is consistent with this approach. If at some later stage a means of evaluating the externalities, significant money-income effects, excess burden and/or marginal income utilities is developed, these values could be integrated into the research framework at the base of this thesis.

3: Classifying Government Expenditures

Valuing government-provided goods and services at the cost to the government of providing them still leaves the major tasks of identifying the households who consume the goods and the determination of the money-income value of the goods consumed by the households. The published SWF literature, which has not specifically addressed the question of the effects of government expenditures on household income distribution, is not very helpful in resolving problems. Quantitative studies, such as those by Gillespie (1965, 1966), Musgrave et al (1974) and so on have treated the government-expenditure side of the budget in a cursory fashion because of lack of data. Hence, the analysis of the incidence of government expenditures lacks the conventionally accepted incidence assumptions (such as those trotted out on occasions when the incidence of the tax side of the budget is under consideration). For this reason, this Chapter goes into some detail about the assumptions used to impute money-income values for government expenditures to households.

Shoup (1969) remains one of the fullest expositions of the types of government expenditures. He classifies government outlays as either explicit or imputed. Explicit government outlays are transfer payments and payments for goods and services. Transfer payments can be further classified as either unrequited (payments involving no quid pro quo; for example, welfare payments) or as payments, representing asset transactions (for example, purchases of existing real assets, chiefly land and buildings, or purchases of financial instruments, as in open market operations). An imputed government outlay is an expense that does not give rise to a money transfer. For example, an annual depreciation charge for a building owned and used by the government is an imputed outlay. This form of spending is not considered in this thesis which is concerned with current government outlays as defined by the New Zealand System of National Accounts (NZSNA).

While Shoup's exposition distinguishes a number of government outlays by defining their differing economic effects, published data are not detailed in a similar manner. To get the most mileage from available data, much rougher classifications are required.

For the purpose of incidence analysis, government current expenditures can be broadly classified according to four specific (and different) economic functions:

- 1) **Transfers:** direct money-income benefits to households such as national superannuation, the unemployment benefit and income-support to farmers. The money-income value of transfers is the analog of income taxes, mainly affecting the sources of income.
- 2) **Collective or public goods:** government-provided goods and services which are non-excludable and which have an indivisible benefit. Also included in this group are government expenditures (such as general subsidies and current transfers) which may have specific beneficiaries who cannot be identified because of lack of information.
- 3) **Specific or private goods:** goods and services which are excludable and which have a specific beneficiary. The money-income value of these is allocated to households assuming that the costs incurred are an adequate basis for valuing the benefits received by those who consume the goods and services. In the case of a specific good provided both by the government and by the private sector, the money-income value is the good's market price.
- 4) **Subsidies:** are current grants made by the government to ensure a guaranteed price or to hold a market price below the cost of production. The money-income value of subsidies is the analog of indirect taxes, mainly affecting the uses of income. When the households which consume subsidised goods can be identified, the subsidies are defined as "direct" in this thesis. Otherwise, they are classified as "general" and grouped with collective goods.

Of the above four functions, transfer payments can be most easily identified from published accounts such as the New Zealand System of National Account (NZSNA) or the Public Account. In contrast, government-financed goods and services are not classified as specific or collective in any of the information published about the central government.

The Public Account broadly defines government expenditures by programme or function. The NZSNA account distinguishes between government market and non-market activities. Non-market activities are further identified by expenditure function and ownership. In Figure 6.1, on the first page of this Chapter, central government outlays are classified by expenditure function. These functional classifications can be roughly re-classified by economic function into transfers, collective goods, specific goods and subsidies, as in Figure 6.2 below.

FIGURE 6.2

AN ECONOMIC CLASSIFICATION OF TOTAL CENTRAL
GOVERNMENT NON-MARKET EXPENDITURES IN 1981/82

	<u>\$M</u>	<u>\$M</u>	<u>\$M</u>
<u>Transfers: Monetary Benefits</u>			
Income Support	958.1		
National Superannuation	<u>1,895.8</u>		
Social Welfare Cash Benefits		2,853.9	
Supplementary Minimum Prices		217.0	
Total Monetary Benefits			<u>3,070.9</u>
<u>Collective Goods</u>			
General Expenditures		1,775.3	
Current Transfers		428.5	
External Payments (Overseas Debt Servicing)		416.3	
General Subsidies		103.9	
Total Collective Goods			<u>2,723.8</u>
<u>Specific or Private Goods</u>			
Health		1,436.3	
Education		1,364.5	
Internal Interest Payments	845.4		
Less Savings	<u>(402.1)</u>		
Interest/Savings		443.4	
Agriculture & Fisheries	170.9		
Housing	74.8		
Maori Affairs	<u>21.5</u>		
Total Other		267.2	
Total Specific or Private Goods			<u>3,511.4</u>
<u>Subsidies</u>			
Farm, Employment, Milk, Public Transport			<u>254.4</u>
<u>Total Central Government Non-Market Expenditure</u>			<u>9,560.5</u>

Source: Figure derived from Department of Statistics NZSNA accounts.

After classifying government expenditures by economic function, the next step is to identify the households which consume these expenditures. Musgrave, Case and Leonard (1974) made innovative use of available data to distribute the benefits of government-financed private goods. For example, the benefits from (private-good) education are allocated among households by the distribution of household occupants identified as students. In the case of highways, expenditures are divided in line with consumer and business use of the facilities. The amount distributed among households is determined according to consumer expenditures on automotive products. The amount distributed to businesses is according to total consumption expenditure based on the assumption that business-automotive costs are passed forward in prices of finished goods. Interest payments are imputed to the holders of public debt, with payments to banks imputed to the holders of bank shares. The value of these specific goods for each household is found by dividing the total number of users into the total cost (as recorded by the budget) of each service.

Several of those researching the expenditure side of the government budget, including Musgrave, Case and Leonard (1974), note difficulties in allocating collective goods to household income groups. It is not always clear who derives a benefit from indivisible expenditures and it is particularly difficult to arrive at a specific valuation of the benefit for individuals.

Early empirical studies avoided this problem by excluding collective goods. Conclusions based on this practice, however, are likely to be seriously misleading. For example, if the government increases transfer payments to lower-income households, the decision to finance them by either a cut in expenditure for a government-provided public good (such as defence) or a government-provided private good (such as education for the children of those on lower incomes), will clearly affect the welfare of different income groups. If defence expenditure is ignored because of the difficulty of attributing the benefits of an indivisible public good to households, it is the same thing as treating that expenditure as neutral. Yet, the decision between cutting a defence measure or an education measure may not be "neutral" as far as most households are concerned.

Indivisible expenditures (expenditures on collective goods) present further difficulties because, although they are intended to be equally available for consumption by all, it is not clear how this intention translates into the money-income values by household income and household type. The general equilibrium literature tends to treat collective goods in aggregate and does not provide any conclusive insight into their distribution. So quantitative researchers have instead attempted to test results using different assumptions. This is discussed further in Section B of this Chapter, which is devoted to collective government goods.

Many government spending measures have both private good and public good characteristics and it is not possible to be exacting when trying to separate the two. For example, spending on education provides specific benefits to the recipients of education, to children in primary schools and colleges, to university students and returning adult students. Educational spending also provides public benefits (not to mention externalities). Public benefits are produced by such things as by public lectures and, more indirectly perhaps, through the advice academics might provide to policymakers. Externalities arise because, for example, everyone in the population benefits from a better educated workforce. Meerman's approach to valuing government spending at taxpayer cost is useful because it enables the public benefit and externalities from education to be ignored in a consistent fashion. Further study is required to show whether the public-good characteristics of government expenditures have significant redistributive influence.

Once the private-good-type benefits of government expenditures are identified, the next problem is to find suitable data. Private-goods' benefits may be split between several beneficiaries or factors of production and there are often insufficient data measuring the money-income gain to all these groups.

The government also makes factor payments, such as the salaries paid to teachers, post office employees and police officers. These are entered in the national accounts as personal income.

Although the change in factor payments as a result of government expenditure is properly an expenditure incidence consideration, it is not treated explicitly by the Stage One and Two approaches in this thesis.

These approaches focus on the consumption of government-provided goods by household, not the effects on households because of the manner in which governments choose to produce the goods.

A reasonable incidence assumption is that those who directly consume government-provided goods are likely to be the major beneficiaries, at least in the short term. However, even with this simplifying assumption, there are still substantial data problems. For example, although New Zealand data about the users of health services are quite detailed, information about the incomes of the users is not collected. Thus, the age, sex and geographical characteristics of health consumers can be identified, but not their incomes (and certainly not their household incomes). Nevertheless, using Census and Household Survey data of the age distribution of household occupants by range of income as a distributor, it is possible to estimate the distribution of hospitalization and other health expenditures by household type and income. Using age as the distributor implies that age is the main determinant of hospitalization use, rather than income.

The above discussion highlights a number of major qualifications, any one of which could have a significant effect on the results of a study aimed at assessing the distribution of government expenditures. Unfortunately, it is necessary to adopt some restrictive assumptions in order to carry out a study of this breadth. Despite this, a number of interesting results emerge, even when they mainly highlight what is not known.

4: Imputing the Money-Income Value of New Zealand Expenditures to Private Household Income Groups

The main Sections of this Chapter use available data to attempt to identify the consumers of government goods and services. The Household Survey is then used to estimate the distribution of these consumers by income groups and household type and the 1981 Census is used to aggregate this distribution for the entire population of private households. Based on this distribution, a money-income value of specific central government outlays in 1981/82 is imputed.

Figure 6.3 below summarises the adjustments to the NZSNA figures so that they represent the private-household population. Basically, all NZSNA expenditures are assumed to be consumed by the estimated 95 percent of the population living in private households. Further adjustments are then made to reflect views about particular expenditure items. For example national superannuation and health expenditures are adjusted downwards more than the others. In the case of national superannuation and health expenditures, it is assumed that a larger proportion of those over 60 live in institutions and only 87.5 percent of the costs of providing these is allocated to private households. In the case of subsidies, the direct subsidies and supplement minimum payments to farmers (SMPs) are allocated in total to private households but only 95 percent of general subsidies are allocated. The following sections of this Chapter are based on the data as set out in Figure 6.3.

FIGURE 6.3

**APPROXIMATE VALUE OF GOVERNMENT EXPENDITURE
CONSUMED BY PRIVATE HOUSEHOLDS**

	NZSNA Amount in Figure 6.1 \$M	Adjustment to Derive Expenditure Consumed By Private Households	Amount Consumed By Private Households \$M
Social Welfare Benefits			
National Superannuation	1,895.8	87.5%	1,659
Other Cash Benefits	958.1	97.0%	927 ^a
	<u>2,853.9</u>		<u>2,586</u>
Collective Goods			
General Expenditures	1,775.3	95.0%	1,687
Collective Goods n.e.i. ^b			111
	<u>1,775.3</u>	95.0%	<u>1,798</u>
Health	<u>1,436.3</u>	87.5%	<u>1,257</u>
Education	<u>1,364.5</u>	94.0% ^c	<u>1,293</u>
Interest (less concessions)	<u>1,261.8</u>	95.0%	<u>1,199</u>
Subsidies & Miscellaneous			
Subsidies	575.1	(99.5%)	572 ^d
Miscellaneous	293.6	95.0%	279
Grand Total	<u>9,560.5</u>	(94.0%)	<u>8,984</u>

Notes: a) Includes all family beneficiaries in private households. Since the age distribution of occupants in private households is known, this weights up to slightly more than 95 percent. b) n.e.i. means not elsewhere included. c) This adjusts up to 95 percent when expenditure for agriculture and Maori education (classified in miscellaneous) is included. d) It is assumed that almost all subsidies are consumed by private households. Sources: Figure 6.1 adjusted as explained in text.

A. SOCIAL WELFARE BENEFITS

Section A is devoted to a discussion of central government expenditure on social welfare cash benefits, which totalled \$2,853.9 million or about 30 percent of total government outlays in 1981/82. Another \$458.9 million, or 4.8 percent of total central government outlays, was spent on health benefits, education supports and home ownership grants. These three support schemes are discussed under the appropriate section headings, later in the Chapter.

Figure 6.4 shows the NZSNA classification of social assistance grants in 1981/82 and the years immediately before and after.

FIGURE 6.4

SOCIAL ASSISTANCE GRANTS ANALYSED BY PURPOSE

(\$ Million)	Year Ended 31 March				
	1980/81	Change %	1981/82	Change %	1982/83
Support for -					
Health ^a	272.1	15.5	314.4	61.3	345.9
Education ^b	91.6	14.1	104.5	-10.3	93.7
Home Ownership ^c	33.9	18.0	40.0	-17.3	33.1
Sub-total: Support Schemes	<u>397.6</u>	15.4	<u>458.9</u>	3.0	<u>472.7</u>
Income Support to -					
National Superannuitants	1,556.8	21.8	1,895.8	27.6	2,418.9
Unemployment, Widows and Families	672.0	12.3	754.6	14.1	861.1
Sickness, Invalids and War Pensions	165.3	10.5	182.7	18.6	216.6
Miscellaneous ^d	<u>19.4</u>	7.2	<u>20.8</u>	76.0	<u>36.6</u>
Sub-total: Social Welfare Monetary (Cash) Benefits	2,413.5	18.2	2,853.9	23.8	3,533.2
TOTAL	2,810.7	17.9	3,312.8	20.9	4,005.9

a) Health support includes the government subsidy paid to private hospitals on behalf of patients; pharmaceutical benefits; general practitioners, maternity and specialist subsidies and payments for dental and laboratory services. b) Education support includes government subsidies to private schools, boarding allowances and tertiary bursaries. c) Home ownership support includes: 1) the rates rebate scheme; 2) interest subsidies to Housing Corporation for low-interest housing loans. d) Miscellaneous is a residual figure which includes: telephone rental and television licence subsidies, apprentices lodging and travel allowances, and government employee bursaries. Source: Department of Statistics.

A.1 The Distribution of National Superannuation Payments

By far the largest single government outlay is the grant for national superannuation. In 1981/82, it accounted for about two-thirds of all social welfare cash benefits and nearly a fifth of total government outlays.

The percentage distribution of national superannuation payments by household income and type is illustrated by Table 6A.1. About 70 percent of national superannuation payments are distributed to the lower 30 percent of households, households with market incomes under \$9,750. By far the majority of national superannuitants live in one-adult or two-adult households. Only 11.4 percent of national superannuation payments are received by households with three-or-more adult occupants.

Table 6A.1

**ESTIMATED DISTRIBUTION OF NATIONAL SUPERANNUATION INCOME
PAID TO PRIVATE HOUSEHOLDS IN 1981/82
BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE**

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
Proportion of Total (%)											
Less Than \$250	12.0	0.0	11.1	0.0	0.1	0.2	0.0	-	-	0.1	24.2
\$250-(\$3,950)	12.1	0.0	15.6	0.0	0.3	0.2	0.0	-	-	0.0	28.6
\$3,950-(\$9,750)	5.0	0.0	10.1	0.0	0.1	0.1	0.0	1.3	0.2	0.1	16.7
\$9,750-(\$13,450)	1.2	0.0	5.5	0.0	0.1	0.0	0.0	0.7	0.3	0.0	7.7
\$13,450-(\$16,900)	-	0.0	3.6	0.0	0.1	0.2	0.0	1.1	0.1	-	5.8
\$16,900-(\$20,250)	-	0.0	3.0	0.0	0.0	0.0	0.0	1.1	0.6	-	4.8
\$20,250-(\$24,200)	-	0.0	1.5	0.0	0.1	0.0	0.0	0.2	0.4	-	2.2
\$24,200-(\$29,200)	-	0.0	1.7	0.0	0.0	0.1	0.0	0.2	0.6	-	3.2
\$29,200-(\$36,650)	-	-	1.7	0.0	0.2	0.1	0.0	1.4	0.4	-	3.7
\$36,650 and over	-	-	1.2	0.0	0.0	0.0	0.0	1.0	0.7	-	3.0
Total (%)	31.9	0.0	55.0	0.0	0.9	0.7	0.0	7.7	3.7	0.2	100.0

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households. Cells with too few observations designated (-).

A.2: Social Welfare Income Support

Besides national superannuation, income support is provided through the Department of Social Welfare in the form of the family benefit, as well as the unemployment benefit, the domestic purposes benefit, the widows benefit, the sickness benefit, benefits for invalids and orphans and war pensions. In addition, there are a number of miscellaneous cash benefits to cover such things as accommodation and telephone rental. As the next tables show, the family benefit is mainly distributed to middle-income households and above, while other social welfare benefits are largely consumed by low-income households.

A.2.a: Family Benefit Recipients

Family benefit is normally paid to the mother of the child, unless someone else is deemed to be the legal guardian. The family benefit payment is payable if the child is:

- (i) Aged under 16,
- (ii) Aged under 18, and still attending school; or,
- (iii) Aged 18, turned 18 in current December year, and still attending school.

The Household Survey does not specifically identify recipients of the family benefit, although information on payments received is collected. For this study, eligibility for the family benefit is determined according to the above criteria, information which is available from the Household Survey. However, date of birth is not collected, so it is not possible to know whether a person turned 18 in the current December year. For the purpose of this research, all 18 year olds still attending school are assumed to qualify for a full year.

Once the qualifying individuals are identified, this information is used to calculate the proportion of family beneficiaries by income groups and household types. These proportions are then applied to total spending on family benefit for private households in 1981/82 (\$297.7 million) to impute a money-income value for each income group and household type.

Table 6A.2

DISTRIBUTION OF CHILDREN
BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type					
	2 Adults With Children		3 or More Adults		1 Adult	All
	1 Child	2 Children	3 or More Children	With Child(ren)	With Child(ren)	House- holds
Proportion of Total (%)						
Less Than \$250	0.3	0.4	1.0	-	3.1	5.1
\$250-(\$3,950)	0.3	0.4	0.7	-	1.3	2.8
\$3,950-(\$9,750)	0.8	1.9	3.1	0.9	1.0	7.6
\$9,750-(\$13,450)	1.3	3.0	4.1	0.9	0.5	9.8
\$13,450-(\$16,900)	1.2	4.3	5.9	1.6	-	13.2
\$16,900-(\$20,250)	1.2	3.9	6.1	1.6	-	13.0
\$20,250-(\$24,200)	1.1	4.6	5.7	2.5	-	14.2
\$24,200-(\$29,200)	0.8	3.0	4.2	3.6	-	11.7
\$29,200-(\$36,650)	0.8	2.9	3.0	3.6	-	10.2
\$36,650 and over	0.5	2.0	3.7	6.0	-	12.2
Total (%)	8.2	26.3	37.5	21.3	6.8	100.0

Sources: Estimated distribution based on data from Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households. Cells with insufficient observations designated (-).

The distribution of children eligible for the family benefit, which is also the distribution of the money-income value of the family benefit, is shown by Table 6A.2 above. Looking at the final column of Table 6A.2, less than 10 percent of children reside in households in each of the lowest four income deciles. Since middle-income households account for the greatest proportion of children, they consume the greatest money-income share of the family benefit.

A.2.b: The Distribution of Social Income Support

Social welfare income support refers to the family benefit, war pensions, the unemployment benefit, the DFB, the sickness benefit, and benefits for widows, invalids and orphans (national superannuation is excluded). When these are identified from Household Survey data, the largest share goes to the lowest household income decile.

As Table 6A.3 shows below, the distribution of social welfare income support by household income group for all households (see final Column) is a skewed one. Those in the top income decile receive a larger share than all except the bottom three deciles. This is largely explained by the distribution of the money-income value of the family benefit (see Table 6A.2).

When the distribution of social welfare income support is analysed by household type (see "Total" row of Table 6A.3), the largest share of 23.3 percent of income support goes to three-or-more-adult households with children. The second largest share of 14.1 percent goes to one-adult households with children.

Table 6A.3

THE PERCENTAGE DISTRIBUTION OF
SOCIAL WELFARE INCOME SUPPORT PAID TO PRIVATE HOUSEHOLDS 1981/82
BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
Proportion of Total (%)											
Less Than \$250	0.1	3.7	0.3	3.0	1.4	1.3	1.3	-	-	13.9	26.5
\$250-(\$3,950)	0.1	4.0	0.7	1.5	0.2	0.1	0.8	-	-	4.8	13.1
\$3,950-(\$9,750)	0.6	0.7	0.3	1.0	1.4	1.6	1.1	0.4	1.3	1.7	10.0
\$9,750-(\$13,450)	0.0	0.1	0.5	0.5	0.8	1.5	1.4	0.2	1.5	0.4	6.9
\$13,450-(\$16,900)	-	0.0	0.0	0.5	0.8	1.8	2.0	0.2	2.0	-	7.6
\$16,900-(\$20,250)	-	0.0	0.0	0.1	0.6	1.3	2.0	0.3	2.6	-	7.0
\$20,250-(\$24,200)	-	0.0	0.2	0.1	0.4	1.6	1.9	0.8	2.1	-	7.1
\$24,200-(\$29,200)	-	0.0	0.2	0.0	0.3	1.0	1.4	0.5	3.7	-	7.1
\$29,200-(\$36,650)	-	-	0.0	0.1	0.3	1.0	1.0	0.2	3.2	-	5.7
\$36,650 and over	-	-	0.0	0.1	0.2	0.6	1.3	1.8	4.9	-	9.0
Total (%)	0.8	8.6	2.3	7.0	6.3	11.9	14.1	4.7	23.3	21.1	100.0

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households. Cells with insufficient observations designated (-). Weighted up for individual components of social welfare support.

A.3: The Household Income Distribution of Social Welfare Benefits

Table 6A.4 compares the distribution of all direct monetary benefits (transfers) by income deciles. SMPs (discussed in greater depth in Section F) are the only cash transfers which are not distributed in favour of the two lower income groups. Note that the total amount for each transfer has been adjusted in different ways to represent the proportion of recipients who are occupants of private households (see Figure 6.3).

Table 6A.4

MONETARY BENEFITS (CASH TRANSFERS) BY HOUSEHOLD
INCOME GROUP IN 1981/82 (STAGE ONE AND STAGE TWO DEFINITIONS)

Household Market Income (\$ p.a.)	A Social Welfare Income Support (\$M) %		B National Super- annuation (\$M) %		C (A+B) Social Welfare Benefits (\$M) %		D (E-C) SMPs (\$M) %		E Total Monetary Benefits (\$M) %	
Less Than \$250	246	26.5	402	24.2	648	25.1	6	2.8	654	23.3
\$250-(\$3,950)	121	13.1	475	28.6	596	23.0	6	2.8	602	21.5
\$3,950-(\$9,750)	93	10.0	278	16.8	371	14.3	39	18.0	410	14.6
\$9,750-(\$13,450)	64	6.9	128	7.7	192	7.4	22	10.1	214	7.6
\$13,450-(\$16,900)	71	7.6	97	5.8	167	6.5	27	12.4	194	6.9
\$16,900-(\$20,250)	65	7.0	79	4.8	144	5.6	18	8.3	162	5.8
\$20,250-(\$24,200)	65	7.0	37	2.2	102	3.9	21	9.6	123	4.4
\$24,200-(\$29,200)	66	7.1	52	3.2	118	4.6	31	14.3	149	5.3
\$29,200-(\$36,650)	53	5.7	61	3.7	114	4.4	19	8.8	133	4.8
\$36,650 and over	84	9.1	50	3.0	134	5.2	28	12.9	162	5.8
Total	927	100.0	1659	100.0	2586	100.0	217	100.0	2803	100.0

Sources: Table 6A.1, Table 6A.3, Table 6F.1.

A surprising observation from Table 6A.4 is the size of the various shares of monetary benefits consumed by the 60 percent of households earning above the average wage in 1981/82 (those households with incomes above \$13,450). The upper 60 percent of households are estimated to receive 43.4 percent of social welfare income support, 22.7 percent of national superannuation and 66.3 percent of SMPs. The share of total monetary benefits for the upper 60 percent of households was 33.0 percent. There has been considerable debate about whether national superannuation succeeds in assisting those on low incomes. The observations above suggest that the scope of such an analysis should be

Chart 6.1 is a graphic illustration of the redistributive effect of national superannuation. The Lorenz curve for national-superannuation-money-income shares by household is concave to the line of equality and the Gini coefficient is .48. This shows that national superannuation is "unequally" distributed in favour of households with low market incomes, reflecting the fact that a majority of national superannuitants have household incomes in the lowest 30 percent of market income. Note that these figures are for pre-tax national superannuation income. The distribution of post-tax national superannuation would favour low-market-income householders even more.

The Lorenz curve for social welfare income support is also concave, but it is closer to the line of equality. This shows that social welfare benefits are less redistributive than national superannuation.

CHART 6.1

NATIONAL SUPERANNUATION, THE FAMILY BENEFIT AND TOTAL SOCIAL WELFARE SPENDING: COMPARISON OF RELATIVE EQUALITY

In comparison to other social welfare monetary benefits, the family benefit is more equally distributed to households. Its Lorenz curve is closer to the line of equality in Chart 6.1. Also, it is convex, showing that the share of family benefit going to higher income households is greater than the share going to low income households. This result is consistent with the fact that the average number of children per household increases as household income rises.

Table 6A.5 illustrates the distribution of monetary benefits by household type. Note that the Stage One and Stage Two definitions of monetary benefits are the same.

Table 6A.5

MONETARY BENEFITS FOR 1981/82 BY HOUSEHOLD TYPE
(STAGE ONE AND STAGE TWO DEFINITIONS)

		Household Type									
		1 Adult		2 Adults		2 Adults with Children		3 or More Adults		1 Adult with Chld'n	All House- holds
		Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil- dren	With Chil- dren	
<hr/>											
(A) Income Support											
Amount (\$M)		7	79	21	65	58	110	131	44	216	927
% Distrib.		0.8	8.5	2.3	7.0	6.3	11.9	14.1	4.7	23.3	100.0
(B) National Superannuation Income											
Amount (\$M)		529	-	912	-	14	12	1	128	61	1659
% Distrib.		31.9	-	55.0	-	0.9	0.7	0.1	7.7	3.7	100.0
(C) Social Welfare Benefits (A + B)											
Amount (\$M)		535	79	933	65	73	122	132	172	277	2586
% Distrib.		20.7	3.1	36.1	2.5	2.8	4.7	5.1	6.6	10.7	100.0
(D) SMPS (\$M)											
Amount (\$M)		4	6	10	27	15	28	45	32	49	217
%		1.8	2.8	4.6	12.4	6.9	12.9	20.7	14.7	22.6	100.0
(E) Total Monetary Benefits (C + D)											
Amount (\$M)		540	86	943	92	87	150	177	203	326	2803
%		19.3	3.1	33.6	3.3	3.1	5.4	6.3	7.2	11.6	100.0

Sources: Table 6A.1, Table 6A.3, Table 6F.10

Not unexpectedly, the largest proportion of the total money-income value of monetary benefits, is estimated to accrue to national-superannuitant households. As shown by the last line of Table 6A.5, two-adult, national-superannuitant households received 33.6 percent of total monetary benefits and one-adult national superannuitant households received 19.3 percent. These two household types accounted for 23.2 percent of total households and only 11.9 percent of the total occupants of private households.

Chart 6.2 pictures the significance of National Superannuation in relation to other monetary benefits.

CHART 6.2
VALUE OF DIRECT MONETARY BENEFITS IN 1981/82 BY HOUSEHOLD TYPE

As Chart 6.2 shows, national superannuitants are the largest consumers of social welfare spending. Since they tend to be concentrated in the lower market income brackets, the overall conclusion which emerges is that monetary benefits are largely consumed by households in the three lowest income deciles.

B. DISTRIBUTION OF COLLECTIVE GOODS

Collective goods are those which have the characteristic of non-excludability. Two types of government expenditures classified as collective goods are **general expenditures** and **other collective goods**. General expenditures cover the costs of administering the government-provision of goods and services. Other collective goods include some government-provided goods which have private good characteristics but where the consumers of the goods cannot be directly identified. Government spending on general administration is an example of a general expenditure. Overseas debt servicing is a collective good. In total, these goods account for 30.5 percent of 1981/82 central government non-market expenditure.

In 1981/82, \$1,775.3 million or 18.6 percent of central government outlays were for **general expenditures** including general administration, defence and so on. Another \$948.5 million or 9.9 percent of central government outlays are expenditures on **other collective goods**, including overseas debt servicing, current transfers and subsidies. Figure 6.5 below lists the main government outlays classified as collective goods for the analysis in this thesis.

FIGURE 6.5

CLASSIFICATION OF COLLECTIVE GOODS

<u>Expenditure</u>	<u>NZSNA Amount in 1981/82</u> <u>\$ Million</u>
General Administration	861.5
Defence	587.3
Social, Recreation and Research Services	219.4
Industries, Royalties and Patents	97.5
National Library	9.6
General Expenditures	1,775.3
External Payments (Overseas Debt Servicing)	416.3
Current Transfers	428.5
General Subsidies	103.7
Total Other Collective Goods	948.5
Total Collective Goods	2,723.8

Note: Adjusted so 95% x \$2,723.8 million = \$2,587.6 million consumed by private households. Source: Department of Statistics, NZSNA data.

As noted in the introduction, many early quantitative studies of the distribution of the benefits of government expenditures ignored government collective goods altogether because of the difficulty in identifying the beneficiaries of indivisible expenditures. This practice is tantamount to assuming that the money-income benefits of government collective goods are distributed equally to each household. Later studies have attempted to generate different assumptions about the distribution of indivisible government expenditures. It would be difficult to test the reality of many of these assumptions. Instead, different assumptions about the distribution of collective goods are tested. At issue is whether the overall expenditure incidence results are sensitive to differing assumptions. If they are, it may be worthwhile to engage additional research resources to discover more about the consumers of government-provided collective goods.

Gillespie (1965) tested the sensitivity of his results to four assumptions about the beneficiaries of non-specific (or indivisible) expenditures. Gillespie allocated indivisible expenditure benefits:

- a) Equally per family (like Case 7 in this thesis).
- b) Similarly as (the broad measure of) income (Case 4).
- c) Similarly as capital income (Case 5).
- d) Similarly as disposable income (Case 2).

Gillespie's results were very sensitive to the above assumptions with assumption (a) distributing general-government expenditures most in favour of low income households and assumption (b) distributing expenditures most in favour of those on higher incomes.

Musgrave, Case and Leonard (1974) develop three different methods of distributing the income-value of benefits among income groups:

- a) In proportion to total income (most like Case 4);
- b) In proportion to tax burdens (Case 6); and
- c) On a per capita basis (Case 8).

This thesis considers eight assumptions about the distribution of collective goods. Seven of these are based on the Gillespie and Musgrave

assumptions as noted above. The new assumption, Case 1, assumes that consumption of government goods and services is distributed in a similar pattern to consumption of privately-produced goods and services.

Table 6B.1

**ASSUMPTIONS FOR DISTRIBUTING THE MONEY INCOME VALUE
OF GOVERNMENT COLLECTIVE GOODS
Eight Cases Compared**

Household Market Income (\$ p.a.)	House- hold Expend. Case (1) ^a	Dispo- sable Income Case (2)	Market Income Case (3)	Total (Gross) Income Case (4)	Pro- perty, Rates ^b Case (5)	Personal Income Tax Case (6)	House- holds Case (7)	Persons in H'holds Case (8)
Percentage Distribution (%)								
Less Than \$250	3.9	3.3	-0.1	2.7	5.7	0.9	10.0	6.2
\$250-(\$3950)	4.8	4.1	0.9	3.5	9.6	1.6	10.0	5.8
\$3950-(\$9750)	6.5	5.8	3.8	5.0	8.0	2.8	10.0	8.1
\$9750-(\$13450)	7.4	7.1	6.3	6.4	8.1	4.6	10.0	9.2
\$13450-(\$16900)	9.0	8.4	8.1	8.0	9.3	6.6	10.0	10.8
\$16900-(\$20250)	10.4	9.7	10.0	9.5	10.5	8.7	10.0	11.0
\$20250-(\$24200)	11.1	11.0	11.9	11.0	11.0	10.7	10.0	11.8
\$24200-(\$29200)	12.7	13.0	14.4	13.3	11.1	14.0	10.0	11.4
\$29200-(\$36650)	15.4	15.4	17.6	16.1	12.5	17.9	10.0	11.7
\$36650 and over	18.7	22.0	27.1	24.6	14.1	32.2	10.0	14.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Notes: a) Standard case. b) Proxy for capital income. Sources: Estimated distributions based on data from the Department of Statistics Household Survey 1981/82, and weighted up using data from the 1981 Census of Population and Dwellings to represent the total population of private households. Case 6 based on ASSET model.

Table 6B.1 compares eight distributions of the money-income value of collective government expenditures by household market income groups. Case 1 is discussed in the preceeding paragraph. Case 2 implies a declining marginal utility of income as income rises, a proposition discussed in the introductory section of this Chapter. Gillespie (1966) supports this assumption as relating to the derived demand for "general" government expenditures which arises from the uses to which personal income is put as determined by disposable income.

Case 3 assumes that households consume government-provided goods in relation to their market income or in other words, income-earning potential not only increases market-spending power, it also increases

political voting power. In addition, it reflects the view presented by Aaron and McGuire (1970) that the marginal utility of income declines as income rises and, in turn, the relative utility of public goods rises. Case 4 assumes that total income is the important determinant of voting power and the marginal utility of public goods, whether the income is earned in the market place or not.

Another plausible assumption is that property ownership is the most significant determinant of the consumption of government indivisible expenditure. For example, a property owner's benefit from the judiciary and from defence and police expenditures may be an increasing function of the value of the property. There are no data available which specify the value of property owned in New Zealand. The Household Survey does collect information about property rates paid and this is the distributor for Case 5, based on the assumption that property rates reflect the relative difference in property values. This distribution is extremely limited, however, since property rates differ for each rateable jurisdiction.

Case 6 assumes that government collective goods are consumed by households in relation to the amount of income tax they pay. According to this assumption, the highest two income groups benefit far more than the others - the top 20 percent of households would receive over 50 percent of the benefits from general government.

Finally, Cases 7 and 8 reflect two interpretations of the view that all members of the population benefit from collective goods. Case 7 represents the distribution if the benefit from collective goods relates to households. Case 8 is the distribution if all members of the population are assumed to benefit equally from collective goods.

A comparison of Cases 7 and 8 indicates that (because the number of occupants per household tends to be an increasing function of income), the results would differ, whether it is assumed that the money-income benefits are spread equally per household or equally per person. The annoying reality (annoying because it is yet another complexity!) is that some collective goods are probably consumed equally by households (postal delivery) while others are consumed equally per person (national

defence). Further, there may also be some public goods which mainly benefit adults (that is, those individuals old enough to vote). There is a lot to learn about consumer preferences for public goods.

Of the assumptions displayed by Table 6B.1, the one most beneficial to high income households is Case 6 (personal income tax) and the one most beneficial to low income households is Case 7 (distribution of households). Of the plausible assumptions (ruling out Case 2, which may explain demand for private goods, but does not seem to be a plausible explanation of demand for collective goods), distributing the money-income value of general government expenditures in relation to household expenditure is the least extreme. This is the standard case used throughout this thesis. Chart 6.3 below uses Lorenz curves to show that the distributions of collective government expenditures by Case 1, Case 6 and Case 7 are all quite different.

CHART 6.3

THE CONSUMPTION OF COLLECTIVE GOVERNMENT
GOODS BY HOUSEHOLD MARKET-INCOME DECILES: LORENZ
DIAGRAM OF RELATIVE EQUALITY OF THREE CASES

Table 6B.2

COMPARING THE EFFECT OF EXTREME ASSUMPTIONS ABOUT COLLECTIVE GOVERNMENT BENEFITS ON THE DISTRIBUTION OF TOTAL GOVERNMENT EXPENDITURE

Household Market Income (\$ p.a.)	Assumption Most Beneficial to High Income Groups (Case 6, Personal Income Tax)				Assumption Most Beneficial to Low Income Groups (Case 7, Number of Households)			
	A	B	C	D	E	F	G	H
	Collectv Govern. Goods (Case 6)	Other Govern. Expend.	Total Govern. Expend.	% of Total	Collectv Govern. Goods (Case 7)	Other Govern. Expend.	Total Govern. Expend.	% of Total
	\$M	\$M	\$M	%	\$M	\$M	\$M	%
Less Than \$250	24	886	910	10.1	259	886	1145	12.7
\$250-(\$3950)	41	828	869	9.7	259	828	1087	12.1
\$3950-(\$9750)	73	738	811	9.0	259	738	997	11.1
\$9750-(\$13450)	119	507	626	7.0	259	507	766	8.5
\$13450-(\$16900)	171	547	718	8.0	259	547	806	9.0
\$16900-(\$20250)	225	533	758	8.4	259	533	792	8.8
\$20250-(\$24200)	277	516	793	8.8	259	516	775	8.6
\$24200-(\$29200)	362	556	918	10.2	259	556	816	9.1
\$29200-(\$36650)	463	554	1017	11.3	259	554	813	9.0
\$36650 and over	832	732	1564	17.4	258	732	990	11.0
Total	2587	6397	8984	100.0	2587	6397	8984	100.0

Sources: Columns A and E based on Table 6B.1. Derivation of distribution of Columns B and C from results in following Sections and summarised in Section G.

Table 6B.2 compares the effect of the two extreme assumptions (Case 6 and Case 7) on the distribution of total government expenditure (standard case). A comparison of Columns D and H in Table 6B.2 shows that in both cases, the distribution of total government expenditures turns out to be slightly U-shaped, with the bottom and upper income deciles benefitting more from government spending than the middle income deciles.

The two extreme assumptions make the most difference to the upper-income decile's share of the money-income value of government expenditures. The upper income decile benefits substantially more under the Case 6 conditions where it is assumed that general expenditures benefit households in relation to how much they pay (for government) in personal income taxes.

Applying the Case 6 distributor results in 17.4 percent of the money-income value of total government spending accruing to the 10 percent of households in the top income bracket. Applying the Case 7 distribution results in only 11.0 percent of total government expenditure accruing to the top 10 percent of households.

Chart 6.4 compares the distribution of the money-income value of total government expenditure based on the Case 1 (government expenditure is distributed in the same way as household expenditure), Case 6 (personal income tax) and Case 7 (households) assumptions about the consumption of collective goods by market-income group. Although the patterns of distribution are different, they are only significantly different for the very highest household-market-income group.

CHART 6.4

COMPARISON OF THE PATTERN OF CONSUMPTION OF THE MONEY-INCOME VALUE OF TOTAL GOVERNMENT EXPENDITURE BASED ON THREE ASSUMPTIONS ABOUT THE CONSUMPTION OF COLLECTIVE GOODS

Case 1, where government collective expenditures are assumed to be allocated in the same pattern as household expenditure, is selected as the standard case for this thesis. However, it is not selected as the standard assumption for the thesis because it is necessarily more probable. Case 1 is selected because the resulting distribution lies somewhere between the most extreme assumptions.

Both Gillespie (1965, 1966) and Musgrave et al (1974) choose a concept similar to total income¹ as the standard case. They reason

that there is a higher probability that this alternative reflects what is really human behaviour. The personal income tax distribution is similar to the distribution of total income (see Table 6B.1). Hence, if a similar assumption was adopted in this thesis, it would create a distribution of total government expenditure more akin to the Case 6 illustrated by Chart 6.4.

Reynolds and Smolensky (1977) believe that households benefit from government collective expenditures on some egalitarian basis, as well as in proportion to income. They adopt the novel assumption that collective expenditures are "arbitrarily distributed, one-half by the distribution of households and one-half by share of initial income". If a similar assumption was adopted in this thesis, it would result in a distribution of shares of total government expenditure more akin to Case 7 in Chart 6.4.

Table 6B.3 on the next page displays the distribution of the money-income values of collective government expenditures based on the standard (Case 1) assumption by market income group and household type. Turning to the distribution of collective expenditures by household type (see Total % row, Table 6B.3), the assumption that collective expenditures are distributed in relation to household expenditure results in a distribution that favours two-adult, non-national-superannuitant households. These households are estimated to consume 16.4 percent of collective benefits, but they account for only 15.0 percent of households and 10.0 percent of persons occupying private households. Similarly, childless three-or-more-adult households are estimated to consume 12.9 percent of collective expenditures but they only account for 8.3 percent of households and 9.4 percent of the occupants. In contrast, national-superannuitant households' share is nearly the same as their share of the private-household population.

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1. In fact, it is similar to the concept of Stage Three pre-budget income adopted in this thesis. Musgrave et al define "total income" to include money income (market income plus transfer payments) as well as certain items such as corporate source income other than dividends (that is, corporation tax and retained earnings), other capital gains, imputed rent and so forth. Gillespie defines "broad income" as personal market income, various kinds of imputed income (capital gains, retained earnings and so on) and non-money income (food grown and consumed on the farm, net rental value of owner-occupied farms and so on). Transfers are also included.

Table 6B.3

THE MONEY-INCOME VALUE OF COLLECTIVE GOODS
ALLOCATED IN PROPORTION TO HOUSEHOLD EXPENDITURE (CASE ONE)
BY HOUSEHOLD INCOME GROUP AND BY HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		

	Total Amount Per Group (\$ Million)										
Less Than \$250	26	5	26	5	3	3	5	-	-	21	101
\$250-(\$3,950)	34	8	47	8	5	5	3	-	-	10	124
\$3,950-(\$9,750)	21	21	36	16	18	21	16	8	8	10	168
\$9,750-(\$13,450)	5	28	26	26	26	31	23	10	16	5	192
\$13,450-(\$16,900)	-	23	23	31	28	52	36	8	21	-	233
\$16,900-(\$20,250)	-	21	21	49	28	54	49	21	23	-	269
\$20,250-(\$24,200)	-	10	18	60	28	65	44	23	36	-	287
\$24,200-(\$29,200)	-	8	10	88	23	49	44	41	57	-	329
\$29,200-(\$36,650)	-	-	8	83	26	75	31	78	93	-	398
\$36,650 and over	-	-	13	60	21	44	44	140	163	-	484

Total	91	129	225	424	210	396	297	334	423	59	2588

Percentage Distribution (%)											
Less Than \$250	1.0	0.2	1.0	0.2	0.1	0.1	0.2	-	-	0.8	3.9
\$250-(\$3,950)	1.3	0.3	1.8	0.3	0.2	0.2	0.1	-	-	0.4	4.8
\$3,950-(\$9,750)	0.8	0.8	1.4	0.6	0.7	0.8	0.6	0.3	0.3	0.4	6.5
\$9,750-(\$13,450)	0.2	1.1	1.0	1.0	1.0	1.2	0.9	0.4	0.6	0.2	7.5
\$13,450-(\$16,900)	-	0.9	0.9	1.2	1.1	2.0	1.4	0.3	0.8	-	9.0
\$16,900-(\$20,250)	-	0.8	0.8	1.9	1.1	2.1	1.9	0.8	0.9	-	10.4
\$20,250-(\$24,200)	-	0.4	0.7	2.3	1.1	2.5	1.7	0.9	1.4	-	11.1
\$24,200-(\$29,200)	-	0.3	0.4	3.4	0.9	1.9	1.7	1.6	2.2	-	12.7
\$29,200-(\$36,650)	-	-	0.3	3.2	1.0	2.9	1.2	3.0	3.6	-	15.4
\$36,650 and over	-	-	0.5	2.3	0.8	1.7	1.7	5.4	6.3	-	18.7
Total	3.5	5.0	8.7	16.4	8.1	15.3	11.5	12.9	16.3	2.3	100.0

Comparative Figures - Percentage Distribution of:

H'holds	10.8	8.7	12.4	15.0	7.8	12.6	10.4	8.3	10.3	3.7	100.0
Persons	3.6	2.9	8.3	10.0	7.9	16.9	19.0	9.4	18.7	3.4	100.0

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households. Cells with insufficient observations designated (-).

C. DISTRIBUTION OF MONEY-INCOME BENEFITS FROM HEALTH EXPENDITURE

The distribution of government-provided health services is analysed by dividing health expenditure into two main groups - hospitalization and other health care. In 1981/82, of health expenditure (\$1,436.3 million), just over 75 percent was spent for hospitals (\$1,083.1 million) and the remaining amount was spent on non-hospital services (\$353.2 million) and mainly consists of medical benefits (\$269.2 million). Figure 6.6 displays information about central government health (non-market and non-capital) expenditures in 1981/82.

FIGURE 6.6

HEALTH EXPENDITURE, 1981/82
(CENTRAL GOVERNMENT NON-MARKET EXPENDITURE ON HEALTH)

		<u>\$Million</u>
<u>Health Outlays (NZSNA)</u>		
Final Consumption Expenditure		1,121.9
Social Assistance Grants		<u>314.4</u>
Total Health Outlay		<u>1,436.3</u>
<u>Health Outlays Divided Between Hospital and Non-hospital</u>		
Expenditure on Hospitals	1,083.1	
Non-hospital Expenditure	<u>353.2</u>	
		<u>1,436.3</u>
<u>Health Outlays Distributed to Private Households</u>		
Assuming 12.5% of those utilizing health are resident		
permanently in institutions: (87.5%)(1,083.1M) =		947.7
(87.5%)(353.2M) =		<u>309.1</u>
		<u>\$1,256.8</u>

Source: Department of Statistics, NZSNA data.

In the Estimates, information about expenditure by the Department of Health is broken into eight sub-programmes. To impute a household distribution for each one, an estimate is made of non-capital-per-head expenditure by broad age groups. This is done by assuming that age and sex-specific levels of service (as indicated by the 1981 National Health Statistic Centre's census of hospitals) are constant to the levels experienced in March year 1982 (the base year of this thesis).

To derive the appropriate utilisation rates for 1981/82, the 1981 estimates of per head health expenditure are multiplied by the age distribution in 1981/82. The estimated age distribution of the population, by both narrow and broad age bands, is given in Figure 6.7 below.

FIGURE 6.7

ESTIMATED MEAN AGE DISTRIBUTION OF NZ POPULATION
FOR THE YEAR ENDED 31/3/82

Age Group	Male	Female
0-4	127,840	122,490
5-9	145,270	139,080
10-14	156,530	149,630
15-19	155,680	148,870
20-24	139,540	135,240
25-29	121,030	122,380
30-34	119,550	119,550
35-39	98,810	98,140
40-44	87,020	85,990
45-49	75,240	72,430
50-54	78,570	74,400
55-59	73,450	73,440
60-64	60,430	67,230
65-69	52,560	60,700
70-74	39,000	48,930
75-79	23,740	34,750
80-84	11,670	21,320
85-89	4,180	10,580
90-94	1,320	3,930
95-99	250	880
100+	50	120
<u>Summary Age Groupings</u>		
Births	50,025	
0-14	840,880	
15-64	2,006,990	
65+	313,980	

Source: Department of Statistics.

For the sub-programmes concerned with expenditure by hospital boards, private hospitals and Lake Alice Mental Hospital, it is possible to derive estimates for each of the age groups listed in Figure 6.7, as well as maternity. For the other seven sub-programmes, estimates are made in broader summary age groupings in Figure 6.7 and maternity. This latter procedure implies that per capita expenditure within these broad age bands is the same. For example, per capita expenditure on the age

group 15-19 is assumed to be the same as per capita expenditure for the 15-64 group.

The Household Survey does not specifically identify maternity cases. These costs are estimated separately and imputed to individuals of age 0 on the basis that these babies would reside in households where the maternity services were consumed.

C.1: Hospital Expenditure

Central government appropriations to hospital boards are voted by Parliament based on estimates of expected usage for each hospital. Expected usage is primarily a function of the population base served by each hospital board. To project hospital usage for different population bases, Sutton (1984) calculates weightings by age and sex which approximate the proportion of hospital expenditure devoted to these groupings by diagnosis according to the Census taken in 1981. For this thesis, these weightings are further adjusted for the mean age distribution of the population in March year 1982 and used to impute the money-income value of hospital expenditure by household income and household type.

C.1.a: The Derivation of Hospital Utilisation Rates By Age

The cost of hospital treatment varies according to diagnosis (D). There are no specific data on the cost of treatments by age, sex or income. Lacking this data, Sutton applies rough assumptions about the relative costs of the main types of hospital care. For each of the kinds of bed days in the above classifications, relative costs as follows were used:

D1:	general short stay days (surgery)	:	1.00
D2:	general long stay days (long-stay geriatric)	:	0.31
D3:	days spent in mental hospital	:	0.31
D4:	obstetric days	:	1.00

General short-stay days refer to diagnosis for non-obstetric, non-mental surgery where the time spent in hospital by Census night was less than or equal to 29 days. General long-stay days refers to those who on Census night had been in hospital for a period greater than or equal to 30 days. The other two classifications, days spent in a mental hospital and obstetric days, are self explanatory.

Table 6C.1 shows the per head hospital-stay figures which were derived when the relative diagnosis costs were applied to the 1981/82 population. Note that the users of public and private hospitals are not specifically identified in the Household Expenditure Survey. So although the logic of Sutton's approach would treat these population groupings separately, this has not been done. Thus, in essence, the figures for private hospitals indicate public support for them rather than individual consumption of their services. In other words, it is considered that the fact private hospitals are there for emergencies makes them a government-provided service, even for those who never use private hospitals.

Table 6C.1

HOSPITAL UTILISATION RATES
(Weighted Days per Head per Year)

Age Group	Public Hospitals		Private Hospitals	
	M	F	M	F
0-4	0.775	0.650	0.014	0.004
5-9	0.500	0.365	0.018	0.027
10-14	0.543	0.356	0.024	0.014
15-19	0.755	0.598	0.016	0.041
20-24	0.924	0.707	0.041	0.037
25-29	0.839	0.873	0.036	0.071
30-34	0.783	0.918	0.054	0.067
35-39	0.801	0.868	0.040	0.130
40-44	0.817	0.914	0.073	0.147
45-49	1.132	1.149	0.088	0.223
50-54	1.401	1.231	0.141	0.144
55-59	1.929	1.517	0.152	0.178
60-64	2.399	1.678	0.178	0.165
65-69	3.499	2.369	0.264	0.387
70-74	4.088	3.151	0.539	0.745
75-79	5.529	5.009	1.190	1.915
80-84	7.547	7.842	2.510	4.588
85-89	10.551	10.824	5.112	9.513
90-94	15.535	13.899	8.984	16.471
95+	18.700	14.337	13.834	28.342

Sources: Weightings based on Tables C1 and A1 from Projections of Hospital Usage 1983-2016, Department of Health. Table derived for 1981/82 data by Bacica, Department of Statistics.

One difficulty with imputing the money-income value of hospital usage to private households using the utilisation rates above is that a larger than average proportion of those receiving hospital care will be

defined as residents of institutions (hospitals) rather than residents of private households on Census night. Further, it is likely that a major proportion of those resident in hospital will be the elderly.

This thesis adjusts for the first problem by allocating 87.5 percent, instead of 95 percent, of central government hospital spending to private households. This still leaves the question of how to deal with the increasing propensity of the elderly to reside in hospitals or other institutions. The hospital utilisation rates in Table 6C.1 may overstate consumption by those over sixty who are usually resident in private households. If a major proportion of those who are elderly and ill actually are resident in institutions, it could be argued that those remaining in private households will be healthier on average. In addition, the hospital utilisation rates could overstate the money-income value of hospital care to the elderly. This is because, as their hospital stay lengthens, geriatric patients may require even more custodial care and even less costly medical attention than reflected in the diagnostic weightings used to derive Table 6C.1.

Lacking data which deals precisely with these questions, the method adopted in this thesis is to see how sensitive the results are to different assumptions. The different assumptions are as follows:-

- Case 1 Assumes that the hospital utilisation ratios in Table 6C.1 properly reflect the distribution of the money-income value of hospital expenditure by age;
- Case 2 Assumes that the propensity to reside in hospitals is greater for those over sixty. To adjust for the lower propensity of the non-healthy over 60 to reside in private households and the likely reduction in medical costs (greater propensity of those over 60 to require largely custodial care), hospital utilisation rates in Table 6C.1 are multiplied by 0.80. This weighting was arrived at through rough calculations by Sutton.
- Case 3 Assumes that the proportion of those resident in hospitals instead of private households is an increasing function of age and that the hospital utilisation rates overstate the money-income value of hospitalisation to those over sixty in private households. To adjust for this, weights for those over sixty are adjusted in a linear fashion. In other words, the hospital utilisation rates in Table 6C.1 for the 60-64 age group were divided by 1.125, weights for the 65-69 were divided by 1.250, weights for 75-79 were divided by 1.500 and so on up to those over 95 whose weights were divided by 2.000.

CHART 6.5

EQUALITY OF DISTRIBUTION OF HOSPITAL EXPENDITURE BETWEEN
CASES 1 AND 2 : LORENZ DIAGRAM OF RELATIVE EQUALITY

C.1.b: Hospital Expenditure by Household Type and Income Group

The above assumptions make very little difference to the results. Chart 6.5 shows that in either of the extreme cases (Case 1 and Case 2), the consumption of hospital services is relatively equal with 10 percent of households in each market income group consuming about 10 percent of hospital expenditure. As summarised by Table 6C.2 on the next page, however, hospital expenditure is heavily distributed in favour of national-superannuitant households in all three cases.

The average annual money-income value of hospital expenditure for occupants of a one-adult, national-superannuitant household is \$1100, based on Case 1 assumptions. This compares with an average money-income value of \$180 per occupant of one-adult households with children.

Table 6C.2

HOSPITAL EXPENDITURE BY DIFFERENT HOUSEHOLD TYPES:
THREE CASES COMPARED USING 1981/82 DATA

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
Block A: <u>Average Hospital Expenditure Per Household (\$s per year)</u>											
Case 1	1100	320	1500	510	860	850	960	1100	1200	500	920
Case 2	960	330	1300	540	920	920	1000	1100	1300	530	920
Case 3	970	330	1400	540	910	910	1000	1100	1300	520	920
Block B: <u>Average Hospital Expenditure Per Person (\$s per year)</u>											
Case 1	1100	320	760	260	290	210	180	310	220	180	310
Case 2	960	330	670	270	310	230	190	320	230	190	310
Case 3	970	330	690	270	300	230	190	320	230	190	310
Block C: <u>Total Hospital Expenditure Per Income Group (\$M)</u>											
Case 1	124	29	194	79	69	111	104	91	128	19	948
Case 2	107	30	171	84	75	120	112	92	136	20	948
Case 3	108	30	176	84	74	119	111	92	135	20	948
Block D: <u>Percentage Distribution of Hospital Expenditure by Household Type (%)</u>											
Case 1	13.0	3.1	20.5	8.4	7.3	11.7	10.9	9.6	13.5	2.0	100.0
Case 2	11.3	3.1	18.1	8.9	7.9	12.7	11.9	9.7	14.3	2.1	100.0
Case 3	11.4	3.1	18.6	8.8	7.8	12.6	11.7	9.7	14.2	2.1	100.0
Block E: <u>Comparative Figures - Percentage Distribution of:</u>											
H'holds	10.8	8.7	12.4	15.0	7.8	12.6	10.4	8.3	10.3	3.7	100.0
Persons	3.6	2.9	8.3	10.0	7.9	16.9	19.0	9.4	18.7	3.4	100.0

Source: See text for discussion of the derivation of this table.

Block D of Table 6C.2 shows the percentage distribution of hospital expenditure by household type. The greatest share goes to two-adult

national-superannuitant households who make up 12.4 percent of households but are estimated to consume 20.5 percent of central government hospital expenditure in 1981/82. On the other hand, one-adult households with children who are estimated to consume 2.0 percent of hospital expenditures represent 3.7 percent of households.

Table 6C.3

DISTRIBUTION OF HOSPITAL EXPENDITURE BY HOUSEHOLD MARKET INCOME RANGE:
THREE CASES COMPARED USING 1981/92 DATA

Household Market Income (\$ p.a.)	CASE 1			CASE 2			CASE 3		
	Amount per H'hold \$ p.a.	Total per Group \$M	% of Total	Amount per H'hold \$ p.a.	Total per Group \$M	% of Total	Amount per H'hold \$ p.a.	Total per Group \$M	% of Total
Less Than \$250	1200	124	13.1	1100	113	11.9	1100	113	11.9
\$250-(\$3,950)	1100	119	12.5	1000	106	11.2	1000	107	11.3
\$3,950-(\$9,750)	1000	103	10.9	950	99	10.4	960	99	10.5
\$9,750-(\$13,450)	820	84	8.9	840	86	9.1	840	87	9.1
\$13,450-(\$16,900)	870	90	9.5	890	92	9.7	890	92	9.7
\$16,900-(\$20,250)	830	86	9.0	860	89	9.4	860	89	9.4
\$20,250-(\$24,200)	800	82	8.7	850	88	9.3	840	87	9.2
\$24,200-(\$29,200)	760	79	8.3	800	83	8.8	800	83	8.8
\$29,200-(\$36,650)	770	80	8.4	810	84	8.9	810	84	8.9
\$36,650 and over	980	101	10.7	1000	108	11.3	1000	107	11.3
	920	948	100.0	920	948	100.0	920	948	100.0

Note: Case One is the Standard Case in this thesis. Source: See text for a discussion of the derivation of this table.

When the information about hospital expenditure is tabulated by household income group (see Table 6C.3), there is a tendency for the share of expenditure to reduce as household income increases. This tendency is borne out in all three cases. The existence of national-superannuitant households in the lowest income group causes the share of expenditure to be greatest for these groups. The share of hospital expenditure estimated to be consumed by the upper 10 percent of households is also greater than 10 percent, but this reflects the greater number of occupants in these households. Although the average money-income value of hospital expenditure per high-income household is as high or higher than the average for the other income groups, the average per occupant is similar.

CHART 6.6

HOSPITAL EXPENDITURE SHARES (CASES 1 AND 2) COMPARED WITH
SHARES OF COLLECTIVE EXPENDITURES AND MONETARY BENEFITS FOR
1981/82 BY HOUSEHOLD MARKET INCOME DECILE

The shares of hospital expenditure by household market income group are remarkably equal under both Case 1 and Case 2 conditions, as can be seen from Chart 6.6. The estimated distribution of hospital expenditures is certainly more equal than the estimated distribution of collective expenditures and monetary benefits.

Gillespie (1966) derives similar results for Canada, but that is because, in the absence of data showing the distribution of hospital patients by income class, he assumes that hospital care costs are "randomly" distributed by household income class. In contrast, Musgrave et al (1974) use patient data for the United States and find the majority of government-provided hospital services are consumed by the lower income groups.

C.2: Non-hospital Health Services

Central government expenditures on health services other than hospitals are also detailed in the Estimates. However, there are little data available about the consumers of non-hospital health services. To begin with, there are no data equivalent to the National Health Census. Sutton (1984) estimates age-specific per capita expenditure on each sub-programme of Vote Health 1979/80 for the broad age groups 0-14, 15-64, 65 and older, and for maternity (obstetric). These are then applied as relative expenditures, and similar equations to those in

Section C.1.a above are applied to get per capita estimates for 1981/82 for the broad age groups. Table 6C.4 shows the results.

Table 6C.4

PER CAPITA VOTE HEALTH EXPENDITURE IN 1981/82 BY AGE
(Excluding Hospital Services and Capital)

	Birth	0-14	15-64	65+
\$ Per Person Per Year				
Programme I : Administrative Services				
Administration	14.656	1.935	2.342	10.549
Research & Planning	2.139	0.284	0.342	1.540
Programme II : Dental Services				
Administration	-	0.239	0.016	-
Dental Benefits ^a	-	3.826	2.691	-
Dental Nurse	-	2.719	-	-
School Dental	-	25.539	-	-
Programme IV : Welfare Services				
Welfare	-	-	-	3.907
Programme V : Medical Research				
Medical Research	-	2.125	2.123	2.126
Programme VI : Medical & Pharmaceutical Services				
Administration	0.951	0.360	0.371	1.249
Medical Benefits ^a	172.531	65.038	67.120	226.639
Postgrad	-	0.670	0.670	0.670
Programme VII : Public Health & Environmental Protection				
Administration	-	0.634	0.263	0.253
Disease Prevention	-	0.778	0.311	0.313
Environmental Health	-	1.269	1.269	1.269
Family Health	-	14.648	0.803	-
Food/Nutrition	-	0.440	0.440	0.456
Health Education	-	0.321	0.321	0.320
Occupational Health	-	0.021	0.462	0.023
Public Health Nursing	-	8.014	1.385	2.012
Scientific Services	-	1.082	1.082	1.083
Programme VIII : Data Processing Services				
Administration	4.475	0.325	0.574	2.651
Computer Centres	2.905	0.210	0.372	1.716
Terminal Networks	1.122	0.081	0.142	0.660
TOTAL (Non-Hospital)	198.779	130.557	83.099	257.436

Notes: a) Social Assistance Grants. This table is consistent with the Central Government current income and outlay account. Sources: Information about government non-hospital spending from The Estimates of Expenditures (1983). Per capita figures based on Sutton (1984). Bacica of the Department of Statistics adjusted the figures for 1981/82 data.

Table 6C.5

1981/82 CENTRAL GOVERNMENT NON-HOSPITAL HEALTH SERVICES
FOR PRIVATE HOUSEHOLDS BY RANGE OF
HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil-	Chil-		
								dren	dren		
As a Proportion of the Total for all Cells (%)											
Less than \$250	2.7	0.3	2.8	0.3	0.3	0.3	0.5	-	-	1.6	9.1
\$250-(\$3,950)	2.7	0.3	3.8	0.2	0.2	0.3	0.3	-	-	0.6	8.7
\$3,950-(\$9,750)	1.1	0.4	2.4	0.4	0.8	1.3	1.5	0.4	0.6	0.5	9.3
\$9,750-(\$13,450)	0.2	0.5	1.3	0.6	1.2	1.9	2.1	0.4	0.7	0.3	9.1
\$13,450-(\$16,900)	-	0.3	0.8	0.7	1.1	2.8	2.9	0.4	1.1	-	10.4
\$16,900-(\$20,250)	-	0.2	0.6	0.9	1.1	2.4	3.1	0.7	1.2	-	10.4
\$20,250-(\$24,200)	-	0.1	0.3	1.1	0.9	2.8	3.0	0.6	1.9	-	10.8
\$24,900-(\$29,200)	-	0.1	0.3	1.4	0.7	1.8	2.1	0.8	2.7	-	10.1
\$29,200-(\$36,650)	-	-	0.3	1.2	0.7	1.7	1.4	1.6	3.0	-	10.0
\$36,650 or Over	-	-	0.3	0.7	0.5	1.2	1.8	2.5	5.0	-	12.0
Distribution by Household Type	7.0	2.3	13.0	7.5	7.6	16.4	18.9	7.6	16.5	3.4	100.0

Sources: Derived by Bacica based on Sutton (1984) using the 1981 National Health Statistics Centre's Census of Hospitals, mean population estimates, data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households. Cells with insufficient observations designated (-).

Table 6C.5 tabulates the distribution of non-hospital health expenditures using the information of per capita expenditure by age derived in Table 6C.4. A comparison of Table 6C.5 with Table 6C.2 (Block D), shows that households with children are bigger consumers of non-hospital health care than of hospital services. One-adult and two-adult national-superannuitant households also receive a greater share of non-hospital health expenditure than their share of the population. They are estimated to receive 20.0 percent of the money-income value of non-hospital health expenditure, while accounting for 11.9 percent of total persons.

Two-adult households with three or more children are estimated to consume the largest share of non-hospital health expenditure. Their share is 18.9 percent, according to the bottom row of Table 6C.5. This share does not look so large when it is recognised that two-adult households with three or more children contain 19.0 percent of the population of occupants of private households.

Turning to the distribution of central government non-hospital health spending by household-market-income group (see final Column of Table 6C.5), it looks fairly even at first sight. All except the upper household-market-income decile (which receives the largest share of 12.0 percent) are estimated to receive roughly 9 or 10 percent of the money-income value of this type of expenditure.

As Table 6C.6 shows, the picture changes when the distribution of non-hospital-health spending (Column A) is compared with the proportion

Table 6C.6

NON-HOSPITAL HEALTH SERVICES FOR PRIVATE HOUSEHOLDS BY RANGE OF HOUSEHOLD MARKET INCOME : SOME SELECTED COMPARATIVE DATA FOR 1981/82

Household Market Income (\$ p.a.)	Money-income Value of Non-Hosp. Health							
	The Distribution of:			As a Percentage of:			Average Dollars	
							Per Year Per:	
	Non- Hosp	Hse- Holds	Per- sons	Market Income	Total Income	Expend- iture	Per- son	House- hold
	A	B	C	D	E	F	G	H
	As a Proportion of the Total (%)						\$ Per Year	
Less Than \$250	9.1	10.0	6.2	-	4.8	4.3	150	270
\$250-(\$3,950)	8.7	10.0	5.8	16.0	3.6	3.4	150	260
\$3,950-(\$9,750)	9.3	10.0	8.1	3.9	2.7	2.6	110	280
\$9,750-(\$13,450)	9.1	10.0	9.2	2.3	2.0	2.3	99	270
\$13,450-(\$16,900)	10.4	10.0	10.8	2.1	1.9	2.2	97	310
\$16,900-(\$20,250)	10.4	10.0	11.0	1.7	1.6	1.8	94	310
\$20,250-(\$24,200)	10.8	10.0	11.8	1.5	1.4	1.8	91	320
\$24,200-(\$29,200)	10.1	10.0	11.4	1.1	1.1	1.5	88	300
\$29,200-(\$36,650)	10.0	10.0	11.7	0.9	0.9	1.2	85	300
\$36,650 and over	12.0	10.0	14.0	0.7	0.9	1.2	86	360
Total	100.0	100.0	100.0	1.6	1.4	1.9	100	300

Sources: Derived by Bacica based on Sutton (1984) using the 1981 Census of Health, mean population estimates, the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

of persons in each income group (Column C). Only the bottom three household-market-income brackets consume a share of non-hospital health greater than their share of occupants, according to Table 6C.6. For example, the lowest-income group includes 6.2 percent of total persons who consume an estimated 9.1 percent of the money-income value of non-hospital health expenditure. In comparison, the highest income bracket only consumes an estimated 12.0 percent of this form of health expenditure but contains 14.0 percent of the persons resident in private households in 1981/82. The differences between the household and personal distribution of non-hospital health services are compared by Columns G and H of Table 6C.6.

C.3: The Distribution of Total Health Expenditure: Conclusion

Government-provided health services appear to be the most evenly distributed of all of government's major expenditure functions. Table 6C.7 below combines the results derived in Section C.1 for hospitals with the results in Section C.2 for non-hospital health expenditure to derive the distribution of the money-income value of total current central government health expenditure by household market-income decile in 1981/82.

Table 6C.7

**CENTRAL GOVERNMENT HEALTH EXPENDITURES CONSUMED BY PRIVATE HOUSEHOLDS:
THE ESTIMATED DISTRIBUTION AND AVERAGE MONEY-INCOME VALUE
BY RANGE OF HOUSEHOLD MARKET INCOME IN 1981/82**

Household Market Income \$ pa	Percentage Distribution of Total Health Consumption			Average Health Consumption Per Household per Annum		
	Case 1 (%)	Case 2 (%)	Case 3 (%)	Case 1 (\$)	Case 2 (\$)	Case 3 (\$)
Less than \$250	12.1	11.2	11.2	1500	1400	1400
\$250-(\$3,950)	11.6	10.6	10.7	1400	1300	1300
\$3,950-(\$9,750)	10.5	10.2	10.2	1300	1200	1200
\$9,750-(\$13,450)	9.0	9.1	9.1	1100	1100	1100
\$13,450-(\$16,900)	9.7	9.9	9.9	1200	1200	1200
\$16,900-(\$20,250)	9.4	9.6	9.6	1100	1200	1200
\$20,250-(\$24,200)	9.2	9.7	9.6	1100	1200	1200
\$24,900-(\$29,200)	8.7	9.1	9.1	1100	1100	1100
\$29,200-(\$36,650)	8.8	9.2	9.1	1100	1100	1100
\$36,650 or Over	11.0	11.5	11.4	1300	1400	1400
TOTAL	100.0	100.0	100.0	1200	1200	1200

Sources: Combines Tables 6C.3 and 6C.6. See text for explanation.

Table 6C.7 displays the results derived according to the three cases for allocating hospital expenditure (see Section C.1.a. for assumptions). The distribution in all three cases is slightly U-shaped, with the largest shares going to the two bottom-most and the upper-most deciles of households. The difference between the highest average health expenditure per household per year (\$1,500) and the lowest (\$1,100) is just over a third.

When the distribution of the money-income value of health expenditure is analysed in relation to the distribution of persons occupying private households, it appears to be more heavily distributed in favour of the three low income groups. Columns A and B of Table 6C.8 compare the distribution of persons with the distribution of total health expenditure in Case 1.

Table 6C.8

**CENTRAL GOVERNMENT HEALTH EXPENDITURES (CASE 1)
CONSUMED BY PRIVATE HOUSEHOLDS BY RANGE OF HOUSEHOLD MARKET INCOME
IN 1981/82 : SOME SELECTED COMPARISONS**

Household Market Income (\$ p.a.)	Money-Income Value of Health Services					
	Distribution of:		As a Percentage of:			Average Value Per Person p.a.
	Total Health (Case 1)	Persons in Privt H'holds	Market Income	Total Income	H'hold Income Expend- iture	
	A	B	C	D	E	F
	%	%	%	%	%	\$
Less than \$250	12.1	6.2	a	26.0	23.0	790
\$250-(\$3,950)	11.6	5.8	86.0	19.0	18.0	810
\$3,950-(\$9,750)	10.5	8.1	18.0	12.0	12.0	520
\$9,750-(\$13,450)	9.0	9.2	9.3	8.1	9.1	400
\$13,450-(\$16,900)	9.7	10.8	7.8	7.1	8.2	370
\$16,900-(\$20,250)	9.4	11.0	6.1	5.7	6.8	340
\$20,250-(\$24,200)	9.2	11.8	5.1	4.9	6.3	320
\$24,900-(\$29,200)	8.7	11.4	4.0	3.8	5.2	310
\$29,200-(\$36,650)	8.8	11.7	3.3	3.2	4.3	300
\$36,650 or Over	11.0	14.0	2.7	2.6	4.4	320
TOTAL	100.0	100.0	6.5	5.8	7.5	400

Note: a) Market income is negative for this group because of losses.

According to Table 6C.8, none of the upper seven household-income deciles is estimated to consume a share of government-provided health as great as the share of people in that decile. This result is particularly interesting, given that the method of imputing health consumption is by **household occupants** according to age (not by income). Since the population of persons is larger for the upper income groups, it is surprising that their share of health expenditure is not larger.

The value of health services consumed by low-income households seems even more pronounced when seen in relation to other income and consumption patterns. As Columns C through E of Table 6C.8 indicate, the money-income value of government-provided health is a substantially larger proportion of market income, total income and household expenditure for the three lowest income groups than it is for the other seven groups. The final Column of Table 6C.8, Column F, shows that the average money-income value of government-provided health per person tends to decline as household income increases.

C.3.a: Total Health Distributed By Income Group : Conclusion

Compared with the distribution of social welfare expenditures and collective goods, the distribution of the money-income value of health expenditure is more evenly spread among household income groups. The conclusion of the approach outlined in this section, however, is that the impact effect of central government health spending is to redistribute resources to the bottom income groups. This result emerges when health consumption is analysed per person. There are fewer occupants, on average, in the households in the lower income groups.

The main factor shaping the distribution of health spending is the large proportion of national superannuitants in the lower household-income deciles. The majority of health spending is for hospital services and those over 60 take up a large proportion of bed-days in hospital. About 70 percent of private-household occupants aged 60 or over are in the three lowest household-market-income deciles. Nearly 60 percent of the households in the three lowest household-market-income deciles are either one-adult or two-adult national-superannuitant households.

C.3.b: Health Consumption By Household Type

The proportion of health services estimated to be consumed by national-superannuitant households is very high in relation to their share of the population. This is shown by Table 6C.9 below (see especially Block D and Block E, "Persons").

Table 6C.9
CENTRAL GOVERNMENT HEALTH EXPENDITURE BY DIFFERENT HOUSEHOLD TYPES
IN 1981/82 : THREE CASES COMPARED

Household Market Income (\$ p.a.)	Household Type											
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n		All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With			
	Sup		Sup					Chil- dren	Chil- dren			
<u>Block A: Average Health Expenditure Per Household (\$s per year)</u>												
Case 1	1300	400	1800	660	1100	1200	1500	1300	1700	770	1200	
Case 2	1200	410	1600	690	1200	1300	1600	1300	1700	810	1200	
Case 3	1200	410	1700	690	1200	1300	1600	1300	1700	800	1200	
<u>Block B: Average Health Expenditure Per Person (\$s per year)</u>												
Case 1	1300	400	900	328	383	310	276	390	310	276	406	
Case 2	1200	410	800	344	403	327	291	397	324	295	406	
Case 3	1200	410	750	344	399	325	287	397	322	286	406	
<u>Block C: Total Health Expenditure For All Households By Household Type (\$M)</u>												
Case 1	145	36	234	103	93	162	162	114	179	29	1257	
Case 2	129	37	211	107	98	171	171	116	187	31	1257	
Case 3	130	37	216	107	97	170	169	116	186	30	1257	
<u>Block D: Percentage Distribution of Health Expenditure (%)</u>												
Case 1	11.6	2.9	18.6	8.1	7.4	12.9	12.9	9.1	14.2	2.3	100.0	
Case 2	10.3	2.9	16.8	8.5	7.8	13.6	13.6	9.2	14.8	2.4	100.0	
Case 3	10.3	2.9	17.2	8.5	7.7	13.5	13.5	9.2	14.8	2.4	100.0	
<u>Block E: Percentage Distribution of: (%)</u>												
H'holds	10.8	8.7	12.4	15.0	7.8	12.6	10.4	8.3	10.3	3.7	100.0	
Persons	3.6	2.9	8.3	10.0	7.9	16.9	19.0	9.4	18.7	3.4	100.0	

Sources: Combines Tables 6C.2 and 6C.5. See text for derivation.

One-adult and two-adult national superannuitant households only account for 11.9 percent of the occupants of private households in 1981/82, but it is estimated that they consume 30.2 percent of government-provided health services, given the Case 1 conditions (see Block D, Table 6C.9). The Case 1 money-income value of the average-single-adult, national-superannuitant's health consumption is \$1,300 a year, over three times that of occupants of other non-national-superannuitant household types. Contrasted with this are one-adult households with children who are estimated to consume an average of under \$300 per occupant. This group received a 2.3 or 2.4 percent share of health expenditure according to block D, but contains 3.4 percent of persons in private households.

Clearly, the results suggest that the consumption of government health services by national-superannuitant households is considerable. It is possible, however, that their consumption is even greater than suggested by the results of the approach followed in this section. Different assumptions have been tested to ensure that the value of hospitalisation consumed by those over 60 is not over-stated.

As highlighted by these results, an important area of further research is the cost of providing hospital care to the elderly. It is known from the Census and Household Survey data report that the majority of those over 60 are in the lower market income groups. An important area of research is to determine if the assumptions of relative costs, where long stay costs are assumed to be about 31 percent of general hospitalisation costs (see Section 6.C.1.a), are realistic.

Further research about the consumption of health is required because the implications for income redistributive policy are great. The results in this thesis suggest that health expenditure is less redistributive than social welfare policies, where the goal is to achieve a more equal distribution of household incomes by concentrating government expenditure on the lower household-market-income groups. Even so, the share of health expenditures consumed by the lower income groups is higher than the share of most other expenditures. Furthermore, one aim of redistributive policy is to assist those over 60 and it appears that health expenditure is a candidate for assisting in the achievement of that aim.

D. EDUCATION EXPENDITURE

This section is devoted to an assessment of the distribution of the money-income value of direct educational expenditures by households. Direct (specific or private) benefits from education are defined as the value to the student of attending a government-funded educational institution. In 1981/82, government current expenditure on education amounted to \$1,364.5 million, 14.3 percent of total central government non-market outlays.

Not considered in this section is the tax expenditure for education provided by the personal income tax. The contribution of funds for schools is encouraged by a tax deduction for school fees and donations. This deduction is taken into account when deriving the distribution of personal income tax payments in Chapter Five.

In 1981/82, the New Zealand government had direct control, as the sole or main supplier of funds, of over 90 percent of all primary schools, 72 percent of all secondary schools and more than 90 percent of tertiary educational establishments as well as pre-schools. It also directly funds private schools operated through the Catholic Church educational system and other approved independent schools.

Education is also provided to the agricultural sector through Vote Agriculture and Fisheries. This may also provide indirect economic benefits to the population as a whole. However, the direct benefits to the farmer come in the form of increased income. In NZSNA terms the educational expenditure on the farm sector was \$1.5 million in 1981/82. This is distributed among households whose occupants list farming as their chief occupation and is included in the discussion in Section F of the Chapter.

The Maori population receives the direct benefit of vocational training administered by the Department of Maori Affairs. In 1981/82, total expenditure for this was \$3.4 million. The Census provides information about ethnic affiliation and this expenditure is distributed to non-family benefit individuals over 15 who are not fully employed.

D.1: Distribution of Educational Expenditures by Household Income Group

It is assumed that educational expenditures are consumed by the students being educated. The money-income value of education is allocated to students, depending on their stage of schooling, as determined by their age.

The 1981 Census surveyed attendance at educational institutions, as well as the income of students. Unfortunately, this information could not be easily linked with the 1982 Household Survey data, which are the basis of most of the derivations of the money-income value of central government income and outlays in this thesis. There were three main reasons for this:

- 1) the income information in the census was not collated into household units;
- 2) 1981/82 household incomes were higher than in 1981 when the Census was taken; and
- 3) with changes in the age distribution over the year, students would have moved ahead at school.

Lacking the precise information needed to identify the value of education consumed by household income group, age is the proxy used to impute the money-income value of education to the consumers of education. As a first step, education expenditure is classified by the level of schooling. This is achieved using the information included in the Estimates Vote Summary for the Department of Education.

Figure 6.8 classifies educational expenditures by programme as listed by the Vote, Department of Education. It shows the adjustments necessary to make the information consistent with the NZSNA definitions of education outlay. Capital is excluded from the current outlay account, as are receipts. The relevant figures for this thesis are from Column D of Figure 6.8 and are an account of net non-capital government education expenditure.

About 85 percent of education (non-capital) expenditure can be attributed to specific consumers (students) and thus fits with the definition of private benefit. The rest is distributed in proportion to the consumers who are specifically identified.

FIGURE 6.8

EXPENDITURE UNDER VOTE EDUCATION IN 1981/82
(Adjustments to the Estimates to Exclude Capital and
to Make Consistent with NZSNA [\$ Million])

	Current (A)	Capital (B)	Receipts (C)	Net Non- Cptl (D)	Total (B+C+D)
Programme 1 : Administration and General					
Administration	19.7	.4			
Examinations/Research	4.7	-			
	24.5	.4	6.5	18.0	24.9
Programme 2 : Pre-school					
Administration	.8	-			
Kindergartens	17.8	.8			
Playcentres & Oth Pre-School	1.1	.4			
	20.2	1.2	neg	20.2	21.4
Programme 3 : Education Support Services					
Administration	2.3	-			
School Inspection	6.3	-			
Guidance	18.4	-			
Curriculum Development	5.0	.1			
Transport	36.8	.8			
Recruitment of Teachers	.2	-			
	68.9	.9	.1	68.8	69.8
Programme 4 : Operation of Schools					
State Primary	447.7	4.4		447.7	
State Secondary	331.5	2.7		331.5	
Private	55.2	.6		55.2	
Special & Correspondence	37.1	.2	2.4	34.6	
School Buildings	-	76.7		-	
	871.4	84.6	2.4	869.0	956.0
Programme 5 : Teacher Education					
Administration/Building	.2	2.3			
Pre-Service	56.7	.2			
In-Service	3.7	2.3			
	60.7	2.5	.8	59.9	63.2
Programme 6 : Senior Technical and Community Education					
Administration/Building	.9	14.6			
Technical Institutes	87.0	3.2			
Student Assistance	7.3				
Continuing Education	9.0	-			
	104.2	17.8	.7	103.6	122.1
Programme 7 : University Education					
Administration/Building	182.1	23.9			
Student Assistance	30.1	-			
	212.2	23.9	-	212.2	236.1
Sub-Total					
	1,362.2				
Programme 8 : National Library					
	9.6	.7	.2	9.5	10.4
TOTAL					
	1,371.8	132.0	10.7	1361.2	1,503.8

Figure 6.9. summarises the information from Figure 6.8 and lists the assumptions made for allocating the education expenditures to households.

Programme 1 (Administration and General), Programme 3 (Education Support Services), Special and Correspondence under Programme 4 and Programme 5 (Teacher Education) are assumed to be of collective benefit to the consumers of education and are distributed to those consuming education in relation to the amount of education they consume. Programme 8, the National Library, is considered to be a collective good and as such has been already imputed to household income groups in Section B of this Chapter.

FIGURE 6.9
EDUCATION EXPENDITURES BY LEVEL OF EDUCATION IN 1981/82

	Amount in Estimates	How Allocated
	\$ Million	
Pre-School	20.2	Children 3 or older but less than 5;
State Primary	447.7	Children 5 or older but less than 13;
State Secondary	331.5	Children 13 or older but less than 18;
Private	55.2	Private school students, identified in Household Survey;
Technical Education ^a	103.6	) Those listing themselves as students in 1981 Census;
University Education ^b	<u>212.2</u>	
General Education - Prog 1	18.1	) Distributed in relation to distribution of other educational expenditures
Consumption - Prog 3	68.6	
- Spec & Cor	34.6	
- Prog 5	<u>59.8</u>	
	181.4	
National Library	9.5	Collective good (see Section B, Chapter Six)
	<u>1,361.2</u>	
	(1,374.1) ^c	

Notes: a) \$7.3 million technical schools bursaries. b) \$30.1 million university bursaries. Total bursaries in 1981/82 were \$37.4 million. c) difference between NZSNA definition explained by Health \$0.4 million; Maori Affairs \$3.5 million; Ag & Fish \$1.5 million. Sources: 1983 Estimates and Figure 6.8.

FIGURE 6.10

ATTENDANCE AT A TERTIARY INSTITUTION
BY AGE GROUPS AND SEX IN 1981 CENSUS

Age	Male			Female		
	(A) Attending	(B) Tot. Pop	Ratio A/B	(C) Attending	(D) Tot. Pop	Ratio C/D
15	135	(30192)	.0045	180	(28800)	.0063
16	1398	(30978)	.0451	1458	(29400)	.0496
17	4917	(31731)	.1550	4971	(30354)	.1638
18	9516	(32205)	.2955	7530	(30984)	.2430
19	9144	(31713)	.2883	7110	(30279)	.2348
20-24	23388	(137421)	.1702	15747	(132216)	.1191
25-44	21291	(418254)	.0509	18741	(418161)	.0448
45-59	2829	(227322)	.0124	3729	(220554)	.0169
60+	1050	(19052)	.0551	1161	(245619)	.0047
	73668			60627		

Note: Total students equalled 134,295. Sources: Department of Statistics: 1981 Census, Volume 6, Table 7; Volume 2, Table 4.

To distribute the money-income value of tertiary education, 1981 Census information is used to calculate the ratio of the number of students to the population of all those of the same age and sex. These are recorded in Figure 6.10 above. These ratios are then applied to the age population derived for the 1982 year at the base of this thesis (see Figure 6.6).

Note that the above data cannot to be directly related to household income. This means it is not possible to analyse questions such as whether tertiary education is consumed in greater amounts by students from households with above-average income.

The estimated distribution of total education consumption is shown by Table 6D.1. Because the number of children is an increasing function of income (see Table 6A.2), it is predictable that the share of education is an increasing function of income. Another factor here is the likelihood that the average age of children will rise as household incomes increase. Since the provision of education becomes costlier at each higher level of education, the money-income value imputed increases with the age of the student.

Table 6D.1

ESTIMATED DISTRIBUTION OF EDUCATION CONSUMPTION IN 1981/82
BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
As a Proportion of the Total for All Households (%)											
Less than \$250	0.0	0.0	0.1	0.0	0.2	0.4	0.6	-	-	2.4	4.0
\$250-(\$3,950)	0.1	0.1	0.1	0.1	0.3	0.3	0.5	-	-	1.2	2.9
\$3,950-(\$9,750)	0.0	0.1	0.1	0.4	0.5	0.9	2.4	0.5	1.0	0.9	6.9
\$9,750-(\$13,450)	0.0	0.2	0.1	0.3	0.7	1.7	3.0	0.4	0.9	0.5	7.8
\$13,450-(\$16,900)	-	0.2	0.1	0.4	0.7	2.6	3.9	0.4	1.8	-	10.3
\$16,900-(\$20,250)	-	0.2	0.1	0.5	0.7	3.3	5.1	0.7	1.6	-	12.3
\$20,250-(\$24,200)	-	0.1	0.0	0.6	0.8	3.5	4.5	0.6	2.7	-	13.1
\$24,900-(\$29,200)	-	0.0	0.0	0.9	0.7	2.5	3.9	0.8	4.0	-	13.0
\$29,200-(\$36,650)	-	-	0.0	0.8	0.6	2.6	2.9	1.5	5.2	-	13.6
\$36,650 or Over	-	-	0.0	0.3	0.4	1.7	3.1	2.3	8.4	-	16.2
TOTAL	0.2	1.0	0.6	4.4	5.5	19.4	29.9	7.2	26.0	5.8	100.0

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households. Cells with insufficient observations designated (-).

These results illustrated as Table 6D.1, differ markedly from those of Gillespie (1965, 1966) and those of Musgrave et al (1973, 1974). Gillespie finds that in Canada, the lower income groups consume the greater share of education expenditures, while Musgrave et al find that in the United States, it is the middle income groups which consume the largest shares. All these studies assume (as this one does) that education consumption should be allocated to households by the distribution of students. This suggests that the distribution of students differs in Canada, the United States and New Zealand. In particular, it appears that the average number of children per household is not an increasing function of income in the former two countries.

It is not surprising, given the approach used to impute education to households, that households with children, especially those with two or more, account for by far the largest share of education expenditure.

more, account for by far the largest share of education expenditure. What is surprising is the share of education consumed by one-adult households with children. Education is one of the few expenditures (besides the domestic purposes benefit) which is shown to be distributed in favour of this group, based on the approach adopted in this thesis. Solo parent households account for 3.7 percent of households and 3.4 percent of persons and are estimated to receive 5.8 percent of the money-income value from 1981/82 educational expenditure.

In evaluating the results in this thesis, it must be recognised that the value of education per student depends on many things which may not be reflected simply by data about the cost of education at different levels. For example, an issue which has concerned New Zealand educationalists is who benefits from tertiary education and who should pay for it. Figure 6.10 shows that about a quarter of 18 and 19 year olds attend tertiary institutions. Although it is commonly believed that these students are likely to come from high income households, the research in this thesis has not covered this issue since **age** rather than **income** is the distributor.

Another issue related to the distribution of education concerns the delivery of education to those in rural areas:

"An inescapable consequence of population distribution is that educational administrators find it easier to assemble classes, to supply teachers, and to provide facilities and supportive services in centres where population density is relatively high... from the earliest days of colonial education, rural parents have felt that the schooling available in country districts was inferior and have suffered from an ... anxiety lest their children should be educationally disadvantaged". (Educational Development Conference, 1974, p. 209).

Besides the location of the school, other important determinants of the value of education consumed by students include the types of courses offered at the school (science, agriculture, arts, typing), the number of students per teacher, whether the school is a model or normal school and, indeed, whether the school is in a low-income or high-income neighbourhood. These are areas for further research.

E. INTEREST PAID BY GOVERNMENT TO HOUSEHOLDS

A central government outlay of growing importance is interest payments. In 1981/82, internal and external interest payments accounted for 13.2 percent of total government outlays. Internal and external interest payments combine to make up the fifth largest expenditure item in that year. In more recent years, the central government expenditure on interest has exceeded its outlays for health and education. Figure 6.11 below displays figures for interest concessions and savings, as well as internal and external payments in 1981/82.

FIGURE 6.11
1981/82 CENTRAL GOVERNMENT INTEREST PAYMENTS ANALYSED BY
FUNCTION AND ASSUMPTIONS FOR IMPUTATION

Function	Amount (\$ Million)	How Allocated (Chapter Section in Brackets)
Interest Concessions		
Ag and Fish (Rural Bank)	15.5	Farmers (Section F)
Housing	34.8	First home buyers (F)
Maori Affairs	4.0	Maoris (F)
Miscellaneous	10.0	General good (B)
Savings		
		(402.1) Household savings (E)
Interest		
Internal Payments		
NZ Debt Services	787.7	Savings (E)
Share acquisitions etc in ADB and IBRD	2.6	
Security encashment IMF	55.0	
International Finance Agreement	1.2	845.5
External Payments (Overseas Debt Services)		
	416.3	General Benefit (B)
	<u>1,261.8</u>	

Amount Allocated in Table 6E.1 is 95% of internal payments less savings = \$845.5M - \$402.1M = \$443.4M x 95% = \$421.3M (M = Million). Source: 1981/82 Department of Statistics NZSNA Central Government Income and Outlay Account.

This section examines the distribution of interest payments by households in a very approximate manner. Given the importance of the

government's choice of debt servicing as part of its monetary policy and the rise in interest outlays in recent years, this is an area requiring further research. In particular, the recognition that the beneficiaries of debt policies may vary depending on the stance of monetary policy merits further investigation. For example, if the effect of fully funding government expenditure (that is, by borrowing internally to finance the difference between central government income and outlay) is to reduce inflation, then it would be important to determine the relative money-income value of this to households.

Meantime, the view taken in this thesis is that the primary aim of redistributive policies is to meet shortcomings in current household money income. To complete the analysis of the distribution of central government outlays, it is necessary to attribute the distribution of interest payments to those households who receive a money-income value from these payments in the current year.

The procedure involves three distinct steps. First, it is necessary to distinguish the different type of debt issued by the government. Then, an amount of interest paid to each class of holder of public debt must be estimated. Finally, consideration must be given to the possibility of shifting such payments to individuals other than the holders of the debt.

Figure 6.10 distinguishes the different types of interest payments and concessions financed by government spending. Interest concessions are intended to provide a lower rate of interest to specified individuals. As such, they are private goods and have been treated under miscellaneous in Section F of this Chapter.

Savings, the residual in the NZSNA central government income and outlay account, is distributed to households based on information about their savings recorded by the Household Survey. In 1981/82, savings is a negative item; government current income was greater than its outlays by this amount. Savings would go towards the financing of capital expenditure. The model at the base of the approach in this thesis is myopic with no RPTO effects. So savings could be seen as the household's contribution for public assets it consumes in the current year. Similarly with internal interest payments, it is assumed that households

benefit in relation to their savings patterns as indicated by the Household Survey.

Finally, external payments (interest payments on overseas debt) do not directly accrue to New Zealand households. For the purpose of this thesis, it is assumed that these payments are financing capital which provides a collective benefit in the current year. These external payments have been grouped with collective expenditures in Section 8 of this Chapter. Since capital expenditure in other areas (such as education and health) has been excluded, another way of treating external payments might be to exclude them altogether. However, most current expenditure items include maintenance and other amounts which cover the current use of capital. Because such amounts are not specified for externally-financed capital, then the annual interest payments could be seen as a proxy for current consumption.

A point to be made here is that those holding public debt do receive a money-income return from the interest payments. In the case of internal debt, the value of the return is direct. When evaluating the future taxpayer cost of repaying internal debt, some consideration should be given to the amount some taxpayers have received in interest over the life of the debt. This longer term consideration is not the focus of this thesis. In any given year, however, there will be some taxpayers paying for debt and some receiving interest from the debt. The problem is to translate those flows into household money-income terms in order to evaluate what the net position is for households at different income levels.

While internal debt interest has a more direct money-income effect, the application of household savings as the distributor may give the impression that the relationship is more direct than it actually is. Nearly three-quarters of public debt holdings in 1981/82 were owned by financial institutions, including the Post Office Savings Bank, Trading Banks, the Reserve Bank, Life Insurance Companies and so on. Only about 7 percent of the internal public debt could be said to be owned by the public and this is in the form of inflation-adjusted savings bonds. The remainder is owned by central government trading enterprises, Local Authorities and Public Administrative organisations.

Interest on debt owned by the central government, the Reserve Bank and other central government enterprises is another special case again. Depending on statute, proportions of the surplus of these enterprises are paid into the consolidated account of the Public Account. Here, the interest on debt for all intents and purposes becomes an alternative source of tax revenue. So by imputing a money-income value of this interest payment in relation to household savings, it is inferred that these households gain a money-income value because of what they save in taxes.

For the public debt held by private financial institutions, the procedure carried out here implies that these organisations pass on all of the money-income value of the interest they receive each year to their customers and this in turn enhances the money-income position of their customers' households. Whether there was a net income gain to households in 1981/82 is a debatable point since the financial sector was highly regulated, many institutions being required to hold government securities yielding below market-level interest. Thus, if anything, the household sector may have sustained a net loss from its dealings with private financial institutions. On the other hand, the more immediate effect of the regulations affecting the financial sector was to constrain interest rates on lending so that those households which lost out because of low yields on their savings may have gained through lower interest rates on their borrowing. An interesting research exercise would be to analyse net savings by different household types and income levels to discover if there are any systematic patterns.

The Household Survey collects information about income from savings and expenditure financed by borrowing which would assist in throwing light on some of these issues. This broader study did not go into such detail, since interest payments are only the fifth largest central government expenditure item for 1981/82, the year chosen as the base of the study.

The distributor used to impute the money-income value of central government's net-interest outlays in 1981/82 by household income and type is a sub-group of income surveyed by the Household Survey. This sub-group includes interest received from the Post Office, trustee and savings banks, building societies and mortgages guaranteed by the Housing Corporation, as well as interest from other sources.

Table 6E.1 shows the distribution of net interest to households by market income. The top 10 percent of households receives over a quarter of the money-income return from government (net) internal interest payments. An important assumption underlying this approach is that households own government securities in the same proportion as they own other debt.

Looking at the bottom row of Table 6E.1, it appears that the distribution of government-net-interest by household type is a function of the number of adults in childless households. National superannuitants are important recipients of central government interest income, which is a factor leading to a relatively larger share going to the third-lowest household market-income decile.

Table 6E.1

DISTRIBUTION OF GOVERNMENT NET INTEREST IN 1981/82 BY PRIVATE
HOUSEHOLD BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
As a Proportion of Total for Each Group											
Less Than \$250	0.6	0.1	0.6	0.1	0.1	0.1	0.1	-	-	0.4	2.2
\$250-(\$3,950)	2.0	0.3	2.1	0.2	0.1	0.1	0.1	-	-	0.2	5.2
\$3,950-(\$9,750)	2.8	0.9	2.8	0.4	0.4	0.4	0.4	0.4	0.2	0.4	9.0
\$9,750-(\$13,450)	0.7	0.8	1.9	0.8	0.6	0.7	0.5	0.5	0.4	0.2	6.9
\$13,450-(\$16,900)	-	0.6	1.8	0.9	0.8	1.2	0.8	0.4	0.5	-	8.1
\$16,900-(\$20,250)	-	0.7	1.7	1.4	0.7	1.6	1.1	0.6	0.5	-	8.3
\$20,250-(\$24,200)	-	0.5	1.1	1.5	0.7	1.5	1.6	0.8	1.0	-	8.9
\$24,200-(\$29,200)	-	0.2	0.8	2.7	0.8	1.1	1.1	1.2	1.3	-	10.5
\$29,200-(\$36,650)	-	-	1.3	2.4	0.6	2.1	0.8	2.6	3.0	-	13.0
\$36,650 and over	-	-	3.8	2.6	4.2	2.4	1.7	8.1	4.3	-	27.9
Total (%)	9.0	4.2	17.8	13.0	9.1	11.2	8.3	14.5	11.3	1.6	100.00

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households. Cells with insufficient observations designated (-).

Gillespie (1966) considers the question of the degree of redistribution which comes about because of the existence of public debt by distributing the tax payments for the public debt in the same way as average tax payments. Then the average tax payments made by households are subtracted from the interest payments received by households. Table 6E.2 sets forth a similar procedure based on the data in Table 6E.1 for New Zealand households. The net gain is not great for any income group other than the third decile. Nevertheless, the results shown in Column C do suggest that the government's internal interest payment may have a redistributive effect. Gillespie (1966, p.136) found that for Canada, the lower income earners and the upper income earners were the net gainers.

Table 6E.2

REDISTRIBUTION OF MONEY INCOME VIA
TAXES AND INTEREST PAYMENTS ON PUBLIC DEBT

	Personal Income Tax Payments A	Interest Payments B	Redistribution	
			Amount C = (B-A)	As a % of Total Income
	\$ Million	\$ Million	\$ Million	%
Less Than \$250	3.8	9.3	5.5	0.9
\$250-(\$3,950)	6.7	21.9	15.2	2.0
\$3,950-(\$9,750)	11.8	37.9	26.1	2.4
\$9,750-(\$13,450)	19.4	29.1	9.7	0.7
\$13,450-(\$16,900)	27.8	34.1	6.3	0.4
\$16,900-(\$20,250)	36.6	35.0	-1.6	-0.1
\$20,250-(\$24,200)	45.1	37.5	-7.6	-0.3
\$24,200-(\$29,200)	59.0	44.2	-14.8	-0.5
\$29,200-(\$36,650)	75.4	54.8	-20.6	-0.6
\$36,650 and over	135.7	117.5	-18.12	-0.3
TOTAL	421.3	421.3	0.0	0.0

Sources: Tables 6E.1, 6B.1 (Case 6), Figure 6.10. See text for derivation.

One final note relates to interest payments. In 1981/82, the first \$200 of income from interest and dividends was exempt from taxation. This "tax expenditure" is likely to have consequences for income distribution. These are not covered in the above treatment. It is another area for further research.

F. HOUSEHOLD CONSUMPTION OF SUBSIDIES AND MISCELLANEOUS

This section tidies up some of the loose ends of the central government outlay account. In conceptual terms, the most important item covered in this section is **subsidies**, which also happens to be the last remaining large item of expenditure, representing 6.0 percent of total spending. **Miscellaneous** mainly consists of some previously identified private goods, including expenditures by the Ministry of Agriculture and Fisheries, the Department of Maori Affairs and the Housing Corporation.

F.1: Subsidies

Although total expenditure on subsidies is not particularly great, the number of different types of subsidies is considerable.

A subsidy is a current grant made by either central or local government to private and public enterprises and producer boards. Subsidies include payments to ensure a guaranteed price or to enable market prices of goods and services to be held below the costs of production. Under NZSNA definition, only current grants made by the government to industries are considered to be subsidies. Current grants made by the government to households are considered to be transfer payments.

According to the NZSNA classification, subsidies made by central government fall into three categories:

- a) Current transfers to private industries to produce goods and services are subsidies. Transfers for investment purposes or to cover damage or loss of capital, interest foregone by the government on loans at below market interest rates or interest-free and special taxation incentives or allowances, are not regarded as subsidies for NZSNA purposes.
 - b) Transfers made to government trading establishments which are formally voted as a subsidy payment. These have tended to go to public trading departments or corporations, the Railways and the State Coal Mines, which operate at a loss as a consequence of government policies to keep prices below the cost of production²; and,
-
2. Grants made to government industries to compensate for losses in the current year are regarded as subsidies, but those to compensate for past losses are not.

- c) Imputed subsidies, which are transfers made to government industries to compensate for deliberately incurred losses, but which are not formally voted by Parliament. These are classed as subsidies, even though they are not explicitly voted as such. This is because a transfer is in fact made to these industries when their deficits are absorbed into the Public Account.

Figure 6.12 illustrates the variety of subsidies which are included in the public account.

FIGURE 6.12
SUBSIDIES BY NZSNA CATEGORY IN 1979/80, 1980/81, 1981/82, 1982/83

Year Ending 31 March	1980 \$M	% Change	1981 \$M	% Change	1982 \$M	% Change	1983 \$M
Subsidies Paid by Central Government							
Assistance for oil exploration	4.1	163.4	10.8	164.8	28.6	-32.2	19.4
Control of animal diseases & noxious weeds	11.8	-1.7	11.6	20.7	14.0	-11.4	12.4
Dairy Industry Schemes	15.8	-	..	-	..	-	..
Fertiliser & Lime Topdressing Bounty	2.4	-16.7	2.0	-15.0	1.7	-17.6	1.4
Fertiliser Price	40.6	-24.1	30.8	-8.4	28.2	-4.6	26.9
Fertiliser & Lime Transport	28.8	-12.2	25.3	-4.7	24.1	-10.8	21.5
Grants to research organisations	6.1	13.1	6.9	33.3	9.2	-39.1	5.6
Grants to Wool Board	2.0	-	..	-	..	-	..
Island & coastal shipping services	7.4	32.4	9.8	-18.4	6.5	21.5	7.9
Meat & Wool Income Stabilisation Contribution (SMPs)	..	-	..	-	217.0	81.6	394.0
Private sector employment & training incentives	11.5	-7.8	10.6	43.3	15.2	-5.9	14.3
Public sector employment schemes	32.3	-15.2	27.4	-13.5	23.7	-9.7	21.4
Regional Development Assistance	2.6	3.8	2.7	122.2	8.7	-70.1	2.6
Price Stabilisation - Butter	12.4	56.5	19.4	-	..	-	..
Milk	37.0	-4.9	35.2	-15.6	29.7	-25.3	22.2
Special Payment for sheep & cattle	0.1	-	..	-	..	-	..
Stabilisation - Gas Industry	2.5	0.0	2.5	-4.0	2.4	-75.0	0.6
Railways	97.7	-8.1	89.8	4.9	94.1	1.2	95.2
Stock Retention & Livestock Incentives schemes	7.1	64.3	11.5	66.1	19.1	-4.2	18.3
Other ^a	17.4	124.7	39.1	35.3	52.9	40.5	74.3
Total Central Government Subsidies	341.8	-1.9	335.4	71.5	575.1	28.3	738.0
Local Authority Rate Appropriations	23.2	8.6	25.2	27.0	32.0	-3.1	31.0
Total Subsidies	365.0	-1.2	360.6	68.4	607.1	26.7	769.0

Note: a) In 1982, Other includes: \$12.9 million Urban Passenger Transport Subsidies. Source: Department of Statistics.

Special or temporary employment schemes, established by the government to provide employment for those who would otherwise have been unemployed, are only regarded as subsidies where the special work has been done in a market production group. Where the work is on the provision of non-market government or non-profit services, the reimbursement is treated as a current transfer from the government (and recorded as a transfer in the income and outlay account of the recipient). It is not classified as a subsidy because, by definition, non-market producers cannot receive subsidies³.

Another form of subsidy not included in the Public Accounts is the implicit subsidy provided by the Housing Corporation when it provides mortgages to qualified applicants at below-market-interest rates.

F.1.a: Imputing Subsidies to Household Income Groups

For the purposes of this research, subsidies are divided into three main groups, SMPs (supplementary minimum prices to farmers), direct subsidies and general subsidies. SMPs are discussed in this section because they are paid to the farm industry and for this reason the NZSNA system classifies them as subsidies. However, for this thesis SMPs are treated as current grants to farm households, similar to transfer payments, and grouped with monetary benefits.

Direct subsidies are those for which a specific consumer can be identified. For example, the Milk Price Stabilisation Scheme (Milk Subsidy) accrues to dairy farmers. An intended effect of the scheme is to reduce the price of milk to those consuming it. Hence, the money-income value of the milk subsidy is assumed to be distributed in relation to the consumption of milk as reported by the Household Survey. Other direct subsidies include those which enhance the incomes of farmers, private sector employment schemes and subsidies on passenger travel.

-
3. Those (market and non-market) employers who qualify under the employment schemes are reimbursed in part for the wages paid to their additional staff. The full amount of these wages (subsidised and non-subsidised) is included in the compensation of employees in the production group concerned.

General subsidies are those for which no specific consumer can be identified or which have a collective benefit. In 1981/82, the largest general subsidy was \$29.7 million spent for oil exploration.⁴ Other general subsidies include export programme grants (\$14.6 million) gas reticulation (\$4.6 million), regional development (\$3.7 million), gas industry stabilisation (\$2.4 million) and so on. Another subsidy treated under the heading of general subsidy is the concession for South Island electricity. Since the Household Survey information is not broken down by the North and South Island, it was not possible to distinguish households in these two geographical regions.

Figure 6.13 summarises the method used to allocate central government subsidies by income and household type.

FIGURE 6.13

METHOD FOR IMPUTING SUBSIDIES BY HOUSEHOLD INCOME GROUP

	NZSNA (\$ Million)	Amount Allocated (\$ Million)	Method Subsidy Imputed to House- hold Market Income Groups
SMPs	217	217	
Direct Subsidies	256	256	
Farm Subsidies	88	88	Allocated by persons reporting farming as their occupation
Employment	39	39	Allocated by Age/Sex probability of being in a Private Sector Employment Scheme ^a
Milk	30	30	Allocated by household's expenditure on milk from the Household Survey
Travel		99	
Long-distance	65		
Urban	34		Allocated based on Census information of means of travel to work.
General Subsidies	(104) x (95%)	99	Discussed in Section B

a) Source of this information is Labour Department: Review of Private Sector Employment Schemes, (March 1984).

4. Note that this subsidy refers to actual expenditure by the government and does not include tax allowances for oil exploration, i.e. "tax expenditures".

F.1.b: Who Benefits from Subsidies?

As Table 6F.1 below illustrates, the money-income benefit from subsidies is greatest for the 10 percent of households in the top income group. As Column H shows, the highest-income group is estimated to consume over 16.2 percent of the money-income value of total subsidies in 1981/82.

Table 6F.1

SUBSIDIES : ESTIMATED DISTRIBUTION IN 1981/82 BY INCOME GROUP

Household Market Income (\$ pa)	Direct Subsidies		SMPs		General Subsidies		Total Subsidies (A+C+E)		Average Amount Per H'hold Per Year
	Amnt	Dist	Amnt	Dist	Amnt	Dist	Amnt	Dist	
	A	B	C	D	E	F	G	H	
	\$M	%	\$M	%	\$M	%	\$M	%	\$
Less Than \$250	6	2.3	6	2.8	4	3.9	16	2.8	160
\$250-(\$3,950)	7	2.7	6	2.8	5	4.8	18	3.1	170
\$3,950-(\$9,750)	26	10.1	39	18.0	6	6.5	71	12.4	690
\$9,750-(\$13,450)	20	7.8	22	10.1	7	7.4	49	8.6	480
\$13,450-(\$16,900)	24	9.4	27	12.4	9	9.0	60	10.5	580
\$16,900-(\$20,250)	25	9.8	18	8.3	10	10.4	53	9.3	520
\$20,250-(\$24,200)	31	12.1	21	9.7	11	11.1	63	11.0	620
\$24,200-(\$29,200)	37	14.5	31	14.3	13	12.7	81	14.2	770
\$29,200-(\$36,650)	34	13.3	19	8.7	15	15.4	68	11.9	660
\$36,650 and over	46	18.0	28	12.9	19	18.7	93	16.2	910
Total	256	100.0	217	100.0	99	100.0	572	100.0	560

Note: a) Distribution of general subsidies same as the distribution Collective Expenditures (Case 1). Rounding causes discrepancies between amount of the general subsidy and its percentage distribution. Sources: See Figure 6.12. The distribution of subsidies is estimated using 1981/82 Household Survey information, aggregated to the population of private households using the 1981 Census of Population and Dwellings.

The popular belief about subsidies is that they assist low-income households. Contrary to this belief, Table 6F.1 shows they are not redistributive to the lower-income groups. Although general subsidies seem to be consumed in greater proportion by low-income households than the other subsidies, the lowest 20 percent of household's share of general subsidies is only 8.7 percent.

The distribution of subsidies by household type is shown by Table 6F.2. Direct subsidies are distributed in favour of three-or-more-adult households, particularly those with children. The three-or-more-adult

household type receives an estimated 25.0 percent of direct subsidies, but only represents 10.3 percent of private households and 18.7 percent of the occupants of private households. At the other extreme, one-adult, national-superannuitant households represent 10.8 percent of households and 3.6 percent of the occupants of private households, but are estimated to receive only 1.4 percent of the money-income value of direct subsidies.

According to Table 6F.2, total subsidies (general subsidies and SMPs, as well as direct subsidies) are distributed similarly to direct subsidies. Under the wider definition of subsidies, three-or-more adult households with children still receive the largest share (22.5 percent) but two-adult households with-three-or-more children are estimated to receive the second largest share of total subsidies (16.6 percent).

Table 6F.2

**SUBSIDIES : ESTIMATED STAGE ONE^a AND STAGE TWO^b DISTRIBUTIONS
BY HOUSEHOLD TYPE IN 1981/82**

Household Type											
1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n		All Households
Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil-dren	With Chil-dren			
Money-Income Amount : \$Million											
SMPs	5	6	10	27	15	28	46	30	49	1	217
Direct Subsidies	3	8	10	38	18	31	38	41	64	5	256
General Subsidies	4	5	9	16	8	15	11	13	16	2	99
Total (Stage Two)	12	19	29	81	41	74	95	84	129	8	572
Percentage Distribution of:											
SMPs	2.3	2.8	4.6	12.4	6.9	12.9	21.2	13.8	22.6	0.5	100.0
Direct Subsidies	1.1	3.1	3.9	14.9	7.0	12.1	14.9	16.0	25.0	2.0	100.0
General Subsidies	3.5	5.0	8.7	16.4	8.1	15.3	11.5	12.9	16.3	2.3	100.0
Total Stage Two(%)	2.1	3.3	5.1	14.2	7.2	12.9	16.6	14.7	22.5	1.4	100.0

Notes: a) Stage One subsidies include direct subsidies of SMPs. b) The Stage Two concept is broader and includes general subsidies. Sources: See Figure 6.12. The distribution of subsidies is estimated using 1981/82 Household Survey information, aggregated to the population of private households using the 1981 Census of Population and Dwellings.

F.1.c: Incidence of Subsidies

There is more literature on the economic affects of subsidies than there is for most other government expenditures. Subsidies are usually treated as the analog of "indirect" taxes on consumer goods. The results of general equilibrium studies suggest that the subsidy will be shared between producers and consumers, depending on the elasticities of substitution in demand and production. The treatment of subsidies in the previous section is very rough. For example, the milk subsidy is assumed to be fully consumed by those households consuming milk. An assessment of the economic effects, however, is likely to show that the farmer also benefits through a higher volume of milk sales, that producers using milk as an ingredient benefit and those producing milk substitutes will also be affected.

The research on subsidies suggests that there may be large excess burden effects from subsidies. Syntec (1984) found that forms of industrial assistance in New Zealand, such as subsidies, introduce substantial distortions in resource use by industry. SWF general-equilibrium models can measure both the excess burden effects and the distributional effects of subsidies. Piggott and Whalley (1985) analyse the excess burden and distributive effects of all major U.K. subsidies, including housing and agricultural subsidies. A major finding is that subsidies to local authority housing are a significant source of welfare loss.

F.2: Miscellaneous Government Expenditure

Miscellaneous government expenditure mainly consists of government-provided private goods including expenditures by the Ministry of Agriculture and Fisheries, the Department of Maori Affairs and by the Housing Corporation. Data constraints are such that the estimated distribution of miscellaneous expenditures is more subject to error than the estimated distributions of government expenditures covered in the earlier sections of this Chapter. Expenditures by the Ministry of Agriculture and Fisheries are assumed to be directly consumed by farmers. The distributor for this is the farming occupation group as specified for the ASSET model. Housing consists of housing grants and housing assistance provided through the Housing Corporation. It is

imputed to households using the Housing Corporation eligibility rules as a guide. Census data on race provide a rough guide as to the pattern of consumption of special Maori programmes, which are mainly administered by the Department of Maori Affairs.

Table 6F.3 below illustrates the estimated distribution of miscellaneous government expenditures.

Table 6F.3

ESTIMATED DISTRIBUTION OF MISCELLANEOUS GOVERNMENT EXPENDITURES
IN 1981/82

Household Market Income (\$ p.a.)	Farm Exp: Ag. and Fish.		Maori Affairs & Housing ^a		Total	
	(\$M)	%	(\$M)	%	(\$M)	%
Less Than \$250	4.6	2.7	3.8	3.9	8.4	3.1
\$250-(\$3,950)	5.0	2.9	4.6	4.8	9.6	3.6
\$3,950-(\$9,750)	30.8	18.0	6.3	6.5	37.1	13.9
\$9,750-(\$13,450)	17.3	10.1	7.1	7.4	24.4	9.1
\$13,450-(\$16,900)	21.4	12.5	8.7	9.0	30.1	11.3
\$16,900-(\$20,250)	13.8	8.1	10.0	10.4	23.8	8.9
\$20,250-(\$24,200)	16.9	9.9	10.7	11.1	27.6	10.3
\$24,200-(\$29,200)	24.1	14.1	12.3	12.7	36.4	13.6
\$29,200-(\$36,650)	15.0	8.8	14.8	15.4	29.8	11.2
\$36,650 and over	22.0	12.9	18.0	18.7	40.0	15.0
Total	170.9	100.0	96.3	100.0	267.2 ^b	100.0

Notes: a) Direct expenditures by Maori Affairs total \$21.5 million and housing expenditures total \$74.8 million. b) Total miscellaneous is \$293.6 million and 95 percent of this (\$279 million) is allocated. The \$11.8 million not covered here is considered to be a general expenditure item. Sources: ASSET, 1981/82 Household Survey data aggregated to the total private household population based on the 1981 Census.

The estimated distribution of miscellaneous government expenditures is quite different from the distribution of the major expenditures analysed in other sections of this Chapter. It appears that the share of these expenditures consumed by low-income households are very small. This result is not surprising since expenditures on housing assistance, for example, are not targetted to low incomes. This justifies a more rigorous analysis of miscellaneous expenditures at some future date.

G. CONCLUSION : PRIVATE HOUSEHOLD CONSUMPTION OF GOVERNMENT EXPENDITURES

Three major conclusions stand out when the expenditure side of the budget is analysed in the context of Stages One and Two. They are:

- 1) The money-income shares of total central government non-market expenditures are distributed in a U-shaped pattern, with household income deciles at the top and bottom ends consuming the larger shares.
- 2) The share attributed to national-superannuitant households is markedly greater than their share of either households or of the population of private household occupants. One-adult and two-adult national-superannuitant households are estimated to consume 26.1 percent of actual government current expenditure but only represent 11.9 percent of the total population occupying private households.
- 3) When generalised over the entire population of private households, the pattern that emerges is that any redistribution which takes place when government spending is taken into account is from households with children to childless households.

The Stage One and Stage Two results are analysed further in Section G.1 below. Section G.2 discusses how they might differ if a Stage Three or Stage Four general equilibrium approach to assess incidence was adopted and if other refinements were made. Section G.3 compares the results with overseas studies.

G.1: Results of Stages One and Two

This section summarises the distribution of government expenditures based on the Stage One and Stage Two approaches. Recall that, according to the Stage One approach, only government expenditures which appeared to affect households directly are included. The Stage Two approach attempts to allocate all central government current non-market expenditure to the New Zealand population which is resident in private households.

The main contribution of these approaches is that household consumption of government-provided goods is estimated, based on the relevant data. Unlike the treatment of payments to central government in Chapter Five, the approach in Chapter Six does not consider the extent to which the economic effect of a government expenditure transaction is different from its impact effect.

G.1.a: Share of Direct Government Expenditure Consumed By Household Income Group

Table 6G.1 summarises the distribution of government direct (Stage One) expenditures, tabulated by market-income groups. Column H shows the share of total direct government expenditures consumed by households in each income group. This is compared with the share of households in each income group (Column I) and the distribution of the occupants of private households (Column J).

Table 6G.1

STAGE ONE : THE ESTIMATED DISTRIBUTION OF THE MONEY-INCOME VALUE OF GOVERNMENT DIRECT EXPENDITURE IN 1981/82

Household Market Income (\$ p.a.)	Stage One Government Expenditure								Comparative Figures	
	Direct Monetary Benefits		Govnt Direct Subsidy		Private Goods		Total Govnt Direct Expend		Distri- bution of H'holds	Private H'hold Occupant
	Amnt	Dist	Amnt	Dist	Amnt	Dist	Amnt	Dist		
	A	B	C	D	E	F	G	H	I	J
	\$M	%	\$M	%	\$M	%	\$M	%	%	%
Less Than \$250	654	23.3	6	2.3	194	7.4	854	15.0	10.0	6.2
\$250-(\$3,950)	602	21.5	7	2.7	183	6.9	792	13.9	10.0	5.8
\$3,950-(\$9,750)	410	14.6	26	10.1	236	9.0	672	11.8	10.0	8.1
\$9,750-(\$13,450)	213	7.6	20	7.8	219	8.3	452	7.9	10.0	9.2
\$13,450-(\$16,900)	194	6.9	24	9.4	260	9.9	478	8.4	10.0	10.8
\$16,900-(\$20,250)	162	5.8	25	9.8	274	10.4	461	8.1	10.0	11.1
\$20,250-(\$24,200)	123	4.4	31	12.1	283	10.7	437	7.7	10.0	11.8
\$24,200-(\$29,200)	149	5.3	37	14.5	273	10.4	459	8.1	10.0	11.4
\$29,200-(\$36,650)	134	4.8	34	13.3	280	10.6	448	7.9	10.0	11.7
\$36,650 and over	162	5.8	46	18.0	433	16.4	641	11.2	10.0	14.0
Total	2803	100.0	256	100.0	2635	100.0	5694	100.0	100.0	100.0

Source: See text for derivation.

Total government direct expenditures are consumed in the greatest proportion by the three lowest household-market-income deciles. As shown by Column H, this 30 percent of households is estimated to consume 40.7 percent of government-provided direct goods and services. This share is much greater than the 20.1 percent share of private-household occupants who reside in households in the three lower income brackets.

Direct monetary benefits consist of national superannuation, all other social welfare income support (including the family benefit) and Supplementary Minimum Price payments to farmers. They are distributed most in favour of the low-income groups. Nearly 60 percent of monetary benefits are consumed by the 30 percent of households in the three lowest income groups.

Direct subsidies are consumed in the greatest proportion by the four highest-income groups. Direct government subsidies include subsidies to farmers, subsidies under the private sector employment scheme, milk subsidies, as well as subsidies on long-distance and urban travel.

Government-provided private goods seem to be more evenly spread through the private household population than the other major expenditure items. Private goods include the components of education and health where a specific beneficiary can be identified (administration is excluded from each). Also included are expenditures by Agriculture and Fisheries which have a direct benefit to farmers, Maori Affairs expenditures which benefit Maoris and expenditures by the Housing Corporation which have an identifiable beneficiary.

G.1.b: Share of Total Government Expenditures Consumed by Household Income Group

Stage Two takes the view that ultimately households are the consumers of everything that the government provides. All 1981/82 central government expenditures (as defined in the NZSNA income and outlay accounts) are allocated by household income group. These expenditures include government goods and services which are only indirectly consumed by households. Indirect consumption can arise because households own market-place enterprises which initially consume government-provided goods and services. For example, police surveillance of an industrial plant benefits the households who own the plant (as well as those who work at the plant). Another way in which households ultimately consume government "indirect" expenditures is when they consume privately-produced products which are subsidised by the government.

Table 6G.2

STAGE TWO: THE ESTIMATED DISTRIBUTION OF TOTAL GOVERNMENT CURRENT
EXPENDITURES: MONEY-INCOME VALUE BY INCOME GROUP IN 1981/82

Household Market Income Group (\$ p.a.)	Social Welfare Benefits (excludes SMPS) A	Collective Government Expend (Case 1) B	Health (Case 1) C	Educ- ation D	Subsidies (includes SMPS) E	Interest and Other F	Total Govnt Expend G
\$ Million							
Less Than \$250	648	101	152	52	16	18	987
\$250-(\$3,950)	596	124	146	37	18	31	952
\$3,950-(\$9,750)	371	168	132	89	71	75	906
\$9,750-(\$13,450)	191	195	113	101	49	53	702
\$13,450-(\$16,900)	167	233	122	133	60	64	779
\$16,900-(\$20,250)	144	269	118	159	53	59	802
\$20,250-(\$24,200)	102	287	116	169	63	65	802
\$24,200-(\$29,200)	118	329	109	168	81	81	886
\$29,200-(\$36,650)	114	398	111	176	68	85	952
\$36,650 and over	134	484	138	209	93	158	1216
Total	2586	2588	1257	1293	572	688	8984
Proportion of Total (%)							
Less Than \$250	25.1	3.9	12.1	4.0	2.8	2.6	11.0
\$250-(\$3,950)	23.0	4.8	11.6	2.9	3.1	4.5	10.6
\$3,950-(\$9,750)	14.3	6.5	10.5	6.9	12.4	10.9	10.1
\$9,750-(\$13,450)	7.4	7.5	9.0	7.8	8.6	7.7	7.8
\$13,450-(\$16,900)	6.5	9.0	9.7	10.3	10.5	9.3	8.7
\$16,900-(\$20,250)	5.6	10.4	9.4	12.3	9.3	8.6	8.9
\$20,250-(\$24,200)	3.9	11.1	9.2	13.1	11.0	9.4	8.9
\$24,200-(\$29,200)	4.6	12.7	8.7	13.0	14.2	11.8	9.9
\$29,200-(\$36,650)	4.4	15.4	8.8	13.6	11.9	12.3	10.6
\$36,650 and over	5.2	18.7	11.0	16.2	16.2	22.9	13.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: See text for derivation.

Table 6G.2 summarises the results derived in this Chapter based on the Stage Two assumptions. **Social welfare benefits** (Column A) are distributed most in favour of the low income groups while **interest and other** (Column F) are distributed most in favour of the highest income group. Although **health** (Column C) is the most evenly distributed government expenditure, it is also the second-most favourable to low-income groups.

CHART 6.7

GOVERNMENT EXPENDITURE SHARES TO HOUSEHOLD MARKET INCOME DECILES :
STAGE ONE AND STAGE TWO DEFINITIONS COMPARED

G.1.c: Comparing the Share of Direct and Total Government Spending by Income Class

As Chart 6.7 shows, the U-shaped pattern of the money-income shares of total government expenditure by household income decile emerges regardless of the different approaches in Stage One and Stage Two. It also emerges when assumptions about the consumption of collective goods and about the value of health to the elderly are varied. Many of the assumptions used to impute a money-income value of government expenditures to household income groups are necessarily rough. The fact that similar results are achieved when a range of assumptions is adopted, however, suggests that the approach is robust enough to give an indication of the general pattern of consumption of central government non-market production.

Although the U-shaped pattern holds even when the assumptions applied to impute expenditures by household income group are varied, the distribution to low-income households is more pronounced in Stage One than Stage Two (see Table 6G.1 (Column H), Table 6G.2 (Column G) and Chart 6.7). In the case of Stage One, the bottom three income deciles are each found to receive a larger share of direct central government expenditure in 1981/82 than the other seven income groups. The next highest share (11.3 percent) is that of the highest income group, although remember that there is a larger number of occupants per household in this category.

The results of the Stage One approach show that the bottom 30 percent households (representing 20.1 percent of the occupants of private households) receive 40.7 percent of the money-income benefit from direct government expenditures. In contrast, when all government expenditures are taken into account in the context of Stage Two, the lowest 30 percent of households receive only a 31.7 percent share (see Table 6G.2).

The main difference between the Stage One and Stage Two approach is the inclusion of indivisible or collective government expenditures. A variety of assumptions about the distribution of the money-income value of collective expenditures are tested in Section B of this Chapter. The results show that regardless of the assumptions made, the inclusion of collective expenditures in the analysis results in much less redistribution in favour of the low-income groups than indicated by the Stage One results. This conclusion affirms the decision to analyse the entire expenditure side of the budget when attempting to assess its influence on household income distribution.

G.1.d: Individual Stage Two Expenditures Compared

As graphically illustrated by Chart 6.8, social welfare expenditure is strongly redistributive towards low-income groups while the shares of collective and education expenditures are larger for the higher income groups.

CHART 6.8
THE SHARE OF GOVERNMENT EXPENDITURES TO HOUSEHOLD INCOME DECILES:
FOUR LARGEST EXPENDITURES COMPARED WITH TOTAL GOVERNMENT EXPENDITURE
(Stage Two Approach)

The degree of equality of distribution varies depending on whether it is analysed per household or per person, as the two diagrams in Chart 6.9 show. For example, when health expenditure is analysed by household, its distribution is near the line of equality (see left-hand Chart). When account is taken of the number of occupants in private households, health expenditure is more heavily redistributed towards those on lower incomes (the line of equality bows out to the left, see right-hand Chart).

CHART 6.9
RELATIVE EQUALITY OF MAIN GOVERNMENT EXPENDITURES (STAGE TWO)
LORENZ DISTRIBUTION BY HOUSEHOLD AND BY OCCUPANTS OF PRIVATE
HOUSEHOLDS COMPARED

Education and collective government expenditures are both more equally distributed when their incidence is analysed by private household occupants. When analysed by household, these two expenditures are both clearly unequally distributed with those in the bottom market-income deciles estimated to receive a share of education and collective expenditure which is considerably less than their share of the household population. When account is taken of the average number of household occupants, the picture changes. For social welfare benefits, the Lorenz diagrams for households and household occupants do not differ so much. The Lorenz distribution by person is bowed slightly more to the left than the distribution by household.

G.1.e: The Expenditure Benefit of Stage Two Expenditure

Another standard for analysing the extent of redistribution is the measure of the **effective benefit** of government expenditures. The effective benefit is defined as the ratio of the money-income value of government expenditures consumed by households compared to their income.

Table 6G.3 shows the effective benefit using four different income measures. In all four cases, the effective benefit for the three lowest groups is significantly greater than the benefit for the other groups. As the final two columns (Columns E and F) of Table 6G.3 show, the lowest household market income groups are also estimated to consume a larger money-income value per household and per household occupant than most of those on higher incomes.

Table 6G.3

STAGE TWO GOVERNMENT EXPENDITURE: EFFECTIVE BENEFIT RATES AND ANNUAL AVERAGE MONEY-INCOME VALUES IN 1981/82

Household Market Income (\$ p.a.)	Stage Two Central Government Expenditure as a Proportion of:				Average Money-Income Value of Government Expenditure	
	Market Income A	Total Income B	H'hold Expend C	Stage Two Final Income ^a D	Per Household E	Per Person F
	Effective Benefit (%)				\$ p.a.	\$ p.a.
Less Than \$250 (-)	4400.0 ^b	170.0	150.0	122.6	9580	5114
\$250-(\$3,950)	550.0	130.0	120.0	109.3	9150	5318
\$3,950-(\$9,750)	120.0	83.0	83.0	73.4	8800	3595
\$9,750-(\$13,450)	57.0	50.0	56.0	50.2	6820	2472
\$13,450-(\$16,900)	49.0	45.0	52.0	46.7	7530	2332
\$16,900-(\$20,250)	41.0	38.0	45.0	42.6	7710	2345
\$20,250-(\$24,200)	35.0	33.0	43.0	37.8	7790	2191
\$24,200-(\$29,200)	31.0	30.0	41.0	36.2	8520	2510
\$29,200-(\$36,650)	27.0	27.0	36.0	33.8	9150	2630
\$36,650 and over	24.0	23.0	39.0	30.6	11800	2808
Average (%)	46.0	41.0	53.0	46.9	8680	2900

Notes: a) See Chapter Seven for derivation of Final Income. b) Market income is negative for this group. Sources: Chapter Three income and expenditure; Chapter Six, central government expenditure; Chapter Seven, Stage Two Final Income.

CHART 6.10
EFFECTIVE GOVERNMENT EXPENDITURE: TOTAL GOVERNMENT EXPENDITURE
AS A PERCENT OF TOTAL INCOME, ADJUSTED MARKET INCOME (STAGE TWO
DEFINITION), AND ADJUSTED G.D.P. (STAGE THREE DEFINITION)

Chart 6.10 graphs Columns B and D of Table 6G.3 and the effective benefit based on the broader Stage Three income definition. In all cases the pattern of effective benefit is similar, with the low income groups shown to consume a considerably greater proportion of government spending in relation to their income, no matter how income is defined.

G.1.f: Direct and Total Government Expenditures Analysed By Household Type

The results for Stages One and Two are tabulated by household type in Tables 6G.4 and 6G.5 on the following pages. The most significant finding is that two-adult, national-superannuitant households receive a greater money-income benefit from government expenditure than any other household type. Two-adult, national-superannuitant households consume

22.1 percent of Stage One expenditure compared with 16.9 percent of Stage Two government non-market expenditures.

According to the results, both one-adult and two-adult national-superannuitant households end up with a share of government spending which is estimated to be considerably larger than their share of the population. These households only represent 23.2 percent of households and 11.9 percent of persons in private households but are estimated to account for 34.8 percent of government outlays in Stage One and 26.1 percent in Stage Two.

Table 6G.4

**STAGE ONE: GOVERNMENT DIRECT EXPENDITURE -
ESTIMATED DISTRIBUTION BY HOUSEHOLD TYPE IN 1981/82**

Household Type											
1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Child'n		All House-holds
Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil-dren	With Chil-dren			

Money-Income Amount : \$Million											
Monetary Benefits ^a	540	86	943	92	87	150	177	203	326	199	2803
Govt Prvte Goods ^b	180	46	306	141	185	403	545	223	499	107	2635
Direct Subsidies ^c	3	8	10	38	18	31	38	41	64	5	256
Total	723	140	1259	271	290	584	760	467	889	311	5694

Percentage Distribution of:											
Monetary Benefits	19.3	3.1	33.6	3.3	3.1	5.4	6.3	7.2	11.6	7.1	100.0
Govt Prvte Goods	6.8	1.7	11.6	5.4	7.0	15.3	20.7	8.5	18.9	4.1	100.0
Direct Subsidies	1.1	3.1	3.9	14.9	7.0	12.1	14.9	16.0	25.0	2.0	100.0
Total Expend.(%)	12.7	2.5	22.1	4.8	5.1	10.2	13.3	8.2	15.6	5.5	100.0

Comparative Distributions:											
H'holds by Type	10.8	8.7	12.4	15.0	7.8	12.6	10.4	8.3	10.3	3.7	100.0
Total Persons in Private H'holds	3.6	2.9	8.3	10.0	7.9	16.9	19.0	9.4	18.7	3.4	100.0

- a) Includes national superannuation, social welfare cash benefits and supplementary minimum prices. b) Includes health, education and other.
c) Excludes SMPs. Sources: See text for derivation.

Table 6G.5

STAGE TWO: MONEY-INCOME VALUE OF TOTAL GOVERNMENT EXPENDITURE -
ESTIMATED DISTRIBUTION BY HOUSEHOLD TYPE IN 1981/82

	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All Households
	Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil-dren	With Chil-dren		
A. Amount	\$ Million										
Social Welfare Benefits (excluding SMPS)	535	79	933	65	73	122	132	172	277	198	2586
Collective Expend.	91	129	225	424	210	396	297	334	423	59	2588
Health	145	36	234	103	93	162	162	114	179	29	1257
Education	2	13	8	57	71	251	387	93	336	75	1293
Subsidies	12	19	29	81	41	74	95	84	129	8	572
Interest & Other	45	28	91	91	58	84	82	98	101	10	688
Total Govt Expend	830	304	1520	821	546	1089	1155	895	1445	379	8984
B. Average Money-Income Value of Government Expenditures Expressed in \$000s Per Year:											
By Household	7.5	3.4	11.9	5.3	6.7	8.3	10.7	10.4	13.5	10.0	8.7
By Occupant	7.5	3.4	5.9	2.6	2.3	2.1	2.0	3.1	2.5	3.6	2.9
C. Proportion of Total (%)											
Social Welfare Benefits (excluding SMPS)	20.7	3.1	36.1	2.5	2.8	4.7	5.1	6.6	10.7	7.7	100.0
Collective Expend.	3.5	5.0	8.7	16.4	8.1	15.3	11.5	12.9	16.3	2.3	100.0
Health	11.6	2.9	18.6	8.1	7.4	12.9	12.9	9.1	14.2	2.3	100.0
Education	0.2	1.0	0.6	4.4	5.5	19.4	29.9	7.2	26.0	5.8	100.0
Subsidies	2.1	3.4	5.1	14.2	7.2	12.9	16.6	14.7	22.5	1.4	100.0
Interest & Other	6.5	4.0	13.3	13.3	8.4	12.2	11.9	14.3	14.7	1.4	100.0
Total Govt Expend.	9.2	3.4	16.9	9.1	6.1	12.1	12.9	10.0	16.1	4.2	100.0

Source: For derivation, see Chapter Six, Sections A through F.

In contrast to national-superannuitant households, two-adult households with-one-child do not consume a share of government expenditure which is equal to their share of the population. This group makes up 7.8 percent of total private households and accounts for 7.9 percent of the occupants of private households. Under Stage One conditions, its share of 1981/82 direct government expenditures is 5.1 percent. Its share of total government expenditures under Stage Two conditions is 6.1 percent. A major factor explaining the small share of government expenditure consumed by two-adult households with-one-child is that this group consumes the smallest share of monetary benefits.

Childless two-adult households consume a share of government expenditure that is nearly twice as great under Stage Two conditions as under Stage One conditions. This household type covers 15.0 percent of private households and includes 10.0 percent of the population of private household occupants. Its share of Stage One direct government expenditure is only 4.8 percent while its share of Stage Two government expenditure is 9.1 percent. This discrepancy is largely explained by the inclusion of collective goods in the Stage Two definition of government expenditure.

It is possible to see why childless, "young" (non-national-superannuitant) households could be perceived in two completely different ways. On the one hand, the Stage One results suggest that young childless households receive a relatively small share of the direct benefits provided by the government. In total, young childless households represent 22.3 percent of the people occupying private households but only consume 15.5 percent of government-provided goods and services according to the Stage One definitions. It appears that their taxes are used to provide government goods to others.

On the other hand, the Stage Two results suggest that the economic status of young childless (one-, two- and three-or-more adult) households benefit from government expenditure in proportion to their share of the population. This group is estimated to consume 22.5 percent of government-provided goods and services in relation to other groups. The differences arise between the Stage One and Stage Two results because childless young households consume a large share of government-provided collective goods. These include goods such as police, justice and

defence - the expenditures broadly associated with the protection of private property.

In all, there are four household types whose share of government expenditure is greater than their share of the population of private household occupants under the Stage One conditions. They are: 1) one-adult, national-superannuitant households; 2) one-adult, other households; 3) two-adult, national-superannuitant households; and, 4) one-adult households with children.

Under the Stage Two conditions, there are five household types whose share of expenditure exceed their share of the population. They include the four types mentioned for Stage One as well as childless three-adult households.

Of all the household types whose share of government expenditure is greater than their share of the private-household occupants, only one type includes children. The clear pattern that emerges is that any redistribution of money income which takes place because of government activity is from households with children to childless households.

Another way of analysing the results is to calculate the average money-income value of annual government spending by person and by household for each household type. These calculations are illustrated by Block B, Table 6G.5. As is the case with the rest of the results, the numbers themselves must be seen as indicative only. They do, however, give a perspective on the relative size of government expenditures consumed by household type.

In 1981/82, single-adult, national- superannuitant households are estimated to consume an annual average money-income value of Stage Two government expenditures equal to \$7,500 a year per occupant. Occupants of two-adult, national-superannuitant households consumed government expenditures with a money-income value of \$5,900 each. Childless, two-adult, non-national-superannuitant households consumed \$2,600 worth of government expenditures. In comparison, households-with-children consumed only between \$2,000 and \$2,500 of government expenditure per occupant.

G.1.g: Limitations of Stage One and Stage Two Approaches

As has been acknowledged throughout this thesis, the Stage One and Stage Two approaches suffer from a number of important limitations which must be taken into account when interpreting the results. There are some which pertain explicitly to the expenditure side of the budget which require further discussion. They centre on: 1) the use of eligibility requirements to identify the consumers of government-provided goods; 2) the measurement of government output in relation to expenditure on inputs; 3) lack of an equivalency scale for analysing the results; and 4) failure to take account of the economic incidence of government expenditures.

G.1.g.i: Results Based on Eligibility Requirements

Eligibility criteria are the main basis used to estimate the pattern of consumption of government expenditures in Chapter Six. These criteria indicate the policymaker's objectives for particular expenditure functions. By using eligibility criteria, the approach in Chapter Six neglects to take adequate account of such things as the take-up rate for the family benefit, the possibility of insufficient usage of health care by low income families and so on.

For example, Le Grand (1983) finds that the United Kingdom's National Health Service is equally distributed in the same sense as health appears to be equally distributed in New Zealand. That is, those in the low-income groups consume about as much public health care as those in the high income groups. But Le Grand believes:

"... this does not take account of the fact that the poor suffer more ill health than the rich; so per person ill, they receive less". (Le Grand, 1983, p.6).

In the end, this framework for analysing the influence of the government budget is about what actually occurs, not what the policymaker thinks is supposed to happen (or wishes would happen!). A significant aspect of social and economic behaviour is that the simple availability of a government-provided good does not guarantee that access to the good is the same for everyone. Nevertheless, while the Stage One and Stage Two approaches do not measure the degree of access by households, the

research framework could easily be respecified to incorporate the results of an analysis of the actual use made of government-provided goods. In some cases it might be difficult to find an appropriate method of measuring the degree of accessibility. In other cases, such as education, information exists about expenditure by geographical location. Here, a detailed analysis of the distribution of income by region might yield more meaningful results.

G.1.e.ii: Measurement of Government Output

An important area of further research is conceptual analysis of the value of government output of goods and services as distinguished from government expenditure on providing the goods and services. Information about the amounts spent by the government on education, health and other services does not say anything about the level of the service rendered since the data are only for inputs. Lacking are analogs to the physical units found in the real sector (tonnes of coal, number of refrigerators) since government non-market output consists largely of services, not goods.

Also lacking is the market price information available for services supplied in the private sector. In the NZSNA accounts of central government economic activity, the value of non-market output is understated when compared with that of market output because of the omission of any surplus or measure of fixed capital from the non-market account.

Measures of the value of government outputs could have a number of implications for the results. In particular, it might be shown that health output has a greater value than the cost of inputs to produce health. On the other hand, another government service (an inefficient one) could be found to cost the taxpayer more than the value of its output. Again one of the strengths of a quantitative approach like this is that an improved technique to value government output could be linked to it.

G.I.g.iii: Equivalency Scales

An attempt has been made to present the results of this analysis of

the budgets' redistributive influence in a large variety of ways. No attempt has been made, however, to adjust the results to take account of the variations in individual budget constraints. An individual's income and expenditure level may be determined by factors such as the individual's age, the composition of the household where the person resides (including the number, relationship, and ages of the other occupants) and so on. **Equivalency scales** are intended to generalise information about these factors so that results like those in this Chapter can be adjusted to reflect the different budget constraints of the population that is analysed.

If an equivalency scale were to be applied to the results illustrated by Table 6G.5, it is likely to indicate slightly greater redistribution by the government to households with children. This is because the budget constraints of children tend to be lower than those for adults. Therefore, the money-income value of government expenditures is probably worth more when distributed to children than it is when distributed to adults. The application of an equivalency scale might also indicate greater redistribution in favour of national superannuitants for much the same reason.

G.1.g.iv: Economic Incidence of Expenditure Measures

This thesis uses available data to identify the impact or statutory effects of the expenditure side of the budget. Whereas the Stage Two approach uses the results of the latest incidence literature to analyse the revenue side of the budget (see Chapter Five), Chapter Six's main concern is to identify the "initial" consumers of government expenditures. This approach was adopted because few incidence results exist which are appropriate for the analysis of government expenditures. As Chapter Two and Four discuss, HMM and SWF general equilibrium studies explicitly designed to measure budget incidence often fail to incorporate information about the economic incidence of government expenditures.

To identify the initial recipients of subsidies and collective goods, assumptions were adopted about what the economic effects of these government expenditures might be. The scarcity of general equilibrium research in this area however, means that the assumptions are only very roughly based on economic analysis.

Section G.2 below briefly discusses how a further study could be specified to measure expenditure incidence.

G.2 Expenditure Incidence: Stages Three and Four

Looking specifically at the expenditure side of the budget, two components were distinguished by McLure (1974), expenditure incidence and benefit incidence. Musgrave (1959, pp. 213-215) made a similar distinction. Expenditure incidence is an assessment of how government spending affects private incomes and benefit incidence is an assessment of who receives the benefits of government services. Total incidence, then, is:

"The burden (and benefits) of taxes used to: finance public activity, the benefits of public services and the redistribution of income resulting from the changes in relative factor rewards and product prices induced by the shift of purchasing power from the private to the public sector. For convenience, we can refer to these three effects as tax, benefit and expenditure incidence, respectively." (McLure, 1974, p.7).

Meerman (1978) found McLure's basic tripartite distinction was confusing for several reasons. First, the benefits from public services have private income equivalents. As commonly defined, there is a money-income return from publicly provided goods such as transfer payments, rent allowances, and public medical care received free or at subsidy. Certainly these items are regarded as private income by their recipients. In light of this reasoning, McLure's distinction between expenditure incidence and benefit incidence defines income rather too rigorously as solely returns to factors of production and, on the spending side, solely the goods and services which those returns can purchase.

Second, it is very common, among economists, to use "expenditure incidence" to refer to benefit incidence alone or to benefit incidence plus McLure expenditure incidence. This leads to unnecessary confusion, and a great deal of explanation.

Finally, the common practice of assessing aggregate tax incidence (the amount of change in household income as a result of taxation) is to

define aggregate household tax payments as exactly equal in value to tax receipts. Some studies of "expenditure incidence", on the other hand, deal with the possibility that the value of expenditure to a beneficiary (and hence, aggregate expenditure incidence) may be different from its resource cost.

This practice may give the impression that only expenditure measures have effects on relative prices, on techniques and on the composition of output. But taxes have similar effects. In addition, both taxes and expenditures may contain an element of excess burden or consumer surplus.

Recall from Chapter Two that Meerman deals with these problems by keeping the McLure tripartite distinction, but defines the contents under the heading of tax, expenditure and benefit incidence, differently. Basically, tax and expenditure incidence are defined where the effects on relative prices, techniques and the composition of output are assumed to be zero.

The Stage Three methodology is consistent with Meerman's definition of expenditure incidence. According to this approach, the value of government-provided goods and services to those consuming them would, by assumption, be equal to the amount the governments spend on providing them. This is similar to the approach in Stage Two. The difference between a Stage Three and a Stage Two approach is that the Stage Three approach would specify the determinants of the demand and supply of government-provided goods, whereas Stage Two only attempts to identify the consumers of government-provided goods. For example, an aspect of the supply of government goods which has direct relevance to households is the salaries of public servants.

Greene, Neenan and Scott (1974, p.30) point out that total salary payments could overstate the net gain to public employees from these outlays. Under competitive conditions, where resources are assumed always to be fully employed, it follows that, say, a police officer would have been employed in the absence of the outlay for police salaries, although possibly at a different wage. "Only the difference between his wage, given the actual outlay, and what he would have received without the public outlay can be properly called his source of income benefit" [from the government].

The SWF models could be applied to analyse expenditures using the Stage Three approach. Most are specified to measure both the supply and demand effects of government budget transactions, under competitive conditions where there is full employment. To date, however, the SWF models have not treated government expenditure comprehensively. The point of the Meerman argument is that if it makes theoretical sense to treat tax incidence using a general equilibrium approach and assuming RITO incidence to be zero, then it also makes sense to treat expenditure incidence in the same way.

Perhaps of greater importance to policymakers is knowing the effects of government expenditure on relative prices, technology and output in non-competitive markets where there is no full employment. Here a Stage Four approach would yield relevant results. Before this issue can be treated in a rigorous fashion, however, further work is required to define government expenditures under Stage Three conditions using the SWF approach. When it becomes possible to evaluate the effects of government expenditures when RPTO incidence is zero, then it makes sense to develop models which relax the restrictive assumptions of perfect competition and full employment.

G.3: Comparing the Results With Those Derived for Other Countries

The methodology for inputting a money income value for government expenditures discussed in this Chapter was designed independently to research of a similar nature carried out overseas. A study of this type involves considerable detail and overseas studies tend to publish their results, rather than their methodology. Since there was a considerable amount of relevant data contained in the New Zealand Household Survey, the structure of the analysis in this thesis was shaped by the desire to make the best use of this valuable data source. Nevertheless, even though the approach in this Chapter was structured independently of overseas research, the results have an uncanny similarity to studies for Canada, the United States and the United Kingdom.

The general conclusion which emerges from this quantitative study and those carried out overseas is that the shares of government expenditures are more or less equally distributed when the households are grouped into income groups.

When the expenditures are compared with household income to calculate effective benefit rates, the effective benefit tends to be greatest the lower the income. In other words, the distribution of government expenditures appears to be pro-low-income. This general result is gained from studies by Gillespie (1956, 1966), Musgrave et al (1974), Reynolds and Smolensky (1977), and O'Higgins and Ruggles (June and September 1981).

Turning to the most recent analysis of government spending by household-income group, O'Higgins and Ruggles (June and Sept. 1981), analyse total government expenditure in the United Kingdom in 1971 and the United States in 1970. They find that total government expenditure shares are nearly equally distributed by household-income decile in the United Kingdom while the United States data show a slight tendency for households in the bottom twenty percent to receive less than average shares.

The O'Higgins and Ruggles (OR) approach is similar to the Stage Two approach in this thesis where the entire government budget is analysed. Another U.K. study, that by the United Kingdom Central Statistical Office (CSO) follows an approach similar to the Stage One approach in this thesis. The CSO analysis of the distributional impact of U.K. public expenditure presents a picture which is markedly more favourable to lower-income deciles than that which emerges from the OR analysis of total government expenditure. This is similar to the difference between the Stage One and Stage Two results in this thesis.

Ruggles and O'Higgins (June 1981) reached remarkably similar conclusions for both the United Kingdom and the United States. However, the distribution of the various types of government expenditures differed. For example, while the two countries are similar in that the absolute value of education expenditures rises as income rises. The countries differ because the presence of a relatively large number of student households in the bottom deciles gives one element of U.S. education funding (higher education) a redistributive appearance not evident in the U.K. results. It explains why the distribution of educational expenditures in the Gillespie (1965) and Musgrave et al (1974) studies of the United States is more pro-low-income than the results for New Zealand.

Turning to health expenditure, U.S. public health expenditures are very much more focussed on the poor than in the British National Health Service. O'Higgins and Ruggles (Sept. 1981, p.320) find that U.K. health expenditure increases slightly with household income. Their study shows that the correlation between household size and income outweighs the greater value of the expenditures attributed to the "elderly" households who predominate in the bottom two deciles. As in New Zealand, the households occupied by elderly members of the population tend to be smaller. Unlike New Zealand, it appears that the expenditure in hospital treatment for the elderly is not great enough to increase the total share attributed to the lower-income groups. This may reflect the existence of other types of care for the elderly in the United Kingdom.

According to the OR results, income maintenance expenditures in both the United Kingdom and the United States are of greater absolute and relative importance to the lower half of the household population than are other forms of government expenditure. This is similar to the results for New Zealand. The United States results, however, indicate the possibility of "middle class capture" with the third decile deriving the greatest benefit from social security and public assistance, followed by the second, fourth and fifth deciles. Only the top two deciles receive less income-maintenance than the bottom-income decile. This is explained by the large numbers of students, unemployed persons without dependants and public hospital patients (who do not receive income support) in the bottom decile. In contrast to the U.S., in the U.K., those in the bottom decile receive the largest share of income maintenance and the amount declines consistently through the deciles. Since income maintenance has been analysed by the CSO work over a number of years, this may be a tribute to the assistance of such an approach to policymakers who wish to target income maintenance.

In summary, then, when the results of Chapter Six are analysed by household income group, they tend to show that the overall pattern of government-provided goods and services is distributed fairly evenly to income groups. This same tendency is indicated by quantitative studies carried out in Canada, the United Kingdom and the United States. There are, however, differences in the pattern of distribution for different types of government expenditures. Finally, when the effective benefit is estimated, New Zealand's distribution of expenditure appears more redistributive in favour of low-income groups.

CHAPTER SEVEN
CONCLUSION: AND WHERE TO GO FROM HERE

Everyone has an opinion about how government budget measures affect income distribution. These issues are extremely complex, however, if only because of the variety of activities governments are involved in. An evaluative method is required to assess the effects of the budget based on available information.

This thesis analyses budget incidence, illustrating the various theoretical approaches by defining four stages. The concept of budget incidence becomes more complex with each stage, as does the income concept.

Five main conclusions emerge from the quantitative study of the distribution of the central government current non-market revenues and expenditures by household income group and household type in New Zealand for 1981/82.

- 1) The 1981/82 central government budget does redistribute money income from the higher-income households to lower-income households. The personal income tax is the most important redistributive policy.
- 2) The household types which are estimated to receive the greatest net benefit from the 1981/82 central government non-market budget are one-adult and two-adult national-superannuitant households. These households are the main consumers of social welfare expenditure and government-provided health services.
- 3) Related to 2) above, when the money-income value of government expenditures are quantified by household type, the results show a redistribution from households with children to households without children.
- 4) Priority areas for a study focussing on the effect of the budget on income distribution include: the personal income tax, social welfare, health and educational expenditure.
- 5) Finally, the more theoretically comprehensive the evaluative approach, the less redistributive is the budget. This finding can only be tentative because the more theoretically consistent approaches, Stages Three and Four, were not carried out in a rigorous fashion. Nevertheless, it provides an argument for further development of the empirical general equilibrium incidence models.

Chapter Seven discusses the analysis which leads to the above conclusions. First, the quantitative results as derived in Chapters Three through Six are summarised in Section A. Section B then outlines some further areas of research which could be linked to the taxonomy developed in this thesis. Finally, Section C considers the issues involved in the specification of a computational general equilibrium model designed to analyse the effects of the government budget in relation to household income. The advantages of such a model are that economic effects of budget measures can be evaluated in a consistent fashion and it is possible to use the same index (household income) to assess distributional changes and efficiency changes.

A. THE QUANTITATIVE RESULTS

This section discusses the quantitative results in relation to the four stages elucidated in Chapter One, Section C. Each stage progresses from observable household market income data to a more comprehensive income measure.

Stages One and Two are accounting relationships. Recall, Stage One, money income including direct government transactions, is similar to the non-economist's view of the budget. The government is treated as an entity which taxes household incomes directly and provides goods with private benefits. Stage Two, money income adjusted for all budget non-market activities, broadens the definition of final household income to include the money-income effects of all central government current non-market transactions.

Stages Three and Four are discussed as a means of illustrating some of the economic behavioural relationships which are important to the determination of budget incidence. Stage Three, broad measurement of household income including budget transactions, attempts to take the on-going economic effects of government transactions into account in the initial income concept. Finally, Stage Four, economic measure of budget incidence by household income and type, is included to illustrate some of the issues involved if budget incidence were to be evaluated using a consistent economic theory.

A.1: Results from Stages One and Two

When household income is defined to take account of a money-income value of government budget transactions, it is distributed more equally than household market income. This conclusion holds in both the Stage One and Stage Two cases. On both of these cases, the effect of government current activity in 1981/82 is to reduce the share of final income accruing to the 50 percent of households in the upper income groups and increase the share of final income accruing to the 50 percent in the lower income groups.

Stage One and Two quantitative results are summarised in Tables A7.1 to A7.6, published in Appendix Seven. Looking at the final income distributions, the results of Stages One and Two seem very similar. However, as shown by a comparison of columns D and F in Table 7A.1 below, the distribution of government expenditures for Stage One is quite different from Stage Two.

Table 7A.1
 PERSONAL INCOME TAX DISTRIBUTION
 COMPARED WITH DISTRIBUTION OF STAGE ONE AND STAGE TWO GOVERNMENT EXPENDITURE
 (By Household Income Group for 1981/82)

Household Market Income (\$ p.a.)	Personal Income Tax Stage 1 & 2		Stage One: Gov't Direct Expenditure		Stage Two: Total Govt Expenditure		Comparative Figures	
	Amnt Dist		Amnt Dist		Amnt Dist		House- holds	H'holds Occu- pants
	A	B	C	D	E	F		
	\$M	%	\$M	%	\$M	%	%	%
Less than \$ 250	50	0.9	854	15.0	987	11.0	10.0	6.2
\$ 250 - (\$ 3,950)	89	1.6	792	13.9	952	10.6	10.0	5.8
\$ 3,950 - (\$ 9,750)	156	2.8	672	11.8	906	10.1	10.0	8.1
\$ 9,750 - (\$13,450)	255	4.6	452	7.9	702	7.8	10.0	9.2
\$13,450 - (\$16,900)	366	6.6	478	8.4	779	8.7	10.0	10.8
\$16,900 - (\$20,250)	483	8.7	461	8.1	802	8.9	10.0	11.0
\$20,250 - (\$24,200)	594	10.7	437	7.7	802	8.9	10.0	11.8
\$24,200 - (\$29,200)	777	14.0	459	8.1	886	9.9	10.0	11.4
\$29,200 - (\$36,650)	994	17.9	448	7.9	952	10.6	10.0	11.7
\$36,650 and over	1788	32.2	641	11.2	1216	13.5	10.0	14.0
Total	5552	100.0	5694	100.0	8984	100.0	100.0	100.0

Sources: Appendix Tables 7.1, 7.4.

The main difference between the Stage One and Stage Two approaches is the addition of collective government goods in Stage Two. Since collective goods account for about a third of government current expenditure, their inclusion makes a difference. It is noteworthy that the fact of their inclusion makes a difference, as well as the pattern of their distribution. Comparisons in Chapter Six (Section B) showed that different assumptions about the consumption of collective goods by household income only make a major difference to the distribution of total government expenditure to the upper income decile.

Even though the Stage One and Stage Two distributions of government expenditure shares are quite different, the final income distributions which take account of the budget are very similar. The reason for this is the significance of the personal income tax as a redistributive force. The amount of government expenditure in Stage One (\$5,697 million) is considerably less than that in Stage Two (\$8,984 million). Hence, although the Stage One approach estimates that government-provided goods are distributed more in favour of low-income groups than the Stage Two approach, the combination of the revenue and expenditure side of the budget does not result in a final Stage One income distribution which is more equal than that derived by Stage Two.

Stage One assumes that the economic effect of a budget transaction is the same as its legal effect. Based on the results in the general equilibrium literature, Stage Two also adopts the assumption that the personal income tax is not shifted. So, in both Stages One and Two, the personal income tax is treated the same, though for different reasons.

A comparison of the Stage One and Two results succeeds in showing the significance of the personal income tax in terms of income distribution. This result highlights a major weakness in tax incidence studies, be they quantitative studies or general equilibrium studies. More analysis is required of the detail of the personal income tax, both in relation to its legal effects and to its economic effects. This is discussed further in Section B of this Chapter.

A.1.a: Distribution of Payments and Expenditures

This section summarises the distribution of total payments and expenditures based on the Stage Two approach. Since Stage Two takes the view that ultimately households make all the payments to and consume all the goods produced by the central government, it is necessary to assume some behavioural relationships and this involves the results of general equilibrium studies.

Chart 7.1 below illustrates that the share of total payments to central government is much greater for households in the upper income deciles than for households in the lower deciles. On the other hand, the shares of government expenditures consumed are around 10 percent for each 10 percent of households. From this illustration of the Stage Two results, it appears that payments to government are very redistributive while government expenditures are roughly proportional.

CHART 7.1

COMPARISON OF SHARES OF CENTRAL GOVERNMENT
PAYMENTS AND EXPENDITURES 1981/82: STAGE TWO DEFINITIONS

A.1.b: Net Money Income Change From Budget Activities

Another way of summarising the results of the Stage Two treatment of central government non-market transactions by household income group is to calculate the net money-income gain (loss) from government budget transactions. The estimated net changes for each income group by household type are illustrated by Table 7A.2.

A.1.b.i: Net Change By Income Group and Cell Groups

As the final two columns of Table 7A.2 show, the net impact of the government's non-market budget was to redistribute money income from the upper five household income deciles to the lower five income deciles.

On average, the 10 percent of households earning a market income of less than \$250 are estimated to have received a net money-income benefit of \$7,955 from the government non-market budget in 1981/82. This works out at about \$3,978 per person occupying households in this income group. In contrast, households earning \$36,650 or more paid out \$12,104 more to the government than the money-income value of the government-provided goods they consumed. The net contribution per person in the highest income group is \$3,026.

Perhaps the most interesting results illustrated by Table 7A.2 are those for the individual cells. Unfortunately, because these cells rely on fewer observations when Household Survey information is applied, it is not possible to have as much confidence about the actual magnitudes as it is for the more aggregated figures. The patterns that emerge, however, bear further investigation. For example, the household types making the largest net contribution appear to be those one-child, two-adult households with market incomes in the upper 10 percent. The next largest contribution is made by two-adult households with two children. But while the largest average contribution is made by these particular high-income households which include children, the households with the greatest probability of making a net contribution to the government budget are childless households with two or more adults who do not receive national superannuation.

Table 7A.2

ANNUAL AMOUNT BY WHICH THE MONEY-INCOME VALUE OF 1981/82 CENTRAL GOVERNMENT EXPENDITURE^a CONSUMED BY A PARTICULAR HOUSEHOLD
EXCEEDS WHAT THAT HOUSEHOLD PAYS TO GOVERNMENT
(Average By Range of Household Market Income and Household Type)

	Household Type											
	1 Person		2 Adults Only		2 Adults With Children			3 or More Adults		1 Adult with Children	All House-Holds	Per Person
	Nat.Sup.	Other	Nat.Sup.	Other	One	Two	Three+	No Chldrn	W/Chldrn			
(\$s) Dollars Per Household Per Year												
Less Than \$250	5624	5280	9237	8882	8390	12035	12072	-	-	10678	7955	3978
\$250-(\$3,950)	5222	4383	8602	6074	4440	6405	10720	-	-	9583	6764	3382
\$3,950-(\$9,750)	4096	-109	7164	2786	4409	5176	7807	9659	10467	5942	4936	2468
\$9,750-(\$13,450)	988	-2386	4735	-442	1211	2811	5509	3982	6063	1125	1794	598
\$13,450-(\$16,900)	-	-3302	2454	-1520	12	1355	3182	5267	6638	-	1062	354
\$16,900-(\$20,250)	-	-4974	1122	-3293	-1901	-147	2370	1140	5589	-	-402	-134
\$20,250-(\$24,200)	-	-6393	-1516	-3528	-2848	-1757	792	-1092	2439	-	-1545	-386
\$24,200-(\$29,200)	-	-9121	-1442	-5804	-5341	-3082	-833	-3383	2389	-	-3087	-1029
\$29,200-(\$36,650)	-	-	-2205	-8298	-7701	-4516	-3691	-5482	-2283	-	-5375	-1792
\$36,650 and over	-	-	-13906	-14801	-24435	-17694	-12164	-11956	-7009	-	-12104	-3026
Total Per Household	4626	-1698	5456	-4435	-2400	-1296	1061	-4370	-181	7209	0	0
Total Per Person	4626	-1698	2728	-2218	-800	-324	212	-1457	-36	2403	0	0

Note : a) Government expenditure is as defined for the Stage Two approach. Cells with insufficient observations designated (-).

Source : Stage Two methodology as spelled out in Chapters Three through Six.

A.1.b.ii: Net Change From Budget by Household Type

Generally, the household types with the greatest likelihood of being net recipients from government are single-adult households with children, one- and two-adult national superannuitant households and two-adult households with three or more children. It is useful to take each of these groups in turn and analyse the extent to which these net receipts make them better off.

Single-adult households with children are considerably assisted by the government budget. Indeed, reference to Appendix Table A7.6 shows that this group earned only 0.9 percent of market income, but it is estimated to receive 2.4 percent of income adjusted for all government transactions. However, as the comparative distributions in Appendix Table A7.3 record, one-adult households with children account for 3.4 percent of the persons occupying private households. Hence, even after the redistributive effects of the budget are taken into account, this group does not receive a share of money-income equal to its share of the population. To get a proper perspective on what the share going to this group should be, it would be necessary to know if there are any relevant household equivalences to take into account. For example, do children require a lower level of money income to survive than adults?

In contrast to single-adult households, national-superannuitant households appear to receive a share of final Stage Two income which is greater than their share of the population. For example, the average single-person, national-superannuitant household is estimated to have received a net money-income increase of over \$4,600 in 1981/82 because of government budget activities (see Table 7A.2). In aggregate, this type of household received an estimated 4.8 percent share of final Stage Two income (see Appendix Table A7.6). This share is substantially greater than their 1.9 percent share of market income. It is also considerably greater than their 3.6 percent share of the population of private household occupants. Similarly, two-adult, national-superannuitant households are estimated to receive 9.6 percent of market income adjusted

for the government but represent only 8.3 percent of the total persons occupying private households.

According to Table 7A.2, the other group to receive a net benefit from the government budget is two-adult households with three-or-more children. Table 7A.2 shows that this group started out receiving 11.9 percent of market income and ended up with 12.9 percent of Stage Two final income. This share is substantially below the household type's 19.0 percent share of the private household population which resides in two-adult households with three-or-more children.

Again, because of the large proportion of children in two-adult households with three-or-more children, an analysis of equivalences would assist in putting the results in perspective. It is food for thought that this household type is estimated to receive an average net money-income gain from the 1981/82 government budget of approximately \$1060 per household but this translates to only around \$210 per year per occupant.

A.1.b.iii: Analysis of Net Change: Conclusion

In conclusion, this Section has analysed the budget in terms of the difference between the payments from households to the government and the money-income value of the government-provided goods consumed by households. It shows that the government budget is redistributive, in the sense that some groups receive a net money-income gain from government activity while others are net contributors.

Large net money-income gains because of government activities, however, do not always improve the relative money-income position of some groups. For example, the relative positions of single-adult households with children and two-adult households with three-or-more children are only slightly improved, even though the average net benefit from the government to these groups is substantially higher than for most others. In contrast, the relative money-income position of national-superannuitant households is improved more than is justified by the share of the population represented by this group.

A.1.c: Differences Between Distributions by Households and Persons

Chart 7.2 is a Lorenz diagram for final Stage Two money income (the measure of income which takes into account the net money-income of budget activity). The Chart shows that the equality of distribution varies for households and persons occupying private households. The distribution of final Stage Two income by occupant is closer to the line of equality than the distribution by the final income of households.

All persons are treated as homogeneous for the purposes of analysis in Chart 7.2. Further work to develop equivalency scales based on the different characteristics of the occupants of households could result in a different Lorenz curve.

CHART 7.2
COMPARISON OF THE EQUALITY OF DISTRIBUTION OF STAGE TWO FINAL INCOME
BETWEEN PERSONS AND HOUSEHOLDS IN 1981/82
(Takes Account of Total Central Government Non-Market Activity)

A.2: Conclusions from Analysis of Stages Three and Four

Stage Three takes the view that if households are the basis for the analysis of the effects of the entire budget, then their income and demand must be defined to include all transactions which might be influenced by the budget. Stage Four takes the view that a consistent attempt should be carried out to include all of the economic effects of the budget. Some of the developments required to carry out Stages Three and Four are discussed in Section C of this Chapter.

Initial Stage Three income is a broad measure of income. In effect, gross national product has been imputed to households to recognize household involvement in enterprise. Adjustment to income aggregates are carried out to reflect the pre-tax value of these income aggregates. The calculations of payments to government and the money-income value of central government non-market expenditures are the same as the Stage Two approach carried out in Chapters Five and Six respectively.

The most important outcome of the Stage Three approach is that it shows the government budget to be less redistributive than shown by the Stage One and Stage Two approaches. The top decile's Stage Three final income share is 23.4 percent, which compares with a share of 20.4 percent Stage Two final income. The bottom decile's share of Stage Three final income is 3.4 percent compared with 4.2 percent for Stage Two.

Since the Stage Two and Stage Three treatment of the government budget are the same, the differences in the results are explained by the treatment of income at the base. Specifically, those in the highest income group start out with a bigger share of "broad" income in Stage Three because they tend to be the owners of the companies whose income is imputed to households.

When the Stage Three results are analysed by household type (see Appendix Table A7.8), they show a larger final income share going to one- and two-adult national superannuitant households than was shown by the Stage Two approach. This reflects the fact that, besides high-income households, retired people tend to own company equities. Their share of "broad" income is larger than their share of market income.

When the effects of budget policy are also taken into account following the Stage Three approach, the national-superannuitant share of the final distribution is considerably above their share of the population. In contrast, single-adult households with children end up with a much smaller share of final income under the Stage Three approach than under the Stage Two approach.

The approach in Stage Three has not been nearly as systematic as the approach in Stage Two, so these results must be seen as even less indicative than Stage Two. Even so, they serve to emphasise the importance of the definition of income at the base of a study such as this one.

A.3: Effective Rates of Payments and Expenditures

Another method for analysing the results of quantitative studies is to express them in terms of effective rates. An effective rate is defined as the proportion the money-income value of the government payment or expenditure is of some measure of household income. For example, if total payments to the government by the highest income decile are \$2,531 million and the market income accruing to this decile is \$5,211 million, the decile's effective payment rate is 48.6 percent.

Table 7A.3 analyses effective payment rates and effective government-provision rates in relation to seven different measures of income. The seven measures include **market income**, the Stage Three definition of **"broad" income**, the Stage Four definition of **adjusted broad income**, the Stage One definition of **household income available to spend**, a definition of **income which excludes direct monetary benefits and personal income taxes** and the Household Survey definition of **total income** and the Stage Two definition of **final income**. Table 7A.3 shows that there is a considerable difference in the effective rates, depending on the definition of income which is applied.

Total payments are all payments to government analysed by the Stage Two approach (see B Columns, Appendix Table 7.4). Total government provision is the money-income value of all government expenditures as analysed by the Stage Two approach (see C Columns, Appendix Table A7.4).

Table 7A.3

EFFECTIVE RATES OF PAYMENT AND EXPENDITURE: DIFFERENT DEFINITIONS

Household Market Income (\$ p.a.)	Government Revenue as at % of:							Government Expenditure as % of:						
	Market Income Stage One & Two A	Broad Income Stage Three B	Adjus. Broad Income Stage Four C	H'hold Income to Spend Avail. D	H'hold Income to Spend Less Direct Monetary Benefits E	Total Income F	Stage Two Final Income G	Market Income Stages One & Two H	Broad Income Stage Three I	Adjust Broad Income Stage Four J	H'hold Income to Spend Avail. K	H'hold Income to Spend Less Direct Monetary Benefits L	Total Income M	Stage Two Final Income N
	Effective Government Payment Rate							Effective Government Benefit Rate						
	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Less Than \$250	-727.3	114.3	500.0	27.5	-221.6	25.4	19.9	-4486.4	705.0	3084.4	69.6	1366.4	156.3	122.6
\$250-(\$3,950)	147.6	42.8	57.7	36.7	310.6	32.5	28.8	560.0	162.2	218.9	139.4	1179.3	123.3	109.3
\$3,950-(\$9,750)	55.1	27.8	30.3	40.9	69.9	35.3	32.6	123.9	62.5	68.2	91.9	157.4	79.4	73.4
\$9,750-(\$13,450)	42.9	28.6	30.3	44.4	54.3	36.5	37.3	57.6	38.4	40.7	59.7	73.0	49.0	50.4
\$13,450-(\$16,900)	43.1	29.3	29.5	48.4	56.2	38.3	40.3	49.8	33.9	34.1	55.9	64.9	44.2	46.6
\$16,900-(\$20,250)	43.9	31.1	36.7	52.7	58.7	40.5	44.9	41.7	29.6	34.9	50.1	55.8	38.5	42.7
\$20,250-(\$24,200)	42.2	31.2	34.5	53.2	57.0	40.1	45.6	35.1	25.9	28.6	44.1	52.2	33.3	36.2
\$24,200-(\$29,200)	43.7	32.0	42.6	56.4	60.6	41.4	49.4	31.9	23.4	31.1	41.2	44.3	30.3	37.7
\$29,200-(\$36,650)	44.9	32.7	37.8	60.2	63.6	43.2	53.9	28.1	20.4	23.7	37.7	39.8	27.0	33.8
\$36,650 and over	48.6	31.8	23.6	70.6	73.9	47.1	65.0	23.4	15.3	11.4	34.0	35.6	22.7	31.2
Total (%)	47.2	31.9	31.9	55.1	66.3	41.2	47.4	46.7	31.5	31.5	54.5	65.6	40.8	46.9

Note: (-) minus sign means the effective rate is calculated in relation to a negative income value (loss).

The effective payment rate is all non-market payments to central government as a proportion of the income definition. The effective government benefit rate is the money-income value of all government expenditures as a percentage of the income definition. Source: see text for derivation.

A.3.a: Effective Payments and the Concept of Ability to Pay

The significance of the effective rate calculations is that they put the principle of ability to pay into context. A reasonable interpretation of this principle is that ability to pay for government should be an increasing function of income. In this sense, the payments structure appears to measure up quite well. Referring to Appendix Table A7.4, those in the lowest five income deciles contribute a relatively small share of total government revenue. Certainly, the share contributed is considerably less than the 10 percent share of households in each group.

When the amount paid to the government by the lower-income groups is measured in proportion to their **market income**, (see Column A, Table 7A.3) the picture of how the ability to pay criteria are carried out in practice changes somewhat. The two lowest income deciles pay a far higher effective rate than the other deciles. Indeed, their effective rates are more than 100 percent of market income.

When **Stage Three broad income** or **Stage Four adjusted broad income** are the basis for comparison (see Columns B and C, Table 7A.3), the effective rates are also more than 100 percent for some of the lower income deciles. As is the case with market income, these income definitions reflect a concept of income before government transactions are taken into account. Consistent with this concept, no direct payments to government are deducted and no direct payments from government are added to the income base.

Another interpretation of ability to pay is that the relevant concept is an income concept which includes transfer payments from the government. Two income measures which include transfer payments (monetary benefits) are **household income available to spend** (a concept of disposable income which excludes personal income taxes) and **total income**. The effective payment rates based on these concepts are illustrated by Table 7A.3, Columns D and F. In both these cases, the effective payment rate is an increasing function of income and the three lowest income deciles pay a considerably lower effective rate than the other cases.

Another possibility is that the concept of ability to pay turns on the definition of a household's purchasing power before government-provided benefits (including monetary payments) are taken into account. The concept is represented by Column E, **household income available to spend less direct monetary benefits**. Based on this concept, the effective payment rates for the bottom income deciles are several times the amount of purchasing power accruing to the households.

Over the whole income range, however, the effective payment rates in Column E form a U-shaped pattern. After falling for the bottom four income deciles, the effective payment rate becomes an increasing function of income for the upper six income deciles. A major reason for this is the treatment of personal income taxes. They are in a sense double counted, acting both to reduce the denominator and increase the numerator of the effective rate comparisons.

Whatever income measure is at the base of effective rate calculations, it should be consistent with the economic concepts applied to evaluate the effects of the budget. Based on this view, another basis for calculating the effective payment rate is **Stage Two Final Income**. This income measure is calculated using the same methodology applied to calculate the distribution of payments by household income decile. Column G shows the rate of payment to be an increasing function of Stage Two Final Income. This effective rate calculation also suffers from double counting because personal income taxes are subtracted from both the denominator and the numerator. This results in a higher effective rate for those (upper) income deciles paying the most personal income tax.

For the majority of households, those in the middle-income groups, the effective payment rate is roughly proportional. The average proportional rate varies with the income definition at the base, ranging from a low of 31.9 percent to a high of 66.3 percent.

The analysis of effective rates in this Section suggests that in actual practice, the principle of ability-to-pay is interpreted in an absolute sense. In other words, the absolute amount paid to the government increases with the household's income but it is about the same proportion of income for every income level.

A.3.b: Effective Benefits

Turning to the effective "benefit" rates, the general pattern that emerges is one where the proportion of government-provided goods is a declining function of household income, however defined. Of course, underlying these results is the implicit assumption that the index of the marginal utility of income is constant as income rises. If the view is taken that the marginal utility of income rises with income, then the effective benefit for those in higher groups would be greater.

A.3.c: Comparisons with Results of Other Studies

The pattern of effective payment and benefit rates is broadly similar to that found by Gillespie (1965, 1966) in studies for Canada and the United States. It is also similar to the pattern found by the Musgrave et al (1974) and Reynolds and Smolensky (1977) for the United States and O'Higgins and Ruggles (June and Sept. 1981) for the United Kingdom and the United States.

But while the patterns are similar, the extent of redistribution in New Zealand is greater, according to the results of this thesis. This is for two reasons. First, the distribution of payments to the government is steeper for the New Zealand case, suggesting that those on high incomes contribute a greater share of government revenue here than overseas. Secondly, the distribution of expenditures is not as flat in the New Zealand case suggesting that those on low incomes benefit to a greater extent here than overseas.

Research conducted by the Institute of Policy Studies analyses the impact of the proposed goods and services tax (see Broad and Bacica, 1985: Scott, Goss and Davis, 1985). Their results were mainly expressed as effective rates when disposable income or household expenditure was the tax base. It is not easy to make a direct comparison with the results of the Institute of Policy Studies Research because of the way in which the results are published. The results are broadly consistent with those in this thesis. The personal income tax appears to be slightly more redistributive in 1981/82 than it was for June quarter 1986 (the base period for the quantitative research carried out by Broad and Bacica).

This difference is largely explained by two factors. First, there were changes to the tax structure since 1981/82. Secondly, Broad and Bacica made a number of changes to the treatment of the personal income tax which were not incorporated in ASSET when the work for this thesis was being carried out.

CHART 7.3
EFFECTIVE RATES OF PAYMENT, BENEFIT AND
NET RESIDUE FROM CENTRAL GOVERNMENT BUDGET
TRANSACTIONS BY HOUSEHOLD TOTAL INCOME IN 1981/82

Effective Rate (%)

Chart 7.3 above compares the effective payment (tax) and expenditure (benefit) rates for New Zealand, using total income as the denominator. It shows that the effective rate of tax increases slightly as income rises while the effective rate of expenditures (benefits) increases sharply as income decreases, especially for the low-income groups.

Sawyer (1976, p.14) compares New Zealand's income distribution with that of twelve other members of the Organisation for Economic Cooperation and Development. His comparisons show New Zealand's pre-tax and post-tax distribution to be more equal than the OECD average for the late 1960's, early 1970's. The results of this thesis are also more equal than the OECD average that is calculated by Sawyer.

Another fascinating comparison is between the Stage One and Stage Two results in this thesis and the O'Higgins and Ruggles' (1981) and Central Statistical Office (CSO) results in the United Kingdom. The CSO quantitative studies have generally avoided allocating those taxes and expenditures where methodological uncertainties exist about their incidence so that about one-third of government revenue and over one-half of expenditures are excluded from their estimates. O'Higgins and Ruggles attribute this to the reticence of an official government agency to take sides in unresolved methodological disputes. The outcome is that the CSO methodology is like the Stage One approach where only "direct" expenditures and taxes are allocated. Similar to the results of this thesis, the decision to exclude certain budget items makes a difference to the final distribution of the items that have been included.

The main difference between the CSO work and the O'Higgins and Ruggles' results is that the CSO allocation finds both expenditures and taxes to be more pro-low-income group. In comparison, the Stage One approach in this thesis shows taxes to be distributed in about the same pattern as the Stage Two approach, but expenditures are distributed in a more pro-low-income pattern. The main reason that the Stage One taxes are not also more pro-low income is because this thesis analyses some "direct" indirect taxes which are not included in the CSO analysis.

An interesting feature of the O'Higgins and Ruggles' results is that in moving from the CSO partial allocation of the government budget to total allocation (similar to the Stage Two approach in this thesis), the greatest net gains are to the middle-income deciles. The authors see this as evidence that the earlier CSO results generally overstate the degree of income redistribution in the U.K. Certainly, the similar conclusion in this thesis, from a comparison of the Stage One and Stage Two approaches, is evidence that the more theoretically-comprehensive approaches show the budget to be less redistributive.

B. FURTHER AREAS OF RESEARCH

If nothing else, the results of this thesis show that the study of the influence of the governments budget on income distribution is extremely complex. To date, the task of researchers has been to design an approach which is extensive enough to take account of the most important legal, statistical and economic effects of the entire budget. A job of such breadth could only be accomplished by the adoption of a large number of rough assumptions.

Having adopted similarly rough assumptions, this thesis suffers from many of the same limitations of the earlier empirical and quantitative studies. But an important aspect of this analysis is that it has attempted to describe the various components of the budget in detail. Hence, it is possible to identify the areas where the most is to be gained from a more rigorous economic approach.

For example, the personal income tax (as it was structured in 1981/82) appears to be by far the most important redistributive budget measure. Therefore, additional research to refine the ASSET model is of clear value. Other rewarding research includes further analysis of monetary benefits, health, education and collective expenditures (in that order of priority). Finally, an area where further research is required, which has not given explicit treatment in the quantitative results is the influence of the government budget deficit on household incomes.

B.1: The Incidence of the Personal Income Tax

The results show that the most important redistributive force is the personal income tax. To derive Stage One quantitative results, it is assumed that the personal income tax is a direct tax and is not shifted, or in other words, it is paid by those who are legally liable. Looking only at the direct effects of the tax, it is likely that there is a difference between the legal liability for the personal income tax and what people pay (their actual liability). The ASSET model has been designed to specify the parameters of legal liability for the tax, based on the Household Survey. Further analysis is required to more fully integrate the Inland Revenue Department information about actual tax payments with the ASSET model. Some specific areas for further work

include a fuller specification of tax paid by the self-employed (including an analysis of expenditures incurred while deriving an income) and of the first-home-owner rebate.

Priority should be given to the analysis of the incidence of the personal income tax. The main issue is the validity of the mainstream view in the economics literature that the personal tax is paid directly out of household income.

Chapter Two shows that the Shoven, Whalley, Fullerton (SWF) general-equilibrium models are very thorough in their coverage of taxes. However, their treatment was rather broadbrush in that the taxes are specified in relation to some theoretical equivalent and not according to the way liability for the tax is defined by law. Moreover, while recent versions of SWF models have treated the personal income tax in greater detail, (see Piggott, 1983), there is much more work required to refine key behavioural relationships such as the labour/leisure trade off.

If the economic incidence of a carefully specified personal income tax were assessed, it seems likely that the resulting household income redistribution would be less than that indicated by the results of this thesis. What little evidence there is suggests that those on higher incomes have a greater opportunity (because of the economic power reflected by their higher income) to change their behaviour so as to reduce their tax contribution.

B.2: The Incidence of Government Expenditures

On the expenditure side of the central government budget, more data are required to identify the users of government-provided goods. Then, the next step is to analyse how the distribution to initial users is changed when economic effects of the budget are taken into account.

B.2.a: More on Monetary Benefits

The quantitative results show that social welfare programmes (including national superannuation) are the second-most redistributive after the personal income tax. This is based on a comparison with market

incomes, where national-superannuitant households are found to be mainly distributed in the lower-income groups.

It is possible that the value of assets owned by those over 60 is greater than for other age groups on average. Some issues, such as the ability to make payments to the government and the determination of need for social welfare support, could be treated more fully if the income concept included more details about ownership of assets, especially home ownership. A further research project would be to analyse the Household Survey data about household assets and the Census data on home ownership to discover if national-superannuitant households fall in low-income groups when the income concept is expanded to include a value for assets.

To some economists, national superannuation is not like other income maintenance schemes. It is seen as a transfer of risk to the government instead of individuals planning for themselves. Clearly, to get a perspective on this issue, it would be valuable to learn more about household life-cycle income behaviour and the effect of national superannuation expenditure on patterns of long-term savings.

B.2.b: More on Health Expenditures

Also a priority is to find out more about the users of hospital and of the health services. If the Population Census data were integrated with the National Health Census, fuller details about income, race, family background, and type of hospital treatment could be known. To measure the distribution of health expenditure, information about the cost, and some measure of the quality of bed-care services by patients is also required.

In combination, national superannuation and health expenditure represent major resource transfers in favour of those over 60 years of age. This improves the relative economic positions of national superannuitants, providing them with a final money-income share which is greater than their share of the population. Further research is required to establish whether the weighting for hospital costs used in this thesis accurately reflect the costs of care to the elderly.

B.2.c: More on Education

Another area where improved data are required, is education usage. Fuller details about the income and race of students and the quality of education services consumed are required.

The Census information is able to be broken down into regions and another area for further research might be to analyse the effect of the budget by region. Of particular interest is educational expenditure by school district, disaggregated by level at school so that it could be analysed by the regional distribution of household income using age as the distributor.

B.2.d: More on Collective Goods

The treatment of collective goods seems to explain the difference between the Stage One and Stage Two results. Thus, an attempt should be made to identify whether there are any direct beneficiaries from the expenditures classified as government collective goods in this thesis. For example, there may be some aspects of defence expenditure which are similar to private goods and should, therefore, be analysed by the Stage One approach.

In addition, this is an area where further research is required to establish the incidence of government expenditure. Collective goods are distinct from private goods. The challenge is to model them so that the pertinent differences can be taken into account.

B.2.e: More on Government Expenditures

Meerman (1978) makes a case for analysing government expenditure incidence to complement studies of tax incidence. In addition, further work is required to analyse the effect of transfer payments on income at the margin. Other work is required to derive appropriate relative prices for government-provided health and education as opposed to the prices of similar goods provided by the market. Finally, research is required to determine whether externalities have significant redistributive consequences.

B.3.: The Effects of the Budget Deficit By Household

Budget deficits have become a fact-of-life of modern mixed economies. While it may be acceptable for models of tax incidence to ignore the budget deficit, it does not make sense for redistribution studies. The choice of a particular budget-balancing technique may in fact obscure the incidence of a particular budget proposal and limit the usefulness of a model.

There are a number of factors related to the budget deficit which could have significant consequences for redistribution. Among them are the questions of whether the budget deficit redistributes income to past, present or future generations. Recent deficits have been at least as large as major government expenditure items such as national superannuation, health, education and so on. Thus, the incorporation of more information about the deficit's distributive effect could make a considerable difference to the results of a study of the redistributive effect of the government budget.

Government expenditure to pay interest on its debt has been one of its most rapidly increasing expenditures in recent years. To assess this in relation to household income distribution, it is necessary to discover more about the owners of government debt, how this affects economic activity and what the implications are for households.

B.4: Pot Pourri

Quantitative studies have several major limitations and the one carried out in this thesis is no exception. The most basic, but also the most problematical limitation, is the assumption that the distribution of earnings before the budget is unaffected by the ongoing fiscal process. A second limitation is the necessity to hypothesize about the shifting of various payments to government and the provision of government goods leading to results based on inconsistent macro and micro-relationships.

A criticism of quantitative redistribution studies is that they are merely a snapshot of the economy at a given point in time and do not capture the cause and effect of change. Given that one of the implied

reasons for studying income distribution is to predict policy responses which may improve it, this is a valid criticism. But certainly the first step must be to analyse the distribution of income against some standard. In this case, a snapshot is a perfectly acceptable frame of reference.

Comparison of post-budget household-income distribution with the distribution of market income over a number of years may show some correlation between budget measures which appear to change (increase or decrease) relative money income in a particular year and longer term changes in income distribution.

Chapter Four was written from the angle of the wealth of material in the national accounts which is largely ignored by researchers who have designed their models from the point of view of theoretical economic concepts. The achievement of better results, however, will be an iterative development because as more is learned about economic effects, there will be an identification of things not presently measured. General equilibrium analysis, perhaps the most widely used theoretical framework for economy-wide microeconomic analysis, is only explicitly recognized in the construction of current national income accounts in the aggregate income-expenditure identity, but not in aggregate detail.

General equilibrium models of the SWF variety provide the key to reducing some of the limitations of quantitative studies. For questions of income maintenance, the models need to be specified in such a way that they can distinguish short-run from long-run effects. Before meaningful results can be derived, however, there is a need for more information about households' ownership of assets.

The next step will be to reduce some of the restrictive assumptions of general equilibrium models which may impinge on income distribution. For example, the models are based on restrictive assumptions such as full employment and perfect competition which may obscure significant redistributive effects.

C. WHERE TO FROM HERE : COMPUTATIONAL GENERAL EQUILIBRIUM MODELS

As Shoup pointed out in 1972, econometric models do not take a realistic view of the institutional effects of government expenditure and taxation. On the other hand, quantitative studies may be able to discuss various institutional effects, but without a systematic model it becomes more difficult to maintain internally consistent economic relationships.

Commenting on Shoup (1972), Musgrave said:

"...to construct a general equilibrium model of the Walrasian type which includes not only all relative product and factor prices but also their relationship to the size distribution of income is an enormous, if not impossible task" (p.68).

Over the fourteen years since Shoven and Whalley (1972) first pioneered the multi-sector approach to the analysis of tax effects, the advent of less expensive and more consumer friendly computers has eased the execution of general equilibrium models. It is no longer the solution methods that constrain model applications. Instead, it is the availability of data and the ability of modellers to specify key parameters which determine how the models can be applied.

The most important contribution of the developing framework for evaluating the effects of budget policy is the new insights offered to policy issues. Amongst these is the ability to address distributional and efficiency aspects.

C.1 Income Distribution Versus Excess Burden

Shoven and Whalley (1984) discuss the reaction of policy makers to the results of tax research in the United States:

"For several years following the original Harberger work on the resource allocation effects of taxes in the United States, public finance economists argued that deadweight losses from taxes were small (perhaps one percent of GNP per year). When combined with the results of incidence studies, [e.g. Pechman and Okner, 1974]... suggesting little redistribution from the tax system, this often led to a policy stance in favour of redistributive tax changes with only limited attention focussed on changes designed to improve allocative efficiency".. (p.1032)

Shoven and Whalley go on to say that a striking feature of the results from the general equilibrium tax models is their suggestion of considerably larger deadweight losses (efficiency losses) from tax distortions than previously assessed. In addition, "they do seem to indicate that tax policies may have more redistributive power when their general-equilibrium effects are taken into account". (p.1032)

They do not pursue this latter point in detail. Instead they note that the combination of a graduated schedule of marginal tax rates and the existence of a variety of preferences on assets held by households could result in a more progressive tax system than might initially appear. This is because the general-equilibrium solution yields reduced before-tax returns on the preferred assets, relative to fully-taxed assets, thereby lowering the after-tax returns available to higher-income households.

Further research is required to prove this point. As discussed in Section B of this Chapter, the modelling of the personal income tax needs much development. If factors such as avoidance of tax turn out to be significant, these could offset the progressive effects mentioned by Shoven and Whalley.

The clear message of recent policy initiatives is that whether its true or not, policymakers consider that the excess burden effects of budget policies are significant. Indeed, in some cases they are held to be so important that it is not considered worthwhile to adopt redistribution policies because they would be undone by excess burden effects. Thus, when a budget change is introduced, there is a need for a measure of the desirability of the change which takes account of both efficiency and distributional aspects.

As discussed in Chapter Two, the Harberger model was originally designed to measure both incidence and efficiency loss. The efficiency cost of capital taxation was measured by the change in capital. A unit of capital was defined as that which earns a dollar net of all taxes and hence this change in capital could be interpreted in income terms and compared to national output. Incidence was measured by the change in the price of capital relative to the size of the tax.

SWF general equilibrium models measure welfare changes and their distribution among households in terms of income changes. Such a measure is based on a social welfare function. Ballentine and Thrisk (1979) and Piggott (1980b), amongst others, generalize the function implicit in the use of sums of compensating and equivalent variations (measures of welfare cost widely used in welfare economics).

When there is an explicit utility function generating demands, the comparison is based on the change in income that would compensate each household for any tax changes. As is well known from index number theory, compensating and equivalent variation provide bounds on the welfare change.

With this method, unambiguous rankings of alternative tax arrangements are possible, given estimates of their efficiency and distributional effects. Piggott (1980a, 1980b, 1983) indicates the distributional effects of taxes by incorporating summary measures of equality, including the Gini coefficient and the Atkinson variation, to calculate the overall changes in the equality of incomes.

Piggott (1980a) found for Australia that personal taxes are the most important of taxes analysed in terms of both welfare and distribution. There would be a very substantial welfare gain if personal taxes were removed. This gain comes about because of the trade off between labour and leisure and the tax break available to households who are owner-occupiers. On the other hand, the elimination of personal taxation has a considerable influence on increasing the inequality of income distribution.

To date the research into distributional equality and efficiency has largely focussed on the effects of taxes. The difficult theoretical problem is how to incorporate government expenditures into the analysis.

C.2: Developing SWF Models to Analyse Budget Policy By Households

SWF general equilibrium modeling has developed in an innovative fashion and some researchers indicate an apparent interest in budget policy. Nevertheless, the SWF models do not presently specify a number of key parameters for the study of the redistributive effects of the

budget. This thesis is designed to show what some of them are.

In other words, this thesis takes the opposite position from the SWF general tax incidence equilibrium studies. The general equilibrium studies fit observable data into models which specify economic and behavioural relationships. This thesis starts from the perspective of observable data, first to discover what it shows in relation to household income distribution and second to analyse what insights this provides for specifying relationships in the more formal SWF models.

With the development of computational techniques, the SWF models have been extended to where the detail contained includes input-output transactions tables, national accounts, household income and expenditure data, taxation statistics, foreign trade statistics and flow-of-funds information specified in terms of several production sectors and household income groups (see St. Hilaire and Whalley, 1983). Sophisticated calibration techniques have been designed to adjust all of these sources for mutual consistency.

Mutual consistency is determined in light of the equilibrium conditions adopted. The four sets of equilibrium conditions which are generally specified in in SWF models of tax incidence are:

- 1) Demand equals supplies for all commodities;
- 2) Non-positive profits are made in all industries;
- 3) All domestic agents have demands which satisfy their budget constraints; and,
- 4) The economy is in zero external sector balance.

The primary behavioural equations in SWF models are production and demand equations. Elasticities of substitution between factors or goods are usually selected from previous econometric studies, sometimes carried out for entirely different purposes than the assessment of tax incidence. This means that either the range of parameters used is chosen based on the range of estimated values available or that specific estimates for the parameters are chosen from particular studies. If the

SWF studies were based on elasticities consistent with the data used in their empirical models, their results would be more robust.

Instead, estimates of parameters may vary from study to study and there are no clear rules for deciding among alternatives. The unclear time frame of general equilibrium models adds to this problem. According to the Fullerton, Henderson and Shoven (1982, p.48) survey of the SWF literature, the results are very sensitive to alternative parameter values. This indicates "the importance of developing careful parameterization procedures".

A dynamic model may be more applicable to the analysis of redistribution. Welfare changes are more complicated in a dynamic model. It is necessary to use a present value calculation which will be, of course, sensitive to the discount rate chosen. In addition, the present value welfare gains should be measured only for the initial population, so that the steady state growth rate does not distort the results.

The main difficulty with the existing literature, however, comes down to the treatment of the expenditure side of the budget. The valuation of government-provided private goods is important for two reasons. First, it makes a difference to households that they are provided with goods and services by the government. Related to this is the second consideration that it makes a difference whether the goods are provided by the government or by the private sector. The importance of this difference is a matter of belief for many. But to simply assume that the publicly-provided goods are pure substitutes for privately-provided goods, as the SWF literature does, is to finesse the most important issues.

What the literature about the economic effects of expenditures shows is that the expenditure side of the budget affects income distribution in two ways:

- 1) through the expenditure *per se*
- 2) through the output of goods and services associated with these expenditures.

The valuation of government-provided private goods is fundamental to an objective assessment of the efficiency of government spending. Differences between government-provided goods and those provided by the private sector may centre on esoteric features of the goods related to consumers' assessment of their "quality". There are difficulties in assessing what consumers think about such things, not least because of free-rider problems where to avoid compulsory levies, taxpayers disguise their true preferences.

Keller and Piggott attempt to specify the expenditure behaviour of the government more precisely than other SWF models. But in the end, their description of how consumers choose government-provided private goods is little different from the original Shoven and Whalley (1972) approach which simply treated government goods as perfect substitutes for private goods.

Meerman (1978) shows that there is no reason why the econometricians should need to ignore the expenditure side of the budget. Although there are difficulties in modelling it, these are no different than the difficulties faced with modelling the tax side. Reynolds and Smolensky (1977) attempt to solve some of the same problems that interest Meerman and end up carrying out a quantitative study with the innovation of extending the analysis over three calendar year periods.

Not least because of its greater elegance of expression, Meerman's approach is preferable to that of Reynolds and Smolensky. However, until it can be incorporated into a general equilibrium model which overcomes some of the shortcomings outlined in Chapter Two, the Reynolds and Smolensky approach offers a method for analysing the influence of both the revenue and expenditure side of the government's budget.

This thesis has tended to highlight the features of the computational general equilibrium models which are common to each of the SWF models. This has been necessary to describe their strengths and limitations when it comes to the analysis of income distribution issues. It would be extremely misleading, however, to leave the impression that these models are all the same. Each of the models differ in structure in several ways. To a large extent, these differences arise because of the different interests of the researchers. The core models are quite

detailed, so the choice of further elaboration will depend on the topic of analysis and the balance between simplicity and accuracy of detail.

Besides augmenting the models to better explain the relationship of the household sector to the rest of the economy and to treat government expenditure more realistically, another area for further development is the treatment of government deficits. To handle a government budget which is out of balance requires the specification of a government bond market. In common with most incidence research (both quantitative and empirical) this thesis has centred on the money-income effects of the real economy.

Lacking a flow-of-funds account in New Zealand, it would have been difficult to incorporate a rigorous analysis of financial markets. As described in this thesis, some SWF studies have begun to model financial behaviour, but substantially more could be done in this area.

One way of modeling the general-equilibrium effects of the budget in New Zealand would be to augment existing general equilibrium models. Two candidates are the University of Canterbury SWF-type model and the Victoria University Joanna model. Both are discussed in Chapter Two, Section D.

One of the virtues of Victoria University's Joanna model is that it provides a wealth of information about the effects of a policy change both at the level of the macroeconomy and at the sectoral/commodity level. Joanna can be applied to analyse the economic implications of a tax change in relation to exports, imports and the balance of payments, for employment, economic activity and real gross domestic product and for individual sectors of the economy.

A long-run version of the Joanna model was used to simulate the imposition of the goods and services tax and the removal of wholesales sales tax. Personal income tax cuts which are intended to accompany these indirect tax changes are determined by the model by constraining the ex-post implications to an assumption of no change in the government's Budget Table 2 deficit. The results for disposable incomes are expressed in aggregate with the income tax cuts modelled as being across-the board over all households. According to the Research Project

on Economic Planning (RPEP):

"The modelling of selective income tax reductions and the maintenance (or improvement) of the 'living standards' of certain households disaggregated by income division) could be one of the items on the agenda for further GST/WST research to be undertaken by [RPEP]". (Nana and Philpott, 1985, p.4).

C.3: Meanwhile, Back to Basics

It may take some time before some of the conceptual problems involved in measuring budget incidence can be solved. Meantime, an alternative way of analysing the income distributive effects of the budget is to repeat the quantitative approach at the base of this thesis over a number of years, looking for any pattern of changes in macroeconomic variables such as unemployment, output and so on.

This approach has at least three things in its favour:

- 1) It is easily understood because the economic effects which are incorporated are discussed explicitly. This allows policymakers the opportunity to involve the public in its decision making;
- 2) It makes use of available data, some which is already designed for such analysis including that incorporated in the Department of Statistics ASSET model;
- 3) It can be easily improved through the involvement of others because the main framework is accessible even to non-economists.

Finally, despite their greater sophistication, the incidence results of computational general equilibrium models do not differ all that much for the results of quantitative studies. For example, in both cases the personal income tax is redistributive towards low-income households. At this stage, the value of the SWF models is the potential to measure both distribution and efficiency aspects. But this cannot be developed further until more is understood about the effects of government expenditures.

There is still a considerable amount to learn about the effects of government expenditures using the quantitative approach.

C.4: Evaluating the Budgets' Influence in New Zealand

The introduction of the goods and services tax from 1 October provides an opportunity to see if any significant economic effects could be isolated using a quantitative approach such as this. For example, if there are changes to the economy beyond those expected because of the change in the budget, then these changes could be identified as being part of the response to the changes in taxation.

Developments in the design of general equilibrium models of the New Zealand economy also provide the opportunity for more consistent treatment of the economic problems of analysis of the income-distributive effects of the budget.

APPENDICES

APPENDIX ONE

NOTATION USED IN THIS THESIS

Listed below is the notation used in this thesis. Notation is first used in Chapter One. However, it appears most frequently in Chapter Two.

A	= All factors owned by household.
B^G	= Marginal value of unit of G .
B^P	= Marginal value of private good Q financed by government.
$\hat{C}_t$	= an "expanded" concept of current potential consumption.
d	= Sign for differential.
E	= Elasticity of demand (usually for product x) ¹
G	= Quantity of public good.
g^G	= Government expenditure on group consumption goods.
g^k	= Government capital formation
g^P	= Government expenditure on specific goods and services (private goods)
g^t	= Transfer payments.
H	= Household income (aggregate).
$\hat{H}_t$	= All current net inflows of resources available to the household
h	= Individual household income.
K	= Capital.
K^x	= Capital allocated to producing x .
K^y	= Capital allocated to producing y .
L	= Labour.
P	= Prices corresponding to Q .
p_x	= Price of product x .
p_y	= Price of product y .
Q	= Private goods and services.
R	= Total government receipts.
r^C	= Public charges and fees.

r^D	=	Profits and miscellaneous income from the Government's trading corporations.
r^S	=	Taxes on the sources of income.
r^U	=	Taxes on the uses of income.
S	=	Elasticity of substitution. ¹
S_t	=	share of net worth available for consumption.
T	=	Ad valorem or unit tax or negative tax.
t	=	time period
T_K^x	=	Ad valorem or per unit tax on capital used in the production of x .
W	=	Return to all factors owned by households.
W_t	=	Economic welfare.
x	=	Product x .
x_K	=	The marginal product of capital in the x industry $\frac{x}{K}$. ²
x_L	=	The marginal product of labour in the x industry $\frac{x}{L}$. ²
Y	=	National income.
y	=	Product y . (Note: generally y is the numeraire good and sometimes the only good).
y_K	=	The marginal product of capital in the y industry. ²
y_L	=	The marginal products of labour in the y industry. ²

-
1. E and S are defined to have negative presumptive signs in the derivation of the Harberger model.
 2. Use of the convention that all prices are unity in the HMM model results in x_L and x_K representing the initial relative shares of labour and capital respectively in the total costs of producing x . Under the same convention, y_L , y_K are the relative shares of factors employed in y .

APPENDIX TWO

TAX INCIDENCE CONCLUSIONS FROM HMM STUDIES

SECTION ONE: THREE CONCLUSIONS FROM THE HARBERGER MODEL

Recall equation (B21) given in the text of Chapter Two (Section B) for tax incidence:

$$dw_K = \frac{E \cdot x_K \left(\frac{K^X}{K^Y} - \frac{L^X}{L^Y} \right) + S_x \left(\frac{x_L K^X}{K^Y} + \frac{x_K L^X}{L^Y} \right)}{E (y_K - x_K) \left(\frac{K^X}{K^Y} - \frac{L^X}{L^Y} \right) - S_y - S_x \left(\frac{x_L K^X}{K^Y} + \frac{x_K L^X}{L^Y} \right)} \cdot T \quad (B21)$$

setting A equal to: $E \left(\frac{K^X}{K^Y} - \frac{L^X}{L^Y} \right)$

setting B equal to: $S_x \left(\frac{x_L K^X}{K^Y} + \frac{x_K L^X}{L^Y} \right)$

and setting D equal to the denominator:

$$E (y_K - x_K) \left(\frac{K^X}{K^Y} - \frac{L^X}{L^Y} \right) - S_y - S_x \left(\frac{x_L K^X}{K^Y} + \frac{x_K L^X}{L^Y} \right)$$

then equation (B21) can be rewritten:

$$dw_K = \frac{x_K (A + B) \cdot T}{D} \quad (A:A1)$$

The economic implications of (B21) become more perspicuous when A, B and D are examined individually. Once understood, A, B and D can be easily ordered into equations solving for all possible tax (subsidy) burdens within the Harberger model.

First, it can be established that the denominator of (B21), D, is necessarily positive. The presumptive signs of E, S_x and S_y are negative. Taking the third expression in D:

$$-S_x \left(\frac{x_L K^x}{K^y} + \frac{x_K L^x}{L^y} \right)$$

All the terms in the bracket are positive. The expression is preceded by a minus sign, but since S_x is negative, this makes the entire expression positive. Since the presumptive sign of S_y is also negative, a minus sign in front of S_y makes the second expression in D positive. Turning to the first expression in D -

$$E (y_K - x_K) \left(\frac{K^x}{K^y} - \frac{L^x}{L^y} \right)$$

E is negative, so for D to be positive, the rest of the first expression must be shown to be negative or zero.

If y_K is greater than x_K , the industry producing good y is more capital intensive than the industry producing good x and therefore $\left(\frac{K^x}{K^y} - \frac{L^x}{L^y} \right)$ must be negative (since $\frac{K^x}{K^y}$ would be a smaller fraction than $\frac{L^x}{L^y}$ and the indicated product for $(y_K - x_K) \left(\frac{K^x}{K^y} - \frac{L^x}{L^y} \right)$ must be negative). Likewise, if the industry producing x is more capital intensive, then $(y_K - x_K)$ is negative and $\left(\frac{K^x}{K^y} - \frac{L^x}{L^y} \right)$ will be positive. The indicated product for $(y_K - x_K) \left(\frac{K^x}{K^y} - \frac{L^x}{L^y} \right)$ must again be negative. Finally, if y_K is equal to x_K , then $(y_K - x_K)$ will be zero, making the whole first expression in D zero.

Summing up, the first expression in D can be either positive or zero and the second and third expressions are always positive, so the entire denominator, B, of (B21) is positive in all possible cases.

Since D is always positive, the sign of dw_K (the change in capital's wage) will be determined by the sign of the numerator of equation (B21).

Recalling that in deriving (A:A1), A has been set equal to:

$$E \left(\frac{K^X}{K^Y} - \frac{L^X}{L^Y} \right)$$

the presumptive sign of E is negative, so the sign (A) = $\left(\frac{K^X}{K^Y} - \frac{L^X}{L^Y} \right)$.

When the production of x is more capital intensive than the production of y, the expression in the brackets will be positive and when the sector producing x is the more labour intensive sector, then the bracketed expression will be negative. If the amounts of capital labour are the same in each sector (making the capital and labour production coefficients the same), then the bracketed expression will be zero, as will the entire expression A.

Expression B will always be negative. As set out above, B is equal to:

$$S_x \left(\frac{x_L K^X}{K^Y} + \frac{x_L L^X}{L^Y} \right)$$

The presumptive sign of S_x is negative and the expression in the brackets will always be positive, making the entire expression negative.

Taking the entire expression (A:A1) :

$$dw_K = \frac{(x_K A + B) T}{D}$$

it has been shown that expression D is always positive, B is always negative and A can be positive, negative or zero. The remaining two variables, x_K and T are positive. So, if A is positive and the absolute value of $x_K A$ (expressed as $|x_K A|$) is greater than the absolute value of B ($|B|$), then (A:A1) will be positive in sign. If A is positive and $|x_K A|$ is less than $|B|$ or if A is simply negative, then the sign of (A:A1) will be negative. If A is positive and $|x_K A|$ is equal to $|B|$, then (A:A1) will be zero.

Certain general conclusions emerge when the components of (B21) are considered separately. To give a flavour to the Harberger approach, three of the general conclusions from his model are discussed in some detail below.

1. Only when the industry wherein capital is taxed is more labour intensive can labour bear a proportion of the tax on capital used in producing x greater than its initial share in national income.

Recall that when dw_K is zero, the earnings of capital are the same after the tax distortion. Equilibrium is established without any shift of factors between sectors and labour and capital bear the tax precisely in proportion to their initial shares of factor earnings. For labour's share of the tax burden to be greater than this, dw_K must be positive. When dw_K is positive, the tax distortion has resulted in an increase in capital's after-tax earnings. For this to happen, labour's share of the tax burden must be greater as a proportion of its initial share of national income, than capital's. Since D is always positive, the sign of dw_K will be determined by the sign of the numerator in (B21). Since expression B is necessarily negative, dw_K can be positive only when A is positive and greater in absolute magnitude than B . Expression A can be positive only if

$\left(\frac{K^x}{K^y} - \frac{L^x}{L^y} \right)$ is negative and this can only occur if the industry producing good x is relatively more labour intensive (and less capital intensive) than the industry producing y . Q.E.D.

2. If the absolute value of the elasticity of substitution between labour and capital taxed in producing x is as great or greater than the absolute value of the elasticity of demand for the product whose capital input is taxed, then capital's share of the tax burden will be higher than its initial income share (and labour's share will be smaller than its initial share).

Remembering that $A = E \left(\frac{K^x}{K^y} - \frac{L^x}{L^y} \right)$

$$\text{and } dw_K = \frac{x_K (A + B) \cdot T}{D}$$

(A:A1)

The only term which gives the numerator of (A:A1) a positive sign is

$$x_K \cdot E \cdot \left(\frac{-L^X}{L^Y} \right) \text{ and this term is dominated by } S_x \cdot x_K \left(\frac{L^X}{L^Y} \right) .$$

$$\text{When } |S_x| \cdot x_K \left(\frac{L^X}{L^Y} \right) \geq |E x_K \left(\frac{-L^X}{L^Y} \right)| , \text{ then } dw_K < 0 .$$

3. If the elasticity of substitution between labour and capital in the taxed industry is as great in absolute value as the elasticity of substitution between the final products, then capital must bear more of the tax than labour, relative to their initial income shares.

This holds from conclusion (2) above, since the elasticity of substitution between factors in producing x and y must be greater in absolute value than the elasticity of demand for x. The formula for relating the elasticity of substitution between x and y can be denoted by E_{xy} . In terms of the elasticity of demand for x, E,

$$E = E_{xy} \left(\frac{y}{x + y} \right) .$$

The relationship holds when the relevant elasticity of demand is one which excludes first order income effects. This relationship had particular relevance in Harberger's original work where the government's demand for goods was treated on a par with consumer demand.

SECTION TWO: DERIVATION OF EXTENSIONS TO HARBERGER

Using asterisks to indicate factor prices inclusive of factor taxes, the following equations indicate the elasticities of substitution in the sectors producing x and y:

$$\frac{dK^x/L^x}{K^x/K^x} = S_x \cdot \frac{d(w_K^*/w_L^*)}{w_K^*/w_L^*} \quad (A:AA1)$$

$$\text{and } \frac{dK^y/L^y}{K^y/K^y} = S_y \cdot \frac{d(w_K^*/w_L^*)}{w_K^*/w_L^*}$$

Now disaggregating T into taxes on factors, the gross factor prices in industry x can be related to the corresponding net factor prices in the following way:

$$\begin{aligned} w_K^* &= w_K + T_{K^x} + T_K \\ w_L^* &= w_L + T_{L^x} + T_L \end{aligned} \quad (A:AA2)$$

where T_{K^x} is a tax on capital in x, T_K is a tax on capital, T_{L^x} is a tax on labour and T_L is a tax on labour employed in producing x.

Differentiating the above equations defining the elasticities of substitution and the relationship between gross and net factor prices, substituting for the starred price variables, setting all factor taxes initially equal to zero and making use of the convention that all initial prices are unity, the standard Harberger equations (B5) and (B6) can be extended to:

$$\begin{aligned} \frac{dK^x}{K^x} - \frac{dL^x}{L^x} &= S_x (dw_K + dT_{K^x} + dT_K - dw_L - dT_{L^x} - dT_L) \\ \text{and } \frac{dK^y}{K^y} - \frac{dL^y}{L^y} &= S_y (dw_K + dT_{K^y} + dT_K - dw_L - dT_{L^y} - dT_L) \end{aligned}$$

The relation of changes in product prices to changes in tax inclusive factor prices and sales taxes is:

$$dp_x = x_L dw_L^* + x_K dw_K^* + dT_x + dT_c$$

and $dp_y = y_L dw_L^* + y_K dw_K^* + dT_y + dT_c$ (A:AA3)

where T_x and T_y are taxes on products x and y respectively and T_c is any ad valorem retail sales tax.

In other words, the percentage change in the price of a product is the weighted average of the percentage changes in the tax-inclusive prices of factors (where weights are factor shares), plus any ad valorem excise tax on the product itself and any general ad valorem sales tax. The standard Harberger expressions for the relationship between product prices, net factor returns and various kinds of taxes can be found by substitution,

$$dp_x = x_L(dw_L + dT_Lx + dT_L) + x_K(dw_K + dT_Kx + dT_K) + dT_x + dT_c$$

(A:AA4)

$$dp_y = y_L(dw_L + dT_Ly + dT_L) + y_K(dw_K + dT_Ky + dT_K) + dT_y + dT_c$$

(A:AA5)

AA.1: Tax Equivalences

Although the HMM version of the Harberger model is specified to include nine possible taxes (or subsidies), only four need to be analysed in order to derive the complete incidence picture. This may be best illustrated by the following matrix (note " indicate vertical identities):

$$\begin{array}{rcl} T_c & = & T_{LK} = T_L + T_K \\ & & \text{"} \qquad \text{"} \qquad \text{"} \\ T_x & = & T_Lx + T_Kx \\ & & + \qquad + \qquad + \\ T_y & = & T_Ly + T_Ky \\ T_{xy} & & \end{array}$$

Given these identities, knowledge about the incidence of a single commodity tax, T_x , for example, makes it possible to derive the incidence of the other commodity tax. Similarly, with factor taxes,

knowledge about the incidence of one of the factor taxes such as T_K makes it possible to derive the incidence of the other factor tax. Finally, once the incidence of a tax on one factor used in the production of one good is determined, say T_Kx , then T_Ky and T_Lx can be determined directly and these two results may be used to obtain T_Ly .

In addition, since there is no saving, income and consumption are equivalent. So, a tax on consumption is equivalent to a tax on income. Mieszkowski (1967) demonstrated these equivalences applying Harberger's assumption of complete factor mobility.

AA.2: Derivation of Expressions for Determining the Incidence of Other Partial Taxes.

Recalling equation (A:A1), specifying T more precisely as T_Kx :

$$dw_K = \frac{(x_K \cdot (A + B) \cdot T_Kx)}{D}$$

it is possible to derive expressions which give a general solution for a tax on labour employed in producing x , for labour employed in producing y , for capital employed in producing y , for product x and for product y .

The general solution for the incidence of a per unit tax on labour employed in the production of x is fully derived to provide an example for deriving the remaining four taxes.

Equations (B1) to (B5) in the text remain unchanged. These are:

$$\frac{dx}{x} = E \cdot \frac{d(p_x/p_y)}{p_x/p_y} \quad (B1')$$

$$\frac{dx}{x} = E (dp_x - dp_y) \quad (B2')$$

$$\frac{dx}{x} = x_L \cdot \frac{dL^x}{L^x} + x_K \cdot \frac{dK^x}{K^x} \quad (B3')$$

$$\frac{d(K^y/L^y)}{K^y/L^y} = S_y \cdot \frac{d(w_K/w_L)}{w_K/w_L} \quad (B4')$$

$$\frac{dK^Y}{K^Y} - \frac{dL^Y}{L^Y} = S_Y \cdot (dw_K - dw_L) \quad (B5')$$

Equation (B6) becomes:

$$\frac{dK^X}{K^X} - \frac{dL^X}{L^X} = S_X \cdot (dw_K - dw_L - T_L x) \quad (B6')$$

Equations (B7) through (B14) remain the same. Repeating the main ones:

$$dw_L = 0 \quad (B7')$$

$$dK^Y = -dK^X \quad (B8')$$

$$dL^Y = -dL^X \quad (B9')$$

$$dp_Y = y_L \cdot dw_L + y_K \cdot dw_K \quad (B14')$$

Equation (B15) becomes:

$$dp_X = x_L (dw_L + T_L x) + x_K \cdot dw_K \quad (B15')$$

Equations (B7'), (B14') and B15') can be substituted into equation (B1') giving:

$$\frac{dx}{x} = E[x_K (dw_K) - y_K dw_K + x_K T_L x] \quad (B16')$$

Equation (B17) remains the same:

$$\frac{K^X (-dK^X)}{K^X K^X} - \frac{L^X (-dL^X)}{L^X L^X} = S_Y \cdot dw_K \quad (B17')$$

Equation (B18) is changed by substituting equation (B8') into equation (B5'):

$$\frac{dK^X}{K^X} - \frac{dL^X}{L^X} = -S_X \cdot T_L x \quad (B18')$$

$\frac{dx}{x}$ can be eliminated by equating equations (B3') and (B16'). This leaves three equations and three unknowns, dw_K , dL^X and dK^X . Solving for dw_K gives the answer to the incidence question.

$$dw_K = \frac{\begin{vmatrix} Ex_L & x_L & x_K \\ 0 & -\frac{L^x}{L^y} & \frac{K^x}{K^y} \\ -S_x & -1 & 1 \end{vmatrix}}{\begin{vmatrix} E(y_K - x_K) & x_L & x_K \\ -\frac{S_y}{K^y} & -\frac{L^x}{L^y} & \frac{K^x}{K^y} \\ -S_x & -1 & 1 \end{vmatrix}} T_{Lx} \quad (A:AA6)$$

Making use of the assumption that $x_L + x_K = 1$ and expanding the determinant gives:

$$dw_K = \frac{Ex_L \left(\frac{K^x}{K^y} - \frac{L^x}{L^y} \right) + S_x \left(\frac{x_L K^x}{K^y} + \frac{x_K L^x}{L^y} \right)}{E(y_K - x_K) \left(\frac{K^x}{K^y} - \frac{L^x}{L^y} \right) - S_y - S_x \left(\frac{x_L K^x}{K^y} + \frac{x_K L^x}{L^y} \right)} \cdot T_{Lx} \quad (A:AA7)$$

The denominator of this expression is the same as the denominator of the now familiar equation in the text of Chapter Two (B21) which was solved for the incidence of a tax on capital employed in producing x. In equation (A:A1), this denominator was set equal to D. The elasticity of demand for x times the first bracketed expression in the numerator was set equal to B and the entire second expression was set equal to B. So, equation (A:AA7) may be restated as:

$$dw_K = \frac{(x_L A - B) T_{Lx}}{D} \quad (A:AA8)$$

For a tax on capital employed in the production of y:

$$dw_K = (-y_K A + S_y) T_{Ky} \quad (A:AA9)$$

and the imposition of a tax on labour in the production of y:

$$dw_K = (-y_L A + S_y) T_{Ly} \quad (A:AA10)$$

A partial commodity tax on good x has the following incidence:

$$dw_K = \frac{A T_x}{D} \quad (A:AA11)$$

and a partial commodity tax on good y is determined by:

$$dw_K = \frac{A T_y}{D} \quad (A:AA12)$$

AA.3: Examination of the General Solution.

Recalling the discussion about the general solution to the original Harberger model, D (the denominator in equations (A:AA8) through (A:AA12) above), is always positive. Consequently, the sign for dw_K for all the equations depends on the sign of the numerator. A positive sign for dw_K (i.e. $dw_K > 0$) means that capital will bear a smaller tax burden than labour relative to their initial income shares and a minus sign means that the proportion of capital's initial income paid in tax will be greater than the proportion of income labour pays in tax.

APPENDIX THREE

DATA ON HOUSEHOLD INCOME DISTRIBUTION IN NEW ZEALAND

SECTION ONE: INCOME DEFINITIONS MEASURED BY FOUR NEW ZEALAND DATA SOURCES

The four major sources of information about New Zealand incomes are **Incomes and Income Tax**, **Census of Population and Dwellings**, the **Household Survey** and the **System of National Accounts**. All of these are Department of Statistics publications but data for **Income and Income Tax** are collected by the Department of Inland Revenue from tax returns. This section discusses some of the pertinent aspects of these data in relation to the approach adopted by this thesis.

None of the above data meets entirely with the requirements of this thesis. In particular, the personal income definitions do not measure a comprehensive income concept suitable for evaluating income redistribution as discussed in Chapter Three. Personal income data are grouped into household income groups by both the Census and the Household Survey. The definitions of household income differ because of the different income measures and because of different methods of combining persons into households. To analyse the budget's influence on household income, it is necessary to apply all of the above data sources and more.

A. INCOMES AND INCOME TAX

Incomes and Income Tax publish data recording taxable and assessable income for persons and companies. The definition of income is that required to be reported for tax purposes.

Personal Income is defined for tax purposes to include nearly all salary and wage income (which is taxed at source), earnings of shareholder employees, and the assessable profits of self-employed persons, interest (less exempt interest) earned by persons, net rent and royalties, taxable dividends, assessable income from estates, universal superannuation, annuity income, individual shares of partnership incomes and some overseas income¹.

1. In most cases, if income is already taxed overseas it does not need to be included on a New Zealand tax return.

Three types of income losses may be deducted in calculating personal income for tax purposes. These include current losses, current business losses to be carried forward, and previous losses. Current losses are not the full amount of the loss, but the amount required to reduce income from other sources to "nil". Current business losses refer to the amount of loss incurred in the current year in excess of income from other sources. Current losses and current business losses may be carried forward indefinitely and set off against assessable income in subsequent years. Previous losses are the amount of business losses set off against assessable income for the current year.

A sample of income information from income tax returns and tax deduction certificates provides the personal income statistics for a particular tax year. The data vary from year to year, depending on changes in tax legislation. For example, recent collection of information about low-income earners is hampered by the fact that those earning below \$2,600 before 31 March 1981 and, since then, those earning below \$11,500 (whose only income is from salary, wages, pensions for past war service and national superannuation) are not required to submit tax returns.

B. THE CENSUS

There are two separate Census forms - one for individuals and the other to cover either an occupied private dwelling or a public (non-private) dwelling. The individual Census form collects information about income.

Income for Census purposes refers to all earnings, plus income from other sources such as rents, dividends on shares, interest on investments and savings before the deduction of taxes or insurance. Income derived from social security benefits or war pensions is not included in Census income.

Census income information varies from one Census to another because the question about income is changed and because the question may be placed differently in relation to other Census questions. Instead of giving a precise income figure, respondents choose from a broad-banded range of income categories.

B.1: Census Income

Personal income is measured by asking all individuals filling in a Census form to tick a broad-banded income category. The income question appears on the individual Census forms (a form is also filled out for each occupied dwelling, but it does not contain an income question).

Household income is personal income as defined for Census purposes plus social security income, aggregated for all members of the household. The incomes of the occupants of private dwellings are aggregated based on the mid-point of the broad-banded income range selected.

B.2: Census Households

Table A3.1 shows in the number of occupied dwellings and the change between the 1976 and 1981 Census.

Table A3.1
OCCUPIED DWELLINGS CENSUS NIGHT 1976 AND 1981

Occupied Dwellings	1976	1981	Intercensal Change	
			Number	Percent
Permanent and Private	923,257	1,003,113	+79,856	8.6
Temporary Private	3,227	2,376	-851	-26.4
Non-Private	6,776	6,393	-383	-5.7
Total Occupied	933,260	1,011,882	+78,622	8.4

Source: 1976 and 1981 Census of Population and Dwellings

A **household** on Census night consists of the total occupants of one permanent and private dwelling. Households are further divided into (1) one family only households; (2) other family households; (3) non-family (multi-persons) households; and (4) one-person households.

The households analysed in this thesis are those occupying permanent and private dwellings, with some adjustments. These dwellings make up about 99 percent of total occupied dwellings and account for about 95 percent of the population.

B.3: Census Information on Private Dwelling Ownership

The Census does not presently request information about the value of assets owned by persons and households. It does, however, seek information about whether occupied permanent dwellings are owned, rented or leased or provided with the job.

Table A3.2 summarises the 1976 and 1981 data about dwelling tenure.

Table A3.2

OCCUPIED PERMANENT AND PRIVATE DWELLINGS BY TENURE

Tenure	1976	1981	Proportion of Permanent and Pvte Dwellings		Intercensal Increase	
			1976	1981	Number	Percent
Owned without a mortgage	253,567	287,343	27.6	28.8	+33,776	13.3
Owned with a mortgage	387,078	423,459	42.1	42.4	+36,381	9.4
Rented or leased	248,356	253,386	27.0	25.4	+5,030	2.0
Provided free with job	22,678	21,213	2.5	2.1	-1,465	-6.5
Provided free not with job	8,649	12,321	0.9	1.2	+3,672	42.5
Not Specified	2,929	5,388	...	...	+2,459	84.0
Total	923,257	1,003,113	100.0	100.0	+79,856	8.6

Source: 1976 and 1981 Census of Population and Dwellings.

An area for further research would be to analyse these data by household income group and type. For example, it would put the results of this thesis into perspective if it were known whether there is a greater propensity for national superannuitants to live in households which are owned without a mortgage.

To test the hypothesis that permanent income (some concept of income taking account of life cycle and other expected changes) is a better basis for designing a superannuation policy, it would be helpful if future Censuses could include two questions about assets. One would list possible household assets (shares, debentures, life policies and so on) leaving a space to write an estimated value. The other would be designed like the income question with broad-banded categories but asking dwelling questionnaire respondents to estimate the value of their house.

C. THE HOUSEHOLD SURVEY

Since 1973/74, the Department of Statistics has conducted a survey to determine household expenditure and income patterns. This survey was originally referred to simply as the Household Survey but more recently as the Household Expenditure and Income Survey (HEIS).

A sample of households are surveyed each year and recent surveys have defined income very comprehensively. Income data is collected on both an individual and a household basis.

This thesis is based on the 1981/82 Household Survey. In that year, 3,487 households responded to the Survey, being interviewed in approximately equal numbers each month.

C.1: Household Survey Income Definition

Income ("total income") is the current gross income from all sources (including social welfare and other benefits) for each income recipient in the household. The one exception to this is interest from deposits in savings banks. If a respondent's only income is from this source and is less than \$200 per annum, income figures are not collected.

Up to the 1977/78 collection year, no endeavour was made to obtain precise income details from the respondents. The method of collection used was along similar lines to that used in the Census, where respondents had a broad-banded range of income categories and marked the category pertaining to themselves. From the 1978/79 year, the Household Survey questionnaire was redesigned to include a detailed individual income questionnaire.

Income sources covered by the Household Survey include **wages and salaries, self-employment income, investment income, social welfare benefits and other regular income**. All regular income from these sources combines to the measure of "**total income**".

Wages and salaries mainly comprise wage, salary and piecework payments for jobs currently held. Overtime, commissions and taxable allowances are all classified as wage and salary income.

Self-employment income is the before-tax profit or loss from the respondent's business, trade or profession. In the case of a partnership, only the respondent's share of the profit or loss is recorded. Self-employment and rent income are measured after the deduction of expenses incurred in producing the income, but before tax. That is, they are net profit or loss measures, not "gross income" in accounting terminology. The existence of losses results in a negative income for some household income groups.

Investment income includes interest income, dividend income, rent and royalties.

Social welfare benefit income includes income from national superannuation, the family benefit, the unemployment benefit and other benefits including domestic purposes, invalids, sickness, widows and war pensions and maintenance payments. The pre-tax value of these benefits is included in the Household Survey measure of "total income".

Other regular income includes some income which is assessable for tax purposes and other forms which are not taxable. The taxable component consists of superannuation (other than national superannuation) and income from trusts. The exempt component consists of educational scholarships and bursaries and other regular income not falling into any of the other categories and therefore for which insufficient information is available to specify more precisely.

Matrices set up with income levels on one axis and types of households on the other provide a better picture of the variation in income for policy purposes. Within households, unique people are identified. The identification of people within households allows accurate merging for analysis of the effects of taxes and expenditures. The computer package SAS includes matrix manipulation procedures such that tax calculations, for example, can be performed for a whole matrix (or table) of households or individuals at once.

Certain eligibility criteria must be met by households approached before they are included in the Survey. Basically, the household must be a private New Zealand household and able to provide the required

information at the same address during the month of approach. The household as a whole provides answers to the expenditure questionnaire and each person aged 15 years and over keeps a diary for a period of two weeks and completes an income questionnaire.

A comparison of the 1981/82 Household Survey income data with the 1980/81 Incomes and Income Tax data (taking inflation into account) did not show unambiguous bias in taxable incomes. Although there was evidence of some under and over-estimation depending on income source, total taxable income matched well. However, the data comparison provides evidence that the Household Survey under-represents people with high incomes. At the other end of this scale, a comparison with Department of Social Welfare figures on benefit income revealed substantial under-coverage of benefits other than national superannuation and the family benefit.

As is not uncommon for a survey of this type, households' total expenditure exceeds their disposable income, on average, for all but the 10 or 20 percent of households in the top income groups. Expenditure patterns are likely to be a function of permanent income measures, but the Household Survey only asks for current (rather than historical) income levels. For more discussion of the mismatch between income and expenditure see Broad and Bacica (1985, p.16).

C.2: Time Period of Data

Household Survey data nominally represent a fiscal year, in the case of the quantitative research in this thesis, 1981/82. However, the characteristics of the data are somewhat different from this. The continuous nature of the survey results in data being reported for periods beginning up to two years before the start of the 1981/82 year. For the standard recall variables, the respondent is asked to note income received in the twelve months preceding the interview. Examples are interest, income from overseas and from occasional employment. Data values for these variables have one parameter, the end of the period covered, say e . Thus, standard recall variables are of the form: $y(e, 1)$.

Current data refers to income received from various sources for which the rate of receipt was known only for the time of interview. Examples are wages and salaries and the benefits received at non-standard rates. Data values for these variables have three parameters:

e = end of period covered (= interview date)

l = length of period covered

r = date to which the rate element of income refers (because of the question format, this relates to the latest "normal" receipt). Thus, current data variables are of the form: y (e, l, r).

Business income is the net profit made by the business (or share of the business in the case of partnerships), for some period previous to the interview. This might be any period for which accounts are available but is generally the most recent tax year. The way in which the reported data relates to income in the standard recall year is not known (i.e. whether the business operated for the full twelve months, and whether the individual's participation in the business changed). Normally it is assumed that the business operated for the full recall year in the same manner as the reporting period. Data values for business income are of the form: y (e, l).

C.3: Age

Date of birth is not collected in the Household Survey, just age at the date the survey is taken. Survey respondents are treated as though they remain the same age throughout the year, even though the total respondents are made up from groups surveyed at different times over the year.

C.4: Household Income: Household Sample Survey

A **household** is defined as either a single individual living in a dwelling who makes his or her own housekeeping arrangements or a group of persons living in or sharing a private dwelling for most of the reference period who participate (in some measure at least) in consumption of food purchased for joint use by members, or who, if not dependent upon a household member, contribute some portion of income towards the provision of essentials of living for the household as a whole.

Persons living in institutions or group living establishments such as boarding houses, hotels, motels and hostels are not included in the Household Survey. However, children at boarding school were accounted for by including expenditure on behalf of those children in the recordkeeping of the parent or guardian. If at the interview stage persons occupying a permanent private dwelling could be separated into groups, each achieving independence with respect to the purchase of food and the sharing of meals, then each group was considered a separate household for survey purposes.

Household income is obtained by adding together the values attributed to each income earner in the household. The Household Survey measures total weekly income and this is grossed up to annual income in this thesis by multiplying by 52 weeks.

A useful feature of the Household Survey data and the Census is that unit record data can be used to classify households in different ways. For example, the information could be tabulated by region, as well as by income group and household type.

The sample design of the Household Survey and details of the collection methods are described in Survey reports (see for example, Department of Statistics, 1984 c). The Survey attempts to provide overall average expenditures for the main commodity groups with a sampling error of less than 5 percent. The possible sample error increases as the information is disaggregated to form estimates based on fewer households. To avoid the possibility of misleading results in this thesis, information in individual cells has been suppressed where there are less than four observations.

Non-sampling errors such as non-response, measurement errors and processing errors have not been investigated in depth. However, a comparison of the household type distribution in the 1982 Household Survey and the 1981 Census of Population and Dwellings reveals that single-person and three-or-more adult households with children are under-represented in the Household Survey, while there is an over-representation of two-adult households and two-adult households with two children.

D. NATIONAL INCOME ACCOUNTS

National accounting statistics are designed to provide a consistent and systematic summary of the transactions taking place in the economy. The New Zealand System of National Accounts (NZSNA) is based on the United Nations System of National Accounting. The system has been largely designed from a macroeconomic perspective and does not always achieve consistency among microeconomic transactions.

In recent years, the Department of Statistics has adopted common classifications and concepts for many of its major macroeconomic statistical collections. There is not yet exact consistency, however, between the "income earned by New Zealanders" concept in the NZSNA and that measured by the Census, Household Survey or Incomes and Income Tax.

NZSNA information is provided in aggregate and by production account (production of goods and services by economic activity as defined by the owners of that activity). The Owners of that activity can be either private or government (central or local authority). The activities can be further broken down into market and non-market grouping. However, the NZSNA data presently cannot be disaggregated into a personal or household sector.

The amount of income accruing to persons is compensation of employees for the financial year ending 31 March. **Compensation of employees** includes payments of salaries and wages, whether in cash or in kind to employees, contributions paid on employees' behalf to superannuation funds, private pension schemes, the Accident Compensation Commission and to casualty and life insurance schemes.

A person may also gain income from owning a business. This gain is called **operating surplus**, approximately equal to accounting profit before the deduction of direct taxes, dividends, bad debts and before the deduction of interest paid or the addition of interest received. The annual change in the value of the person's capital is measured by **consumption of fixed capital**, which is the value of depreciation at ordinary rates allowed for taxation purposes plus an estimate for the normal rate of accidental damage, based on the insurance claims by industry groups.

The transactions recognised in the national accounts are flows and are brought to a common denominator of money in current values. The money value of income may be reduced by indirect taxes and increased by subsidies.

Indirect taxes are assessed on producers in respect of production, sale, purchase and use of goods and services and are seen as adding directly to the market price of these goods and services. **Subsidies** are grants made by the government to market-oriented producers who regard the transfers as an addition to income from current production. Under NZSNA, these grants include payments to guarantee prices or to enable market prices of goods and services to be held below the cost of production. Also included are transfers made by local authorities out of rate receipts to finance the losses of their trading departments and deliberately incurred losses of government trading organisations.

D.1: A Household Income and Outlay Account

NZSNA Income and outlay accounts measure current transactions not directly connected with productive activity. These transactions include the disbursement of factor incomes outside the production process, and the receipt and disbursement of other factor incomes such as direct taxation, government transfers, donations, gifts, expenditures of funds outside of New Zealand and savings. Indirectly, income and outlay accounts are linked to the production accounts because they record the initial receipt of factor incomes and final consumption expenditures on goods and services which are produced.

The following is a simplified income and outlay account for the household sector. This is based on ongoing work by the Department of Statistics (1983). An official version of such an account for New Zealand has not yet been derived.

FIGURE A3.1
A SIMPLIFIED HOUSEHOLD INCOME AND OUTLAY ACCOUNT

Outlay (\$)	Income Received (\$)
Final Consumption Expenditure	Compensation of Employees
Property Income Paid	Withdrawals from Entrepreneurial Income
-Interest: Consumer Debt	Property Income Received
Other Interest	
Direct Taxes on Income (income tax)	- Interest
	- Dividends
Compulsory Fees, Fines and Penalties	Social Assistance Grants
Current Transfers n.e.c. to	Current Transfers n.e.c. from
- Private Non-Profit Organisations	- Other residents
- Other Residents	
- Rest of the World	- Rest of the World
Savings (residual)	
Total Disbursements	Total Receipts

Source: Department of Statistics.

D.2: A Flow-of-Funds Account

One weakness of NZSNA is that these accounts do not show the interrelationships between transactions in financial markets. Polakoff's (1978) flow of funds approach is better suited to answering questions like how much of the public debt is distributed to the household sector.

The flow of funds approach divides the economy into four sectors, consumers, business firms, government and the financial institutions. A sources and uses of funds statement combines both the balance sheet and the income statement into one. It includes both real and financial assets. In other words, it is possible to evaluate both the stock and the flow of asset transactions.

A real asset is something which appears in only one balance sheet, that of its owner. Items such as inventories, plant and equipment, houses and automobiles are real assets. A financial asset, on the other hand, is defined as a claim against someone else. It must appear on two

FIGURE A3.2
POLAKOFF'S GENERALISED USES AND SOURCES OF FUNDS ACCOUNT

Uses	Sources
Current Expenditures	Current Receipts
Saving (Δ Net Worth)	
Δ Real Assets	Δ Net Worth
Δ Financial Assets	Δ Liabilities (Borrowing)
Δ Money (hoarding)	

balance sheets, that of its owner and simultaneously on the balance sheet of whoever owes it to that owner (as a liability).

E. DATA USED ON THIS THESIS

The Task Force on Tax Reform (1982) matrix is adopted in this thesis where households are grouped by income and, according to their composition, determined by the number of adults and children in the household and the receipt of national superannuation. This makes it possible to analyse the income effects of budget measures within fairly homogeneous income groups.

To measure the influence of the budget for the entire household population, the Household Survey data are aggregated to represent the private household population using the Census. This process is explained in the next two sections of this Appendix.

Income and Income Tax data provide information for analysing particular aspects of the personal income tax structure and the company tax. NZSNA data are used as the basis for measuring the money-income value of government income and outlays and for other income aggregates.

SECTION TWO: WEIGHTS

This thesis attempts to quantify the effects of the government budget over the entire population of private households. Although ideally, the entire population should be included, it could not be because the Household Survey does not sample activity of those resident in non-private households.

To scale up income or other distributions to the entire population of private households, 1981 Census data are used to weight the 1981/82 Household Survey (HS) results. The aim of the weighting is to adjust the household income by household-type distribution of the Household Survey to match that of the Census.

This note summarises the derivation of the scale-up weights, as carried out by Broad of the Department of Statistics. This scaling procedure adjusts the Household Survey data for differential non-response by household type and income level and for natural sampling variation in the representation of these characteristics in the sample. It appears that differential non-response is most significant for household type, while the adjustments to the income distribution are more cosmetic and aimed at smoothing out the Household Survey distribution to match the Census.

The first step is to develop consistent income by household-type classifications from each source. The next Sections (Appendix Three, Section Three) shows how the Census information is grouped into the selected household types.

The household-type classifications are chosen to reflect the composition of households which are apparently targetted either to receive income maintenance (primarily national superannuation or child-related support) or to be excluded from such support.

Census income data are collected in broad-band income ranges and this dictates the choice of income classification. Since the HS income data are based on unit record observations, the HS information about households is able to be grouped into the Census income classes.

The household survey income data are first adjusted for income growth between the Census year and the Household Survey year.

Table AA3.1 below orders the 1981/82 HS data by Census income range and the designated household type.

Table AA3.1
DISTRIBUTION OF 1981/82 HOUSEHOLD SURVEY SAMPLE HOUSEHOLDS
BY INCOME GROUP AND HOUSEHOLD TYPE

Income Range (\$ p.a. 1980/81 dollars)	Household Type										Total
	1 Adult		2 Adults		2 Adults With Children			3 or More Adults		1 Adult	
										With	
	Nat.Sup.	Other	Nat.Sup.	Other	One	Two	Three+	No Childr	W/Childr	Children	
Less Than \$500	169	27	125	15	10	7	14	14	6	58	445
\$500-(\$3,500)	108	18	122	15	7	9	13	16	4	34	346
\$3,500-(\$5,000)	15	13	27	6	5	6	3	7	3	7	92
\$5,000-(\$6,500)	12	10	11	11	6	12	6	5	3	6	82
\$6,500-(\$8,000)	4	13	28	11	16	20	10	5	7	6	120
\$8,000-(\$10,000)	7	50	19	15	19	37	22	15	8	8	200
\$10,000-(\$12,000)	4	38	27	47	36	60	37	19	18	4	290
\$12,000-(\$14,000)	0	41	14	34	31	52	29	12	15	5	233
\$14,000-(\$18,000)	1	32	21	80	56	83	73	25	43	6	420
\$18,000-(\$22,500)	2	19	25	144	43	88	62	42	59	1	485
\$22,500-(\$25,000)	1	5	5	44	3	36	23	30	29	1	183
\$25,000-(\$30,000)	1	5	7	79	16	43	22	41	46	0	260
\$30,000-(\$40,000)	1	1	5	45	9	19	24	56	48	0	209
\$40,000 or Over	0	0	4	18	4	23	11	29	30	0	119
Total	325	272	442	564	266	495	349	316	322	136	3487
% of Total	9.3%	7.8%	12.7%	16.2%	7.6%	14.2%	10.0%	9.1%	9.2%	3.9%	100.0%

Source: 1981//82 Household Survey.

Table AA3.2 shows the distribution of the private-household population on Census night, 1981, by household type and income ranges. The income ranges include fourteen broad-banded groups and one group called "not specified". "Not specified" refers to households where one or more members did not designate an income range on their Census form.

Table AA3.2
DISTRIBUTION OF CENSUS HOUSEHOLDS BY INCOME GROUP AND HOUSEHOLD TYPE

	Household Type											
Income Range (\$ p.a.)	1 Adult		2 Adults		2 Adults W/Chldn			3 or More Adults			Not Classifiable	
	Nat.Sup.	Other	Nat.Sup.	Other	One	Two	Three+	No Chldn	W/Chldn	1 Adult W/Chldn	Because of Absentees	Totals
Not Specified	9130	6330	14540	13740	10420	15420	14090	14270	20690	5220	10830	134670
Less Than \$500	43740	9530	27540	3840	2030	1760	1610	1230	1020	15080	9230	116600
\$500-(\$3500)	24010	5970	21870	3170	1700	1210	1100	1420	790	3840	5090	70170
\$3500-(\$5000)	5940	2640	5690	1250	730	800	670	720	430	1060	1920	21850
\$5000-(\$6500)	3800	3670	6310	2300	1630	1640	1250	1090	820	1460	2680	26650
\$6500-(\$8000)	2910	5680	5580	3060	2700	3140	2190	1330	960	1180	2640	31370
\$8000-(\$10000)	2590	9300	3050	6680	5020	6410	5360	2520	1960	1580	4620	54090
\$10000-(\$12000)	2060	11320	7130	8280	7310	10910	8510	2770	2390	1940	5420	68030
\$12000-(\$14000)	1410	8010	5410	8440	7050	11130	8510	3150	2930	1170	4560	61770
\$14000-(\$18000)	1340	9310	7610	22980	12380	22970	16160	8030	7060	1300	8110	117250
\$18000-(\$22500)	690	4510	5300	29450	9010	18010	12930	9620	9310	620	7490	106940
\$22500-(\$25000)	180	1210	1590	11150	3130	6820	4730	6060	5880	120	3150	44010
\$25000-(\$30000)	260	1000	2490	18190	4230	7900	6090	11280	9780	90	4940	56250
\$30000-(\$40000)	320	790	1770	8520	2490	5030	3690	14200	9740	90	4720	51370
\$40000 or Over	160	550	1240	3630	1620	3400	3550	10030	5460	70	4660	35360
Totals	98540	79820	122110	144660	71440	116540	90450	87720	80200	34830	80070	1006360

Source: 1981/82 Census of Population and Dwellings

Some people did not specify their income in the Census, and some households had members absent on Census night, so not all households in the Census can be classified exactly into the groups required.

Operations carried out to reallocate the Census "not specified" income and non-standard household type groups are briefly set out as follows:

1) Household with Absentees

It is not possible to be certain of whether absentees on Census night are children eligible for the family benefit or not. The only related information recorded is their "family role" (i.e. mother, father, child, other). It is assumed that all child roles do represent dependent children. Where only children are absent on Census night, the household type is adjusted accordingly and counts added directly to the corresponding column in the table. If any adults are absent, the household type could still be adjusted simply but since the adults could contribute to the household income, the income level had to be considered as well. Neglecting the possibility of losses, the counts were allocated pro-rata to cells in the main table with the corresponding household type and the same or greater income level.

2) Occupants Temporarily Away

On Census night, some dwellings are unoccupied because all the occupants are temporarily absent. These accounted for some 30,200 dwellings in 1981. Some of these represent second dwellings for the household (e.g. holiday homes, "town houses") so that the occupants may have been properly enumerated as usually resident elsewhere; but enumerators attempt to identify and classify these cases as unoccupied. A reconciliation of visitors and absentees in Section Three of Appendix Three concludes that 36,400 people usually reside in these OTA ("occupants temporarily away") dwellings. This implies an average household size of 1.2 people, so single person households must be disproportionately represented in the OTA group. By making some simple assumptions about the independence of the probabilities of adult household members being absent and the effect of the presence of children on these probabilities, estimates of the OTA counts for each household type are made. These imply approximately the expected number of people in OTA DWELLINGS. A

reconciliation of the number of National Superannuitants in private dwellings is used to split the one- and two-adult groups into national-superannuitant households and "other".

3) Incomes Not Specified

The income groups of the OTA households were unknown, putting them in the same situation as the top row of Table AA3.2. All these households were allocated pro-rata over the income groups within the corresponding household type group.

Once the above adjustments have been achieved, it is possible to make the comparison illustrated by Table AA3.3 of the household type representation in the 1981 Census and the 1981/82 Household Survey.

Table AA3.3

COMPARISON OF HOUSEHOLD TYPE REPRESENTATION IN THE 1981 CENSUS AND THE 1981/82 HOUSEHOLD SURVEY

Household Type		Census ¹		HSS ²		Difference	
		(000)	(%)	(000)	(%)	(000)	(%) ³
One Adult	- Natl Superannuitant	111	10.8	96	9.3	-15	-13.3
	- Other	90	8.7	81	7.8	-9	-10.2
Two Adults	- Incl Natl Superannuitant	128	12.4	131	12.7	3	2.1
	- Other	155	15.0	167	16.2	12	7.8
Two Adults With	- One Child ⁴	80	7.7	79	7.6	-1	-1.0
	- Two Children	127	12.2	147	14.2	20	15.9
	- Three Or More Children	104	10.1	104	10.0	0	-0.5
Three Or More Adults	- No Children	99	9.5	94	9.1	-5	-5.0
	- With Child(ren)	103	10.0	96	9.2	-7	-7.6
One Adult	- With Child(ren)	37	3.5	40	3.9	3	8.0
		<u>1035</u>	<u>100.0</u>	<u>1035</u>	<u>100.0</u>	<u>0</u>	<u>0.0</u>

Notes: 1) From Table AA3.2. 2) Estimated by taking percentage distribution of household types in HS (see bottom row table 3.3A) by 1,035,000 Census households. 3) Difference (000) expressed as percentage of number of Census households in group. 4) "Child" denotes a person eligible for payment of Family Benefit. Sources: 1981 Census and Section Three, Appendix Three.

Table AA3.4 reflects the adjustments made to the Census data discussed above.

Table AA3.4

ADJUSTED DISTRIBUTION OF 1981 CENSUS HOUSEHOLDS
BY INCOME GROUP AND HOUSEHOLD TYPE

Income Range (\$ P.A.)	Household Type										
	1 Adult		2 Adults		2 Adults W/Children			3 Or More Adults		1 Adult With Children	Total
	Nat.Sup.	Other	Nat.Sup.	Other	One	Two	Three+	No Childrn	W/Childrn		
Less Than \$500	54430	11650	32180	4320	2830	2270	2190	1470	1540	18800	131690
\$500-(\$3500)	29890	7300	25750	3600	2320	1490	1530	1720	1160	4870	79620
\$3500-(\$5000)	7390	3230	6710	1430	990	1000	930	880	630	1380	24570
\$5000-(\$6500)	4730	4480	7470	2620	2220	2110	1880	1340	1250	1800	29890
\$6500-(\$8000)	3620	6950	6640	3500	3350	3860	2980	1640	1490	1470	35500
\$8000-(\$10000)	3220	11380	9650	7720	6430	7850	7290	3150	3060	2010	61770
\$10000-(\$12000)	2560	13840	8640	9670	9160	13460	11130	3570	3770	2570	78310
\$12000-(\$14000)	1750	9800	6610	9940	8940	13780	11090	4030	4630	1510	72090
\$14000-(\$18000)	1670	11380	9390	27340	15810	29420	21570	10470	11760	1710	139510
\$18000-(\$22500)	860	5510	6580	35230	11840	22630	17590	12830	15790	800	129670
\$22500-(\$25000)	230	1480	1980	13360	4190	8630	6540	8160	9820	150	54530
\$25000-(\$30000)	330	1230	3100	21840	5710	10110	8480	15430	17180	110	83530
\$30000-(\$40000)	400	970	2210	10260	3520	6460	5450	19770	17980	110	67120
\$40000 or over	200	670	1570	4420	2430	4720	5420	14300	13430	90	47250
Total	111280	39870	128480	155250	79750	126780	104070	98700	103490	37380	1035060

Source: See text of Appendix Three, Sections Two and Three, for derivation.

The one remaining difficulty in calculating the post-stratification weights is the existence of empty cells in the HS Table AA3.1. These do not allow direct division of all cells in Table AA3.4 by corresponding cells in AA3.1. The solution used is to somewhat arbitrarily aggregate income groups for the three affected household types before calculating the weights. The neighbouring cells are often small so several are aggregated. This is done so as not to weight any particular survey household excessively. Otherwise, this could have generated more problems in the way of outliers in later tables, something the approximate weighting was meant to solve.

The final weights used to scale up the Household Survey information are derived by dividing the number of observations in each cell (or group of cells as just explained) of Table AA3.4 by the number of observations of the distribution of sample households by income group and household type in Table AA3.1. Table AA3.5 below illustrates the final weights to be applied to the Household Survey data.

Table AA3.5
FINAL WEIGHTS TO BE APPLIED TO HOUSEHOLD SURVEY DATA

Income Range (\$ P.A.)	Household Type									
	1 Adult		2 Adults		2 Adults With Children			3 Or More Adults		1 Adult With
	Nat.Sup.	Other	Nat.Sup.	Other	One	Two	Three+	No Childrn	W/Childrn	Children
Less Than \$500	322	431	257	288	283	324	157	105	256	324
\$500-(\$3,500)	277	405	211	240	331	165	118	107	166	143
\$3,500-(\$5,000)	493	249	249	238	198	167	308	126	211	197
\$5,000-(\$6,500)	394	448	679	238	369	176	313	257	416	300
\$6,500-(\$8,000)	904	535	237	319	209	193	298	328	213	246
\$8,000-(\$10,000)	460	228	508	514	339	212	332	210	383	252
\$10,000-(\$12,000)	977	364	320	206	255	224	301	185	209	642
\$12,000-(\$14,000)	0	239	472	292	289	265	383	336	309	303
\$14,000-(\$18,000)	977	356	447	342	282	342	296	419	273	285
\$18,000-(\$22,500)	977	290	263	245	275	257	284	306	262	629
\$22,500-(\$25,000)	385	395	329	304	524	240	284	272	339	629
\$25,000-(\$30,000)	385	395	443	277	357	235	386	376	374	0
\$30,000-(\$40,000)	385	395	368	228	391	340	227	353	375	0
\$40,000 or over	0	0	392	245	608	205	492	493	448	0
Average	342	330	291	275	300	256	298	312	321	275

Source: See text for derivation.

To see the relative effect of the weighting more clearly, Table AA3.6 below shows the ratio of each weight to the overall average weight.

Table AA3.6

RELATIVE WEIGHTS : FINAL RATIOS FOR MULTIPLYING
1981/82 HOUSEHOLD SURVEY DATA TO 1981 CENSUS TOTALS

Income Range (\$ P.A.)	Private Household Type									
	1 Adult		2 Adults		2 Adults With Children			3 Or More Adults		1 Adult With Children
	Nat.Sup.	Other	Nat.Sup.	Other	One	Two	Three+	No Childrn	W/Childrn	
Less Than \$500	1.09	1.45	0.97	0.97	0.95	1.09	0.53	0.35	0.36	1.09
\$500-(\$3,500)	0.93	1.37	0.71	0.31	1.12	0.56	0.40	0.36	0.56	0.48
\$3,500-(\$5,000)	1.66	0.34	0.34	0.30	0.67	0.56	1.04	0.42	0.71	0.66
\$5,000-(\$6,500)	1.33	1.51	2.29	0.30	1.24	0.59	1.06	0.90	1.40	1.01
\$6,500-(\$8,000)	3.05	1.80	0.30	1.07	0.70	0.65	1.00	1.11	0.72	0.83
\$8,000-(\$10,000)	1.55	0.77	1.71	1.73	1.14	0.72	1.12	0.71	1.29	0.85
\$10,000-(\$12,000)	3.29	1.23	1.08	0.69	0.86	0.76	1.01	0.62	0.71	2.16
\$12,000-(\$14,000)	-	0.81	1.59	0.99	0.97	0.89	1.29	1.13	1.04	1.02
\$14,000-(\$18,000)	3.29	1.20	1.51	1.15	0.95	1.15	1.00	1.41	0.92	0.96
\$18,000-(\$22,500)	3.29	0.98	0.89	0.82	0.93	0.87	0.96	1.03	0.90	2.12
\$22,500-(\$25,000)	1.30	1.33	1.11	1.02	1.77	0.81	0.96	0.92	1.14	2.12
\$25,000-(\$30,000)	1.30	1.33	1.49	0.93	1.20	0.79	1.30	1.27	1.26	-
\$30,000-(\$40,000)	1.30	1.33	1.24	0.77	1.32	1.15	0.76	1.19	1.26	-
\$40,000 or over	-	-	1.32	0.83	2.05	0.69	1.66	1.66	1.51	-
Average	1.15	1.11	0.98	0.93	1.01	0.86	1.00	1.05	1.08	0.93

Source: See text for derivation.

Table AA3.7 shows how the weights differ by income level within each household type; differences between household types have been removed by dividing each column by its average weight in Table AA3.6.

Table AA3.7
RATIO OF HOUSEHOLDS IN SAMPLE SURVEY TO CENSUS HOUSEHOLDS
STANDARDISED BY HOUSEHOLD TYPE

Private Household Type										
Income Range (\$ P.A.)	1 Adult		2 Adults		2 Adults With Children			3 Or More Adults		1 Adult With Children
	Nat.Sup.	Other	Nat.Sup.	Other	One	Two	Three+	No Childrn	W/Childrn	
Less Than \$500	0.9	1.3	0.9	1.0	0.9	1.3	0.5	0.3	0.8	1.2
\$500-(\$3,500)	0.8	1.2	0.7	0.9	1.1	0.6	0.4	0.3	0.5	0.5
\$3,500-(\$5,000)	1.4	0.8	0.9	0.9	0.7	0.7	1.0	0.4	0.7	0.7
\$5,000-(\$6,500)	1.2	1.4	2.3	0.9	1.2	0.7	1.1	0.9	1.3	1.1
\$6,500-(\$8,000)	2.6	1.6	0.8	1.2	0.7	0.8	1.0	1.1	0.7	0.9
\$8,000-(\$10,000)	1.3	0.7	1.7	1.9	1.1	0.8	1.1	0.7	1.2	0.9
\$10,000-(\$12,000)	2.9	1.1	1.1	0.7	0.8	0.9	1.0	0.6	0.7	2.3
\$12,000-(\$14,000)	0.0	0.7	1.6	1.1	1.0	1.0	1.3	1.1	1.0	1.1
\$14,000-(\$18,000)	2.9	1.1	1.5	1.2	0.9	1.3	1.0	1.3	0.9	1.0
\$18,000-(\$22,500)	2.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	0.8	2.3
\$22,500-(\$25,000)	1.1	1.2	1.1	1.1	1.7	0.9	1.0	0.9	1.1	2.3
\$25,000-(\$30,000)	1.1	1.2	1.5	1.0	1.2	0.9	1.3	1.2	1.2	0.0
\$30,000-(\$40,000)	1.1	1.2	1.3	0.8	1.3	1.3	0.8	1.1	1.2	0.0
\$40,000-or over	0.0	0.0	1.0	0.9	2.0	0.3	1.7	1.6	1.4	0.0
Average	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Source: See text for derivation.

SECTION THREE: GROUPING CENSUS POPULATION

Table AAA3.1

POPULATION BREAKDOWN BY LOCATION - DERIVATION OF DE JURE
FROM DE FACTO DISTRIBUTION 1981 CENSUS

Location	Present in Dwelling on Census Night		Usually Resident Population		Total
	Total	Visitors	Usual Residents	Absent on Census Night	
Private Dwellings - Occupants Temporarily Away	0	0	0	36,360	36,360
- All Non-NZ Residents	1,900	1,900	0	0	0
- 3 or more boarders	8,150	170	7,980	250	8,240
- HS eligible	3,007,410	60,700	2,946,710	102,080	3,048,790
Non-Pvt Dwellings - Attached Private Household	6,540	140	6,400	230	6,530
- Resident Staff	7,320	0	7,320	240	7,560
- Inmates (temporary) ⁽¹⁾	88,000	88,000	0	0	0
- Inmates (permanent) ⁽²⁾	56,420	0	56,420	2,100	58,520
Subtotal in NZ ⁽³⁾	3,175,740	150,900	3,024,840	141,270	3,166,110
Overseas	23,500 ⁽⁴⁾	23,500	0	33,130 ⁽⁵⁾	33,130
Total ⁽³⁾	3,199,240	174,400	3,024,840	174,400	3,199,240
(A) - (B) = (C) + (D) = (E)					

Notes: 1) Visitors to hotels, motels, private hotels, guest houses, hospitals, convalescent homes, youth or immigration hostels or camps, motor camps, prisons, police lock-ups. 2) Residents of boarding or rooming houses, educational, religious and welfare institutions, homes for the elderly, armed forces camps, staff quarters. 3) Components may not add to totals due to rounding. 4) NZ residents overseas. 5) Overseas residents in NZ on Census night. Sources: 1981 Census of Population and Dwellings, and Demographic Specialist Studies Section (for estimate of NZ residents overseas).

Table AAA3.2

POPULATION BREAKDOWN BY LOCATION ON CENSUS NIGHT 1981
BY AGE AND RECEIPT OF INCOME - TOTAL POPULATION¹

Location	Age				Total
	Under 15	15 and Over			
		Income			
		Nil	Non-Zero	Not Specified	
Private Dwellings - Occupants Temporarily Away	0	0	0	0	0
- All Non-NZ Residents ⁽²⁾	250	60	1,250	320	1,900
- 3 or more boarders	2,310	420	4,340	580	8,150
- HS eligible	324,930	136,360	1,946,570	99,450	3,007,410
Non-Pvt Dwellings - Attached Private Household	1,520	350	4,180	390	6,540
- Resident Staff	0	100	5,030	2,190	7,320
- Inmates (temporary)	10,580	2,330	51,730	23,360	88,000
- Inmates (permanent)	11,440	5,290	35,090	4,600	56,420
Subtotal in NZ	351,140	144,900	2,048,810	130,390	3,175,740
Overseas	2,200	0	0	21,300	23,500
Total	353,340	144,900	2,048,810	152,190	3,199,240

Notes: 1) Analysis of column (A) in Table AAA3.1 Refer to notes to Table AAA3.1 also. 2) Estimated using average of distributions of "HS eligible" and "resident staff". Source: 1981 Census of Population and Dwellings.

Table AAA3.3

POPULATION BREAKDOWN BY LOCATION ON CENSUS NIGHT
BY AGE AND RECEIPT OF INCOME - VISITORS ¹

Location	Age				Total
	Under 15	15 and Over			
		Income			
		Nil	Non-Zero	Not Specified	
Private Dwellings - Occupants Temporarily Away	0	0	0	0	0
- All Non-NZ Residents ⁽²⁾	260	60	1,260	320	1,900
- 3 or more boarders	30	30	110	0	170
- HS eligible	10,790	12,510	34,580	2,820	60,700
Non-Pvt Dwellings - Attached Private Household ⁽²⁾	20	30	70	10	140
- Resident Staff	0	0	0	0	0
- Inmates (temporary)	10,580	2,330	51,730	23,360	88,000
- Inmates (permanent)	0	0	0	0	0
Subtotal in NZ	21,680	14,960	87,760	26,510	150,900
Overseas	2,200	0	0	21,300	23,500
Total	23,884	14,957	87,760	47,806	174,400

Notes: 1) Analysis of column (B) in Table AAA3.1 Refer to notes to Table AAA3.1 also. 2) Estimated using same visitor/resident proportions as for "HS eligible", by age and income. Source: 1981 Census of Population and Dwellings.

Table AAA3.3a

POPULATION BREAKDOWN BY LOCATION ON CENSUS NIGHT
 BY AGE AND RECEIPT OF INCOME - VISITORS
 (Pro-rata Allocation of Not Specified Incomes 1)

Location	Age			Total
	Under 15	15 and Over		
		Income		
		Nil	Non-Zero	
Private Dwellings - Occupants Temporarily Away	0	0	0	0
- All Non-NZ Residents	250	70	1,570	1,900
- 3 or more boarders	30	30	110	170
- HS eligible	10,790	13,260	36,650	60,700
Non-Pvt Dwellings - Attached Private Household	20	40	30	140
- Resident Staff	0	0	0	0
- Inmates (temporary)	10,580	3,330	74,080	88,000
- Inmates (permanent)	0	0	0	0
Subtotal in NZ	21,680	16,730	112,490	150,900
Overseas ⁽²⁾	2,200	2,760	18,540	23,500
Total	23,884	19,480	131,030	174,400

Notes: 1) Same as Table AAA3.3 with "Not Specified" column distributed over the "15 and Over" groups pro-rata. 2) Proportions "Nil" and "Non-Zero" estimated from "Subtotal in NZ" row. Source: 1981 Census of Population and Dwellings.

Table AAA3.4

POPULATION BREAKDOWN BY LOCATION BY AGE AND RECEIPT OF
INCOME - RESIDENTS IN USUAL DWELLING ON CENSUS NIGHT¹

Location	Age				Total
	Under 15	15 and Over			
		Income			
		Nil	Non-Zero	Not Specified	
Private Dwellings - Occupants Temporarily Away	0	0	0	0	0
- All Non-NZ Residents	0	0	0	0	0
- 3 or more boarders	2,280	390	4,730	580	7,980
- HS eligible	814,140	123,850	1,912,090	96,540	2,946,710
Non-Pvt Dwellings - Attached Private Household	1,500	320	4,100	380	6,400
- Resident Staff	0	100	5,030	2,190	7,320
- Inmates (temporary)	0	0	0	0	0
- Inmates (permanent)	11,440	5,280	35,090	4,500	56,420
Subtotal in NZ	829,450	129,940	1,961,060	104,390	3,024,840
Overseas	0	0	0	0	0
Total	829,450	129,940	1,961,060	104,390	3,024,840

Notes: 1) Analysis of column (C) in Table AAA3.1; refer to notes to Table AAA3.1 also. Source: 1981 Census of Population and Dwellings.

Table AAA3.4a

POPULATION BREAKDOWN BY LOCATION BY AGE AND RECEIPT OF
INCOME - RESIDENTS IN USUAL DWELLING ON CENSUS NIGHT
(Pro-rata Allocation of Not Specified Incomes¹)

Location	Age			Total
	Under 15	15 and Over		
		Income		
		N11	Non-Zero	
Private Dwellings - Occupants Temporarily Away	0	0	0	0
- All Non-NZ Residents	0	0	0	0
- 3 or more boarders	2,280	430	5,270	7,980
- HS eligible	814,140	129,720	2,002,850	2,946,710
Non-Pvt Dwellings - Attached Private Household	1,600	350	4,460	6,400
- Resident Staff	0	150	7,180	7,320
- Inmates (temporary)	0	0	0	0
- Inmates (permanent)	11,440	5,890	39,090	56,420
Subtotal in NZ	829,450	136,540	2,058,850	3,024,840
Overseas	0	0	0	0
Total	829,450	136,540	2,058,850	3,024,840

Note: 1) Same as Table AAA3.4 with "Not Specified" column distributed over the "15 and Over" group pro-rata. Source: 1981 Census of Population and Dwellings.

Table AAA3.5

1981 CENSUS POPULATION BREAKDOWN BY USUAL LOCATION BY AGE
AND RECEIPT OF INCOME - ABSENTEES¹

Location	Age			Total
	Under 15	15 and Over		
		Income		
		Nil	Non-Zero	
Private Dwellings - Occupants Temporarily Away ⁽²⁾	1,960	360	34,040	36,360
- All Non-NZ Residents	0	0	0	0
- 3 or more boarders	50	50	160	260
- HS eligible	19,570	14,360	68,150	102,080
Non-Pvt Dwellings - Attached Private Household	40	40	150	230
- Resident Staff	0	20	220	240
- Inmates (temporary)	0	0	0	0
- Inmates (permanent)	240	640	1,220	2,100
Subtotal in NZ	21,860	15,460	103,951	141,270
Overseas	2,020	4,030	27,080	33,130
Total	23,880	19,480	131,030	174,400

Notes: 1) Analysis of column (D) in Table AAA3.1; refer to notes to Table AAA3.1 also. 2) The age/income distribution for the occupants was derived from the allocation of OTA households to household types (see Section Two, Appendix Three). Source: 1981 Census of Population and Dwellings.

Table AAA3.6

1981 CENSUS POPULATION BREAKDOWN BY USUAL LOCATION BY AGE
AND RECEIPT OF INCOME

Location	Age			Total
	Under 15	15 and Over		
		Income		
		Nil	Non-Zero	
Private Dwellings - Occupants Temporarily Away	1,960	360	34,040	36,360
- All Non-NZ Residents	0	0	0	0
- 3 or more boarders	2,320	480	5,430	8,240
- HS eligible	333,700	144,090	2,071,000	3,048,790
Non-Pvt Dwellings - Attached Private Household	1,540	380	4,610	6,630
- Resident Staff	0	160	7,400	7,560
- Inmates (temporary)	0	0	0	0
- Inmates (permanent)	11,680	6,520	40,320	58,520
Subtotal in NZ	351,320	151,990	2,162,900	3,166,110
Overseas	2,020	4,030	27,080	33,130
Total	353,340	156,020	2,189,980	3,199,240

Source: 1981 Census of Population and Dwellings.

APPENDIX FOUR

CENTRAL GOVERNMENT CAPITAL ACCOUNT

This thesis defines the budget as the central government income and outlay account. An important item missing is government capital spending. This Appendix briefly summarises NZSNA information about the government capital account and treatment of government capital spending by studies of the government's redistributive influence.

A. NZSNA GOVERNMENT CAPITAL ACCOUNT

Table A4.1 is the capital finance account for the entire economy. It shows trends in central government capital formation (line (B)). At the bottom of the Table, this is compared with other components of gross accumulation.

Table A4.1

THE CAPITAL FINANCE ACCOUNT IN AGGREGATE (Includes Market and Non-market Production Groups)

Year Ending 31 March:	1981 (\$M)	% Change	1982 (\$M)	% Change	1983 (\$M)
Increase in Stocks	1,404	11.2	1,561	-34.8	1,018
Gross Fixed Capital Formation					
(A) Private	2,983	42.9	4,262	12.9	4,813
(B) Central Government	1,032	41.6	1,461	40.9	2,058
(C) Local Government	433	13.9	493	12.4	554
Net Lending to the Rest of the World	-736	102.7	-1,485	26.6	-1,880
Gross Accumulation	5,117	23.0	6,292	4.3	6,563
Savings	3,605	33.4	4,808	-3.1	4,657
Consumption of Fixed Capital	1,670	12.1	1,872	15.0	2,152
Statistical Discrepancy	-158		-388		-245
Finance of Gross Accumulation	5,117	23.0	6,292	4.3	6,563
Central Government Fixed Capital Formation (\$M)	1,032	41.6	1,461	40.9	2,058
as proportion of:					
Gross Fixed Capital Formation	23.2		19.7		27.7
Gross Accumulation	20.2		23.2		31.4
Gross Domestic Product	4.2		5.0		6.4

Source: Department of Statistics (latest available figures in March 1985).

Central government fixed capital formation is divided into capital formation related to market production and general government capital finance. Under the system of national accounts, the general government capital finance account would ideally include two sections. The first section records capital transactions in real capital assets and land. The second section would record the source of financial liabilities and assets related to the financing of Public Account expenditure.

Table A4.2 is the record of real capital assets and land of the central government component of the non-market sector. The balancing item of the top half of the account represents the need of the sector to borrow (if negative) or the amount available to lend (if positive). Net lending is the difference between total income and total receipts, excluding transactions in financial assets.

Table A4.2

**THE CENTRAL GOVERNMENT CAPITAL FINANCE ACCOUNT:
REAL CAPITAL ASSETS AND LAND**

Year Ending 31 March:	<u>1981</u>	%	<u>1982</u>	%	<u>1983</u>
	<u>(\$M)</u>	Change	<u>(\$M)</u>	Change	<u>(\$M)</u>
Gross Fixed Capital Formation	400.1	15.2	461.1	12.5	518.7
Stock Changes	5.2	34.6	7.0	11.4	7.8
Strategic Stocks	17.0	-87.6	2.1	-	-
Land Purchase - Net	7.0	65.7	11.6	-34.5	7.6
Capital Transfers:					
New Zealand Residents					
Local Authorities	75.1	5.3	79.1	0.6	79.6
Other	30.4	15.8	35.2	-18.5	28.7
Rest of the World	51.0	6.1	54.1	11.8	60.5
Net Lending	-775.2	23.0	-953.5	35.3	-1,290.0
Gross Accumulation	-189.4	60.1	-303.3	93.6	-587.1
Savings	-234.4	46.2	-342.6	82.8	-626.4
Consumption of Fixed Capital	5.6	23.2	6.9	8.7	7.5
Capital Transfers:					
New Zealand Residents	39.4	-17.8	32.4	-1.9	31.8
Finance of Gross Accumulation	-189.4	60.1	-303.3	93.6	-587.1

Source: Department of Statistics (latest available figures in March 1985).

The net lending figure and the deficit before borrowing figure as published in Budget Table 2 (the most common figure for the government's budget deficit) purport to measure similar things. In fact, they are not compatible. 'Net lending' is the net result of all the central government's public account transactions except any of those involving financial assets and liabilities. On the other hand, the Budget Table 2 balance is the net result including some transactions, such as government loans to the Housing Corporation, which involve changes in financial assets and liabilities.

Table A4.3 shows gross fixed capital formation classified by type of capital.

Table A4.3

GOVERNMENT GROSS FIXED CAPITAL FORMATION BY TYPE OF CAPITAL

Year Ending 31 March	1981 (\$M)	% Change	1982 (\$M)	% Change	1983 (\$M)
Buildings	234.4	5.7	247.7	4.2	258.0
Other Construction	47.6	37.6	57.8	30.8	75.6
Land Improvements	0.6	1.5	0.9	-	0.9
Transport Vehicles	12.0	9.2	13.2	90.8	25.0
Plant, Machinery & Equipment	76.4	-0.8	75.8	28.5	97.4
Other Tangible Assets	..	-	..	-	..
Total Gross Fixed Capital Formation	371.0	6.5	395.3	15.6	456.8

Source: Department of Statistics, NZSNA (latest available figures in March 1985).

A feature of the 1982 year was the growth in other construction, which partly reflected the non-market aspects of the investments in large-scale energy developments.

By far the largest capital item is for buildings. The valuation of building capital formation is in terms of the cost incurred in the current year.

The Table A4.3 information is further disaggregated by government function by Table A4.4. For example, most building is for educational purposes and, in fact, education accounts for around a third of total non-market central government capital formation in recent years.

Table A4.4

CENTRAL GOVERNMENT SERVICES:
GROSS FIXED CAPITAL FORMATION BY FUNCTION IN 1981/82

	<u>Buildings</u>		<u>Other</u>	<u>Land</u>	<u>Trans-</u>	<u>Plant</u>	
	<u>Non-</u>	<u>Resident</u>	<u>Cnstrtn</u>	<u>Improve-</u>	<u>port</u>	<u>Machinery</u>	<u>Total</u>
	<u>Resident</u>			<u>ments</u>	<u>Vehcls</u>	<u>Equipment</u>	
General Admin.	6.1	35.2	45.3	0.3	5.7	11.6	104.2
Defence	0.2	15.3	..	..	..	..	15.5
Education	5.5	107.6	3.0	..	1.4	24.1	141.6
Health	6.7	50.9	3.5	0.4	2.6	26.3	90.4
Social Welfare	2.8	13.7	1.7	0.2	1.5	10.2	30.1
Industries	..	3.7	4.3	..	1.9	3.5	13.4
TOTAL	21.3	226.4	57.8	0.9	13.2	75.8	395.3
Market Prod. Groups	..	1.3	0.2	17.9	1.6	26.7	47.6

Source: Department of Statistics (latest available figures in March 1985).

A better understanding of the influence of the budget on income distribution would be gained from some different capital finance account information. For example, it would be useful to have information about government net borrowing or net lending as the first item of this part of the account. The account would also record how the net borrowing or lending was funded. It would be an account of financial assets and liabilities.¹

1. The Department of Statistics is working on the development of the second section of the capital finance account, in recognition of the importance of information about the sources of financing Public Account deficits to economists and policymakers.

B. TREATMENT OF GOVERNMENT CAPITAL SPENDING IN STUDIES OF BUDGET
INCIDENCE

As Chapter Six of this thesis discusses, the valuation of government current spending in terms of its money-income cost has many limitations. In particular, there are several reasons why it may understate the value of government expenditures including the fact that it does not measure externalities. When it comes to government capital spending, the problems of valuation are increased because of the likelihood that current monetary expenditures fail to match the value of capital-intensive goods which may emanate from large capital investments in the past. Also, current monetary expenditures may produce benefits for future generations.

Because of the difficulties of evaluation of government capital expenditures, most studies tend to aggregate them with other expenditures or ignore capital spending altogether.

B.1: Quantitative Studies Aggregate Current and Capital

Gillespie (1965, 1966) introduced a particularly thorough approach to the analysis of the income-redistributive effects of government expenditures. He is not specific, however, about the treatment of capital.

It appears that he simply aggregates current and capital expenditures for each expenditure classification. So, for example, when he analyses educational expenditure, he takes account of the amount spent on buildings, as well as the amount spent on administration and teaching.

Musgrave et al (1974, p.282) determine the value of an expenditure to its recipient as the costs incurred on behalf of various beneficiaries. "Thus, in the cost of education, [they] considered the building or salary cost which may be imputed to the students attending a particular school".

Gillespie and Musgrave et al treat items of capital spending which are not associated with direct expenditure items as indivisible goods. As discussed in Chapter Six, these indivisible (or collective goods) are then allocated according to several different assumptions.

Reynolds and Smolensky (1977, p.39) believe that in a highly aggregate study, little would be gained by an elaborate allocation of capital accounts overtime and instead assume these are stable over time. The treatment in this thesis is tantamount to the same thing.

B.2: SWF Studies

As is the case with most government expenditures, the Shoven, Whalley and Fullerton general equilibrium studies finesse the treatment of government capital expenditure. St. Hilaire and Whalley (1983) do not even mention it in their discussion of the data set for tax policy analysis. In his working paper about his model for the Australian economy, Piggott (1983, p.3) has one line about government expenditures: "Its expenditures cover not only Public Administration and Defence, of which it is the only consumer, but various other goods and services as well".

As the SWF methodologies are developed, however, there is potential to analyse government capital spending in greater detail. As discussed in Chapter Two, recent versions of the models are able to treat the existence of a government budget deficit and incorporate financial assets. Since it is a reality of modern times that government budgets are in deficit and capital spending is unstable over time, these developments are encouraging. From an income maintenance perspective, it is just as important to know the effects on household income of a government decision to undertake capital formation as for it to decide to spend more on education or health.

APPENDIX FIVE

MORE TABLES : GOVERNMENT RECEIPTS

This Appendix includes tables which are supplementary to those published in the text of Chapter Five. These tables are numbered with letters indicating the relevant section of Chapter Five (B = Indirect Taxes, C = the Company Tax) and so on.

Also included on Page 446 of this Appendix is a brief discussion about estate and gift duty taxes.

FIGURE A5.1

RATES OF STAMP DUTY IN 1981/82

Type of Document	Rate of Duty
Transfer of -	
Mortgage, debenture, shares, share rights, mining rights	40 cents for each \$100 or part of \$100 of the value of the property.
All other property, including land	1 percent for the first \$50,000 of the value of the property; 1.5 percent for the excess over \$50,000 up to \$100,000; 2 percent for the excess over \$100,000.
Leases -	
Rentals	40 cents for each \$100 or part of \$100 of 1 year's rent.
Deed	\$10.00
Duplicate or counterpart	\$1.00
Cheques (as from 4 July 1980)	5 cents for each bill of exchange

Source: 1982 Yearbook.

Table A5B.1

1981/82 INDIRECT TAXES: ESTIMATED DISTRIBUTION BY HOUSEHOLD TYPE

	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All Households
	Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil-dren	With Chil-dren		
Amount of Tax: \$ Million											
Direct Wholesale Sales Taxes	16	38	59	123	54	86	68	127	124	11	706
Specific Taxes	16	28	45	81	39	54	51	90	91	8	503
Racing & Lottery Duty	1	4	6	10	4	5	7	7	11	0	55
Stage One: Direct	33	70	110	214	97	145	126	224	226	19	1264
"Intermediate"	29	41	71	135	67	126	95	106	134	19	823
TOTAL (Stage Two)	62	111	181	349	164	271	221	330	360	38	2087
Percentage Distribution (%)											
Direct Wholesale Sales Taxes	2.3	5.4	8.3	17.4	7.6	12.2	9.7	18.0	17.5	1.6	100.0
Specific Taxes	3.2	5.6	8.9	16.1	7.8	10.7	10.1	17.9	18.1	1.6	100.0
Racing & Lottery Duty	1.8	7.3	10.9	16.4	7.3	9.1	12.7	12.7	20.0	0.0	100.00
Stage One: Direct	2.6	5.5	8.7	16.9	7.7	11.5	10.0	17.7	17.9	1.5	100.0
"Intermediate"	3.5	5.0	8.7	16.4	8.1	15.3	11.5	12.9	16.3	2.3	100.0
Stage Two: Total	3.0	5.3	8.7	16.7	7.9	13.0	10.6	15.8	17.2	1.8	100.0
Comparative Figures											
Distribution of Households (%)	10.8	8.7	12.4	15.0	7.8	12.6	10.4	8.3	10.3	3.7	100.0
Total Indirect Taxes as a Percentage of:											
Market Income (%)	17.3	10.5	15.0	9.7	9.9	9.6	9.6	12.0	10.8	20.0	10.8
Total Income (%)	6.9	9.9	8.5	9.6	9.5	9.2	9.1	11.4	10.1	10.6	9.6

Source: Summarised from Tables in Section B, Chapter Five.

Table A5B.2
AVERAGE AMOUNT OF WHOLESALE SALES TAX PAID BY PRIVATE HOUSEHOLDS
BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds*
	Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil- dren	With Chil- dren		
Average Amount per Household per Year (\$s)											
Less Than \$250	74	120	180	280	210	200	460	-	-	240	160
\$250-(\$3,950)	120	91	340	500	740	340	380	-	-	320	250
\$3,950-(\$9,750)	330	360	370	410	510	600	620	510	670	480	440
\$9,750-(\$13,450)	360	460	460	680	580	480	370	700	1000	270	520
\$13,450-(\$16,900)	-	420	730	580	640	630	510	550	890	-	590
\$16,900-(\$20,250)	-	590	890	900	670	710	680	920	850	-	760
\$20,250-(\$24,200)	-	570	1100	710	590	590	640	1200	880	-	720
\$24,200-(\$29,200)	-	940	600	920	730	750	790	1300	970	-	880
\$29,200-(\$36,650)	-	-	420	880	760	730	760	1700	1300	-	1100
\$36,650 and over	-	-	1400	1100	1200	1000	900	2000	1500	-	1400
Total	150	420	460	790	660	660	640	1500	1200	320	680

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

Table A5C.1

COMPARING DISTRIBUTIONS BY HOUSEHOLD TYPE OF TOTAL PAYMENTS USING
SIX CASES FOR COMPANY TAX

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		

	Estimated Proportion of Total (%)										
Company Tax (Case 1)	3.8	5.1	9.7	16.9	8.4	13.8	11.2	14.1	15.9	1.1	100.0
Household Expend. (Case 2)	3.4	5.2	9.0	17.1	8.3	14.1	11.5	14.0	16.2	1.2	100.0
1/3 Wages & Salary 1/3 Div'nd Income 1/3 H'hold Expend. (Case 3)	3.5	5.1	9.3	16.8	8.6	13.9	11.3	14.3	16.1	1.1	100.0
Dividend Income (Case 4)	4.0	4.9	10.3	16.1	9.1	13.4	10.9	14.7	15.5	1.1	100.0
Dividend Income & Investment Income (Case 5)	4.1	5.0	10.3	16.4	8.7	13.5	11.0	14.4	15.5	1.1	100.0
1/2 Div'nd Income 1/2 Expenditure (Case 6)	3.7	5.1	9.6	16.6	8.7	13.8	11.2	14.3	15.9	1.1	100.0

Source: See text Chapter Five for derivation, especially Section C.

Table A5C.2

AMOUNT OF COMPANY TAX PAYMENTS
BY RANGE OF HOUSEHOLD MARKET INCOME AND PRIVATE HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds*
	Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil- dren	With Chil- dren		
(\$M)											
Less Than \$250	4	1	4	1	-	-	1	-	-	3	14
\$250-(\$3,950)	14	2	14	1	1	1	-	-	-	2	35
\$3,950-(\$9,750)	19	6	19	2	3	3	3	2	1	3	61
\$9,750-(\$13,450)	5	5	13	5	4	5	3	3	2	1	46
\$13,450-(\$16,900)	-	4	12	6	6	8	5	3	3	-	54
\$16,900-(\$20,250)	-	5	12	9	5	10	7	4	3	-	55
\$20,250-(\$24,200)	-	3	8	10	4	10	10	5	7	-	59
\$24,200-(\$29,200)	-	1	5	18	6	7	7	7	8	-	69
\$29,200-(\$36,650)	-	-	9	16	4	14	5	17	20	-	86
\$36,650 and over	-	-	26	18	29	16	12	55	28	-	189
Total	61	28	122	86	61	74	55	98	74	10	669

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

AVERAGE COMPANY TAX PAYMENTS PER PRIVATE HOUSEHOLD PER YEAR
BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

Table A5C.4

COMPANY TAX PAYMENTS BY PRIVATE HOUSEHOLDS
BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds*
	Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil- dren	With Chil- dren		
As a Proportion of Total (Gross) Household Income (%)											
Less Than \$250	1.9	2.5	2.0	3.6	-36.0	3.1	200.0	-	-	2.6	2.4
\$250-(\$3,950)	5.1	4.0	4.5	5.9	6.8	7.1	4.0	-	-	3.4	4.7
\$3,950-(\$9,750)	9.8	4.7	5.8	3.3	3.7	3.5	3.6	4.6	3.2	5.1	5.6
\$9,750-(\$13,450)	6.8	2.0	5.0	3.7	2.4	2.6	2.0	4.8	3.6	2.1	3.3
\$13,450-(\$16,900)	-	1.9	5.7	2.6	2.8	2.3	2.0	3.7	2.5	-	3.1
\$16,900-(\$20,250)	-	2.4	5.8	2.5	2.1	2.8	2.0	2.2	2.1	-	2.7
\$20,250-(\$24,200)	-	2.7	5.3	1.9	1.8	1.9	2.8	3.2	2.5	-	2.5
\$24,200-(\$29,200)	-	1.9	3.5	2.2	2.6	1.8	2.1	2.5	1.8	-	2.4
\$29,200-(\$36,650)	-	-	5.9	1.9	1.5	2.9	1.8	2.7	2.6	-	2.5
\$36,650 and over	-	-	14.0	2.7	8.5	3.0	2.2	3.9	1.7	-	3.5
Total	6.9	2.5	5.7	2.4	3.5	2.5	2.3	3.4	2.1	2.9	3.1

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

Table A5D.1
AVERAGE ANNUAL PAYMENT FOR OTHER GOVERNMENT PAYMENTS IN 1981/82
PER HOUSEHOLD BY RANGE OF HOUSEHOLD MARKET INCOME
AND HOUSEHOLD TYPE (CASE ONE)

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
	\$ Per Year										
Less Than \$250	190	200	330	440	400	430	690	-	-	390	290
\$250-(\$3,950)	240	240	430	610	640	530	500	-	-	470	350
\$3,950-(\$9,750)	330	370	460	500	690	640	580	590	730	560	490
\$9,750-(\$13,450)	310	410	540	610	630	620	560	770	930	440	560
\$13,450-(\$16,900)	-	530	690	660	720	720	670	720	890	-	670
\$16,900-(\$20,250)	-	610	750	760	730	830	820	840	890	-	780
\$20,250-(\$24,200)	-	560	980	780	760	850	820	940	960	-	830
\$24,200-(\$29,200)	-	780	680	900	900	990	1000	1100	1000	-	950
\$29,200-(\$36,650)	-	-	620	960	990	1600	1100	1200	1200	-	1200
\$36,650 and over	-	-	1200	1200	1300	1400	1200	1500	1500	-	1400
Total	250	430	520	820	770	900	820	1200	1200	470	750

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households. Based on data in Table 5E.1 where the total of general government receipts were imputed to households in relation to household expenditure.

Table A5D.2

AMOUNT OF OTHER GOVERNMENT RECEIPTS BY PRIVATE HOUSEHOLDS
 ALLOCATED IN PROPORTION TO HOUSEHOLD EXPENDITURE
 BY RANGE OF HOUSEHOLD MARKET INCOME AND HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds
	Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil- dren	With Chil- dren		
(\$M)											
Less Than \$250	8	2	8	2	1	1	2	-	-	7	30
\$250-(\$3,950)	10	2	14	2	2	1	1	-	-	3	37
\$3,950-(\$9,750)	6	6	11	5	5	6	5	2	2	3	51
\$9,750-(\$13,450)	1	8	7	8	8	9	7	3	4	2	58
\$13,450-(\$16,900)	-	7	7	9	9	15	11	3	6	-	69
\$16,900-(\$20,250)	-	6	6	14	9	16	15	6	7	-	81
\$20,250-(\$24,200)	-	3	5	18	8	19	13	7	11	-	86
\$24,200-(\$29,200)	-	2	3	27	7	15	13	12	17	-	98
\$29,200-(\$36,650)	-	-	2	25	8	22	10	23	28	-	119
\$36,650 and over	-	-	4	18	6	13	13	41	49	-	145
Total	27	39	67	127	63	118	89	100	126	18	774

Sources: Estimated using data from the Department of Statistics Household Survey 1981/82, and weighted using data from the 1981 Census of Population and Dwellings to represent the total population of private households.

Table A5E.1
STAGE ONE: GOVERNMENT DIRECT PAYMENTS BY HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds*
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
\$ Million											
Personal Income Taxes	189	289	494	966	477	810	661	749	877	39	5552
Indirect Taxes	33	70	110	214	97	146	126	224	226	19	1264
Total	222	359	604	1180	574	956	787	973	1103	58	6816
Proportion of Total Direct Payments (%)	3.2	5.3	8.9	17.3	8.4	14.0	11.5	14.3	16.2	0.9	100.0

Source: Estimated based on the Department of Statistics 1981/82 Household Survey aggregated to the private household population based on the 1981 Census.

ESTATE AND GIFT DUTIES

There is no capital gains tax or personal wealth tax in New Zealand. The only wealth taxes are estate and gift duties. Since these are non-recurrent levies, they are excluded from the national accounting treatment in the public account. In recent years, the effect of tax policy has been to reduce existing taxes on wealth.

Estate duty contributed 13.5 percent of total government revenue in 1913, and even by 1935 it still made up almost 10 percent of taxation. It has declined since. The estate duty has not been a major source of tax revenue in recent years. It contributes around \$50 million a year - less than 1 percent of total tax revenue. Because of this, it was possible to increase the exemption level without a great loss in revenue.

Gift duties and land tax are also intended to tax wealth. Gifts valued at less than \$15,000 in any one year are exempt from tax and a progressive scale applies to larger gifts. But, of course, by making gifts over a period of years gift duties may be avoided. Land tax is assessed on non-agricultural land valued in excess of \$175,000.

1. Statutory Impact of Wealth Taxes

Because the rate structures of estate and gift duties are progressive, and the exemptions for these taxes and the land tax are set to ensure the average wealth owner does not pay them, the burden of these taxes increases with wealth. Since there is a high correlation between wealth and income, then these taxes are also likely to burden those on high incomes more than those on low incomes. Estate and gift duties were originally intended to contribute to greater distributive equity by helping to close a tax avoidance loophole - income tax could not be avoided forever by accumulating wealth since the wealth would be taxed when it was transferred as a gift or at death. Under present legislation, however, it is not difficult to rearrange one's affairs to avoid these taxes.

The scale of rates of gift duty is set out in Figure A5.2. It applies to all dutiable gifts made on or after 22 June 1979.

FIGURE A5.2

SCALE OF GIFT DUTY RATES

Value of Item "b" in section 62 (\$)	Rate
Not exceeding 15,000	Nil
15,001-20,000	5 percent on excess over \$15,000
20,001-30,000	\$250 plus 10 percent of excess over \$20,000
30,001-40,000	\$1,250 plus 20 percent of excess over \$30,000
Exceeding 40,000	\$3,250 plus 25 percent of excess over \$40,000

Note: "Excess" means excess of the value in complete dollars. Source: 1982 Yearbook.

Two significant factors influence the statutory impact of wealth taxes. First, the impact of the taxes will depend largely on the amount of legal skill and effort applied to planning an estate. An understanding of the impact of the tax would need to take into account under what conditions individuals are able to take the opportunity to minimise death taxes through planning before death. In addition, the use of trusts and gifts to charitable foundations are specific techniques used for transferring property to avoid payment of wealth taxes.

2. Who Pays Death Duties

One of the more philosophical debates in taxation literature revolves on the issue of who pays death duties (and hence gift duties as gift duties are seen to complement death duties). The Benthamite approach holds that property passing at death does not inherently belong to anyone and thus any duty must be the responsibility of the deceased. On the other hand, Rolph and Break (1961) put the commonsense argument, "it seems reasonably clear that an estate or inheritance tax cannot rest upon the decedent (deceased). Those who bear the tax are those who would, but for the intervention of the government's tax claims, obtain title to the wealth previously owned by the decedent."

APPENDIX SIX

NZSNA FINAL CONSUMPTION EXPENDITURE: DISAGGREGATED CENTRAL GOVERNMENT SERVICES - NON-MARKET PRODUCTION GROUPS

The figures below disaggregate NZSNA figures for central government consumption expenditure (see Figure 4.3, p.188) by departmental function. They provide another perspective on the data used in this thesis to represent the expenditure side of the budget.

	(\$000) 1982	% Change	(\$000) 1983
<u>GENERAL ADMINISTRATION</u>			
901 General Administration			
Audit	1,615	15.3	1,862
Crown Law	1,861	-15.0	2,188
Customs	25,769	14.4	29,483
Environment	953	7.0	1,020
Foreign Affairs	48,732	11.1	54,125
Government Print	4,778	-1.2	4,720
Inland Revenue	58,391	11.2	64,940
Internal Affairs	32,940	13.1	37,240
Justice	104,645	5.4	110,262
Lands & Survey	16,269	14.5	18,622
Legislative	13,198	11.4	14,697
Maori Affairs	2,007	-6.7	1,873
Police	159,538	6.0	169,108
Prime Minister & S.I.S.	5,156	21.8	6,278
State Services	32,177	7.1	34,448
Statistics	24,472	-29.7	17,199
Tourist & Publicity	4,691	-9.8	4,232
Transport	38,512	7.0	41,223
Treasury	58,924	124.8	132,444
Valuation	9,123	-9.9	8,218
Works	4,227	22.5	5,180
Sub-Total General Administration	647,978	17.2	759,362
115 Construction Services			
Works	89,845	67.5	150,466
Sub-Total Construction Services	89,845	67.5	150,466
117 Transport Services			
Internal Affairs	-		12
Transport	21,380	44.3	30,861
Works	89,940	11.8	100,593
Sub-Total Transport Services	111,320	18.1	131,466
119 Business Services			
Works	14,366	-69.8	4,338
Sub-Total Business Services	14,366	-69.8	4,338
TOTAL GENERAL ADMINISTRATION	863,509	21.1	1,045,632

	(\$000)	%	(\$000)
<u>DEFENCE</u>	<u>1982</u>	<u>Change</u>	<u>1983</u>
902 Defence	587,266	6.6	626,191
TOTAL DEFENCE	587,266	6.6	626,191

EDUCATION

903 Administration of Education			
Education Prog.I	20,964	19.2	24,998
Maori Affairs	48	60.4	77
Sub-Total Administration of Education	21,012	19.3	25,075
983 Agriculture & Fisheries	1,499	-35.2	972
Education	1,248,604	10.8	1,383,903
Maori Affairs	3,520	20.3	4,235
Sub-Total Education Services	1,253,623	10.8	1,389,110
TOTAL EDUCATION	1,274,635	10.9	1,414,185

HEALTH

904 Administration of Health	35,314	6.3	37,535
Sub-Total Administration of Health	35,314	6.3	37,535
984 Health Services			
Health	1,086,571	8.1	1,174,940
Sub-Total Health Services	1,086,571	8.1	1,174,940
TOTAL HEALTH	1,121,885	8.1	1,212,475

INDUSTRIES

906 Admin. of Specified Industries			
of Labour Services			
Agriculture & Fisheries	104,471	10.2	115,089
Energy - Department of	3,661	81.2	6,633
Energy Resources (Mines)	-		
Forest Services	8,061	149.3	20,095
Labour	37,415	10.4	41,288
Lands & Survey	8,691	-	8,961
Maori Affairs	8,134	11.7	9,083
Tourist & Publicity	6,116	15.5	7,067
Trade & Industry	12,625	-57.4	5,373
Transport	20,693	-35.1	13,427
TOTAL INDUSTRIES	209,867	6.9	227,016

	(\$000) 1982	% Change	(\$000) 1983
<u>SOCIAL WELFARE</u>			
905 Administration of Social Welfare	59,906	15.8	69,349
TOTAL OF SOCIAL WELFARE	59,906	15.8	69,349

SOCIAL AND RECREATIONAL SERVICES,
RESEARCH

985 Social & Recreational Services and Scientific Research			
Agriculture & Fisheries	39,442	9.4	43,134
Education	10,382	17.6	12,210
Forest Service	22,623	15.1	26,034
Internal Affairs	3,590	21.9	4,377
Lands & Survey	14,981	-1.3	14,794
Maori Affairs	3,933	18.6	4,665
DSIR	55,741	10.1	61,378
Social Welfare	38,992	25.0	48,723
Tourist & Publicity	415	-16.4	347
Transport	12,706	6.8	13,564
TOTAL SOCIAL & RECREATIONAL SVCES ETC.	202,805	12.2	229,226

MAIN EXPENDITURE CATEGORIES (\$000)

General Administration	863,509	21.1	1,045,632
Defence	587,266	6.6	626,191
Education	1,274,635	10.9	1,414,185
Health	1,121,885	8.1	1,212,475
Industries	209,867	8.2	227,016
Social Welfare	59,906	15.8	69,349
Social Recreational Services and Scientific Research	202,805	12.2	229,226
GRAND TOTAL	4,319,903	11.6	4,824,074

PERCENTAGE BREAKDOWN MAIN EXPENDITURES (%)

General Administration	20.0	21.7
Defence	13.6	13.0
Education	29.5	29.3
Health	26.0	25.1
Social Welfare, Social and Recreational Services Research	6.1	6.2
Industries	4.8	4.7
TOTAL	100.0	100.0

APPENDIX SEVEN

SUMMARY TABLES OF THE QUANTITATIVE RESULTS

The tables published in this Appendix summarise the quantitative results produced in Chapters Three through Six. The main text of the thesis (especially Chapters One and Two) discusses the limitations and strengths of the quantitative approach to analysing budget incidence. Unit-record survey data are the basic information applied to derive the quantitative results. The multitude of different formats by which the data can be presented is overwhelming. Further issues can be easily addressed through the application of Statistical Analysis System (SAS) computer techniques to regroup data. Supplementary (unpublished) tables analyse individual budget items:

- 1) By total \$000 amount;
- 2) As a proportion of the total for each income range;
- 3) As a proportion of the total for each household type;
- 4) As a proportion of the total for all households;
- 5) Average amount per household per year;
- 6) As a proportion of compensation to households;
- 7) As a proportion of total (gross) household income;
- 8) As a proportion of household expenditure;
- 9) Average amount per person per year.

To ease assimilation of the main ideas, most comparisons in this thesis are with the distribution of household market income. Some of the limitations to keep in mind when evaluating the results are:

- 1) Market income may not always be the relevant base for comparison. For instance, since some social welfare benefits are taxable, the distribution of personal income taxes by total income may yield patterns not evident in comparisons with market income.
- 2) Market income has been specifically defined for this thesis to account for household earnings in the market place in a given year before they receive a money-income benefit from government provided goods and services. Other studies often format their results by another income concept and this must be recognized when making comparisons. For example, Broad and Bacica (1985) use total income, disposable income or household expenditure as the basis for most of their analysis.
- 3) The complexity of the methodological approach makes it difficult to apply normal statistical tests to assess the reliability of the estimates.

Table A7.1

STAGE ONE : DIRECT MONEY-INCOME
EFFECTS OF THE 1981/82 BUDGET BY INCOME GROUP
(Each Income Group Represents a Decile, 10%, of Private Households)

Household Market Income (\$ p.a.)	plus Direct Market Monetary Income Benefits	Total Income (A+B)	less Persnl Income Taxes	H'hold Income Avail. to Spend (C-D)	plus Sub- sidy Income	less "Direct" Indirect Taxes	plus Gv'ment Private Goods	Money Income W/Direct Gvt Trans actions (E+F+H-G)
A	B	C	D	E	F	G	H	I
\$ Million								
Less Than \$250	-22	654	632	50	582	6	34	748
\$250-(\$3950)	170	602	772	89	683	7	50	823
\$3950-(\$9750)	731	410	1141	156	985	26	82	1165
\$9750-(\$13450)	1212	213	1425	255	1170	20	100	1309
\$13450-(\$16900)	1567	194	1761	366	1395	24	111	1568
\$16900-(\$20250)	1922	162	2084	483	1601	25	138	1762
\$20250-(\$24200)	2291	123	2414	594	1820	31	137	1998
\$24200-(\$29200)	2774	149	2923	777	2146	37	162	2294
\$29200-(\$36650)	3387	133	3521	994	2527	34	195	2646
\$36650 and over	5211	162	5373	1788	3585	46	255	3809
TOTAL	19243	2803	22046	5552	16494	256	1264	18122
Proportion of Total (%)								
Less Than \$250	-0.1	23.3	2.9	0.9	3.5	2.3	2.7	4.2
\$250-(\$3950)	0.9	21.5	3.5	1.6	4.1	2.7	3.9	4.5
\$3950-(\$9750)	3.8	14.6	5.2	2.8	6.0	10.2	6.5	6.4
\$9750-(\$13450)	6.3	7.6	6.5	4.6	7.2	7.8	7.9	7.2
\$13450-(\$16900)	8.1	6.9	8.0	6.6	8.5	9.4	8.8	8.7
\$16900-(\$20250)	10.0	5.8	9.4	8.7	9.7	9.8	11.0	9.7
\$20250-(\$24200)	11.9	4.4	10.9	10.7	11.0	12.1	10.8	11.0
\$24200-(\$29200)	14.4	5.3	13.2	14.0	13.0	14.4	12.8	12.7
\$29200-(\$36650)	17.6	4.8	16.0	17.9	15.3	13.3	15.4	14.6
\$36650 and over	27.1	5.8	24.4	32.2	21.7	18.0	20.2	21.0
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Notes: For definitions of each column, see Figure 7.1 following Table 7.3. Numbers may not add exactly because of rounding. Market income ranges have been defined so that each contains 10 percent of total private households. See Chapters Three, Five and Six for derivation.

Table A7.2

STAGE ONE: DIRECT MONEY-INCOME
EFFECTS OF THE 1981/82 BUDGET BY HOUSEHOLD TYPE

Household Type											
1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n		All House- holds
Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil- dren	With Chil- dren			
\$ Million											
Market Income (A)	357	1054	1204	3594	1656	2822	2296	2741	3329	190	19243
(plus)											
Direct Monetary Benefits (B)	540	86	943	92	87	150	177	203	326	199	2803
Equals:											
Total Income (C)	897	1140	2147	3686	1743	2972	2473	2944	3655	389	22046
(less)											
Personal Income Taxes (D)	189	289	494	966	477	811	661	749	877	39	5552
Equals:											
Household Income Aval.to Spend (E)	708	851	1653	2720	1266	2161	1812	2195	2778	350	16494
(plus)											
Subsidy Income (F)	3	8	10	38	18	31	38	41	64	5	256
(less)											
Indirect Taxes (G)	33	69	110	213	96	146	127	224	226	21	1264
(plus)											
Government Private Goods' (H)	180	46	306	141	185	403	545	223	499	107	2635
Equals:											
Money Income W/Direct Gov Transactn (I)	859	836	1859	2687	1373	2449	2269	2234	3115	441	18122

Note: For definition of each row, see Figure 7.1 see Chapter Three, Five and Six for derivation.

Table A7.3

STAGE ONE: PERCENTAGE DISTRIBUTION OF DIRECT MONEY-INCOME EFFECTS
OF THE 1981/82 BUDGET BY HOUSEHOLD TYPE

Household Type											
		1 Adult		2 Adults		2 Adults with Children		3 or More Adults		1 Adult with Chld'n	All House- holds
		Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil- dren	With Chil- dren	
Proportion of Total (%)											
Market Income (A)		1.9	5.5	6.3	18.7	8.6	14.7	11.9	14.2	17.3	100.0
(plus)											
Direct Monetary Benefits (B)		19.3	3.1	33.6	3.3	3.1	5.4	6.3	7.1	11.6	100.0
Equals:											
Total Income (C)		4.1	5.2	9.7	16.7	7.9	13.5	11.2	13.3	16.6	100.0
(less)											
Personal Income Taxes (D)		3.4	5.2	8.9	17.4	8.6	14.6	11.9	13.5	15.8	100.0
Equals:											
Household Income											
Avail. to Spend (E)		4.3	5.2	10.0	16.5	7.7	13.1	11.0	13.3	16.8	100.0
(plus)											
Subsidy Income (F)		1.1	3.1	3.9	14.9	7.0	12.1	14.9	16.0	25.0	100.0
(less)											
Indirect Taxes (on final goods only) (G)		2.6	5.5	8.7	16.8	7.6	11.5	10.0	17.7	17.9	100.0
(plus)											
Government Private Goods (H)		6.8	1.7	11.6	5.4	7.0	15.3	20.7	8.5	18.9	100.0
Equals:											
Money Income											
W/Direct											
Govt Transactn (I)		4.8	4.6	10.3	14.8	7.6	13.5	12.5	12.3	17.2	100.0
Comparative Distributions:											
Proportion of H'holds of Each Type		10.8	8.7	12.4	15.0	7.8	12.6	10.4	8.3	10.3	100.0
Percentage of Total Persons in Private Households by Household Type		3.6	2.9	8.3	10.0	7.9	16.9	19.0	9.4	18.7	100.0

Source: Based on Table 7.2

FIGURE A7.1

NOTE TO TABLES A7.1, A7.2 and A7.3

-
- (A) Market income is current gross personal earnings. It includes income from salary and wages; dividends; interest; royalties; trusts; self-employed and partnership earnings.
- (B) Includes all direct social welfare benefits, national superannuation and supplementary minimum prices (SMPs).
- (C) Total income comprises market income plus direct monetary benefits.
Note: This definition of total income includes SMPs.
- (D) Personal tax liability is calculated based on stated income in household survey. Takes account of: 1) marginal tax rate scale; 2) life insurance exemptions; 3) expenditures derived while earning an income; 4) rebates for property rates, donations and school fees, first-home mortgage interest, dividends, spouse rebate, single income family rebate, spouse rebate, low income family rebate and young family rebate.
- (E) Disposable income (includes supplementary minimum price payments to farmers).
- (F) Subsidies which have a direct effect only. In other words, price subsidies on final goods such as milk and rail travel or income subsidies such as those available for private sector employment or fertiliser price subsidies and paid to farmers. SMPs are included as monetary benefits.
- (G) Indirect taxes which have a direct effect on the price of final expenditures only are included. Indirect taxes on intermediate goods, such as motor vehicles purchased by companies, which may also add to the prices of final goods, are excluded.
- (H) The money-income value of government expenditures where the ministry of private beneficiary can be identified. Included are; 1) Health; 2) Educational spending; 3) Expenditures by Agriculture and Fisheries which have a direct benefit for farmers; 4) Department Maori Affairs expenditures; and 5) Housing Corporation expenditures which have an identifiable beneficiary.
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Table A7.4

STAGE TWO: THE DISTRIBUTION OF HOUSEHOLD MONEY INCOME ADJUSTED FOR TOTAL CENTRAL GOVERNMENT NON-MARKET BUDGET ACTIVITIES IN 1981/82
(By Household Income Group: Each Group Represents a Decile, 10%, of Private Households)

Household Market Income Group (\$ p.a.)	Income	Payments to Government					Money Income Value of Government Expenditure							Adjust- ment for All Govt Non-Mkt Activits. (C-B)	Market Income Adjusted for Govt Budget (A+D)
	Market Income	Personal	Indirect Taxes	Company	Other Receipts	Total Payments (B1-B4)	Social Welfare	Collective	Health	Education	Subsidies	Interest	Total Govnt Expend. C1-C6		
		Income Tax		Income Tax			Benefits (excludes SMPs)	Government Expend. (Case 1)				and Other			
	A	B1	B2	B3	B4	B	C1	C2	C3	C4	C5	C6	C	D	E
\$ Million															
Less than \$ 250	-22	50	66	14	30	160	648	101	152	52	16	18	987	827	805
\$ 250 - (\$ 3950)	170	89	90	35	37	251	596	124	146	37	18	31	952	701	871
\$ 3950 - (\$ 9750)	731	156	135	61	51	403	371	168	132	89	71	75	906	503	1234
\$ 9750 - (\$13450)	1212	255	161	46	58	520	192	195	113	101	49	52	702	182	1394
\$13450 - (\$16900)	1567	366	185	54	69	674	167	233	122	133	60	64	779	105	1672
\$16900 - (\$20250)	1922	483	225	55	81	844	144	269	118	159	53	59	802	-42	1880
\$20250 - (\$24200)	2291	594	229	59	86	968	102	287	116	169	63	65	802	-166	2125
\$24200 - (\$29200)	2774	777	266	70	98	1211	118	329	109	168	81	81	886	-325	2449
\$29200 - (\$36650)	3387	994	321	86	119	1520	114	398	111	176	68	85	952	-568	2819
\$36650 and over	5211	1788	409	189	145	2531	134	484	138	209	93	158	1216	-1315	3896
Total	19243	5552	2087	669	774	9082	2586	2588	1257	1293	572	688	8984	-98	19,145
	A	B1	B2	B3	B4	B	C1	C2	C3	C4	C5	C6	C	D	E
Proportion of total (%)															
Less than \$ 250	-0.1	0.9	3.1	2.1	3.9	1.8	25.1	3.9	12.1	4.0	2.8	2.6	11.0		4.2
\$ 250 - (\$ 3950)	0.9	1.6	4.3	5.2	4.8	2.8	23.0	4.8	11.6	2.9	3.1	4.5	10.6		4.5
\$ 3950 - (\$ 9750)	3.8	2.8	6.5	9.1	6.5	4.4	14.3	6.5	10.5	6.9	12.4	10.9	10.1	Not rele- vant	6.5
\$ 9750 - (\$13450)	6.3	4.6	7.7	6.9	7.5	5.7	7.5	7.5	9.0	7.8	8.6	7.7	7.8		7.3
\$13450 - (\$16900)	8.1	6.6	8.9	8.1	9.0	7.4	6.5	9.0	9.7	10.3	10.5	9.3	8.7		8.7
\$16900 - (\$20250)	10.0	8.7	10.8	8.2	10.4	9.3	5.6	10.4	9.4	12.3	9.3	8.6	8.9		9.8
\$20250 - (\$24200)	11.9	10.7	11.0	8.8	11.1	10.7	3.9	11.1	9.2	13.1	11.0	9.4	8.9		11.1
\$24200 - (\$29200)	14.4	14.0	12.7	10.4	12.7	13.3	4.5	12.7	8.7	13.0	14.2	11.8	9.9		12.8
\$29200 - (\$26650)	17.6	17.9	15.4	12.9	15.4	16.7	4.4	15.4	8.8	13.6	11.9	12.3	10.6		14.7
\$36650 and over	27.1	32.2	19.6	28.3	18.8	27.9	5.2	18.7	11.0	16.2	16.2	22.9	13.5		20.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		100.0

Source: See Chapters Three, Five and Six for derivation.

Table A7.5

STAGE TWO: THE AMOUNT OF HOUSEHOLD MONEY INCOME ADJUSTED
FOR TOTAL CENTRAL GOVERNMENT NON-MARKET BUDGET ACTIVITIES
IN 1981/82 BY HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										All House- holds*
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		
\$ Million											
Market Income(A)	357	1054	1204	3594	1656	2822	2296	2741	3329	190	19243
Personal Income											
Tax Payments	189	289	494	966	477	811	661	749	877	39	5552
Indirect Tax											
Payments	62	111	181	349	164	271	222	330	360	38	2087
Company Income											
Tax (Case 1)	61	28	122	86	61	74	55	98	74	10	669
Other Receipts (Case 1)	27	39	67	127	63	118	89	100	126	18	774
Total Payments(B)	339	467	865	1528	765	1274	1027	1277	1437	105	9082
Social Welfare Benefits (exc. SMPS)											
	535	79	933	65	73	122	132	172	277	198	2586
Collective Govt Goods	91	129	225	424	210	396	297	334	423	59	2588
Health	145	36	234	103	93	162	162	114	179	29	1257
Education	2	13	8	57	71	251	387	93	336	75	1293
Subsidies	12	19	29	81	41	74	95	84	129	8	572
Interest & Other	45	28	91	91	58	84	82	98	101	10	688
Total Govt Exp.(C)	830	304	1520	821	546	1089	1155	895	1445	379	8984
Net Govt Activities (C-B)	491	-163	655	-707	-219	-185	128	-382	8	274	-98
Market Income Adjusted for Government	848	891	1859	2887	1437	2637	2424	2359	3337	464	19145

Source: See Chapter Three, Five and Six for derivation.

Table A7.6

STAGE TWO: PERCENTAGE DISTRIBUTION OF HOUSEHOLD MONEY INCOME ADJUSTED FOR TOTAL CENTRAL GOVERNMENT NON-MARKET BUDGET ACTIVITIES IN 1982/82 BY HOUSEHOLD TYPE

Household Market Income (\$ p.a.)	Household Type										
	1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n	All House- holds*
	Nat	Oth	Nat	Oth	1	2	3+	No	With		
	Sup		Sup					Chil- dren	Chil- dren		

	Proportion of Total (%)										
Market Income(A)	1.9	5.5	6.3	18.7	8.6	14.7	11.9	14.2	17.3	0.9	100.0
Personal Income Tax Payments	3.4	5.2	8.9	17.4	8.6	14.6	11.9	13.5	15.8	0.7	100.0
Indirect Tax Payments	3.0	5.3	8.7	16.7	7.9	13.0	10.6	15.8	17.2	1.8	100.0
Company Income Tax (Case 1)	9.1	4.2	18.2	12.9	9.1	11.1	8.2	14.6	11.1	1.5	100.0
Other Receipts (Case 1)	3.5	5.0	8.7	16.4	8.1	15.3	11.5	12.9	16.3	2.3	100.0
Total Payments(B)	3.8	5.1	9.5	16.8	8.4	14.0	11.3	14.1	15.8	1.2	100.0

Social Welfare Benefits (exc.SMPS)	20.7	3.1	36.1	2.5	2.8	4.7	5.1	6.6	10.7	7.7	100.0
Collective Govt Goods	3.5	5.0	8.7	16.4	8.1	15.3	11.5	12.9	16.3	2.3	100.0
Health	11.6	2.9	18.6	8.1	7.4	12.9	12.9	9.1	14.2	2.3	100.0
Education	0.2	1.0	0.6	4.4	5.5	19.4	29.9	7.2	26.0	5.8	100.0
Subsidies	2.1	3.3	5.1	14.2	7.2	12.9	16.6	14.7	22.5	1.4	100.0
Interest & Other	6.5	4.0	13.3	13.3	8.4	12.2	11.9	14.3	14.7	1.4	100.0
Total Govt Exp.(C)	9.2	3.4	16.9	9.1	6.1	12.1	12.9	10.0	16.1	4.2	100.0

Market Income Adjusted for All Central Government	4.4	4.7	9.6	15.1	7.5	13.9	12.7	12.3	17.4	2.4	100.0

Sources: Based on Table 7.5.

Table A7.7
STAGE THREE: BROAD MEASUREMENT OF INCOME DISTRIBUTED BY INCOME RANGE

	Gross Domestic Product Income	Money Income Value of:		Broad Income Gross Domestic Product Adjusted for Govnt	
		Payments to Govnt	Govnt Non-Market Expenditures	Amount	% Distribution
	A	B	C	D (A-B+C)	
\$ Million					
Less than \$ 250	140	160	987	967	3.4
\$ 250 - (\$ 3950)	587	251	952	1288	4.5
\$ 3950 - (\$ 9750)	1448	403	906	1951	6.9
\$ 9750 - (\$13450)	1816	520	702	1998	7.0
\$13450 - (\$16900)	2302	674	779	2407	8.5
\$16900 - (\$20250)	2712	844	802	2671	9.4
\$20250 - (\$24200)	3101	968	802	2935	10.3
\$24200 - (\$29200)	3782	1211	886	3457	12.2
\$29200 - (\$36650)	4656	1520	952	4087	14.4
\$36650 and over	7961	2531	1216	6646	23.4
Total	28505	9082	8984	28407	100.0

Source: See Chapters Three through Six for derivation.

Table A7.8

STAGE THREE: BROAD MEASUREMENT OF FINAL INCOME
DISTRIBUTED BY HOUSEHOLD TYPE

Household Type											
1 Adult		2 Adults		2 Adults with Children			3 or More Adults		1 Adult with Chld'n		All Households
Nat Sup	Oth	Nat Sup	Oth	1	2	3+	No Chil-dren	With Chil-dren			
Gross Domestic Product											
Amt \$M	1042	1481	2630	4860	2471	4013	3214	4031	4448	315	28505
Distribution %	3.7	5.2	9.2	17.0	8.7	14.1	11.3	14.1	15.6	1.1	100.0
Money Income Value of:											
Total Govt Payments											
Amt \$M	346	467	878	1527	761	1256	1022	1281	1440	104	9082
Distribution %	3.8	5.1	9.7	16.8	8.4	13.8	11.3	14.1	15.9	1.1	100.0
Total Govt Expend.											
Amt \$M	830	304	1520	821	546	1089	1155	895	1445	379	8984
Distribution %	9.2	3.4	16.9	9.1	6.1	12.1	12.9	10.0	16.1	4.2	100.0
Gross Domestic Product adjusted for Govt											
Amt \$M	1526	1318	3272	4154	2256	3846	3347	3645	4453	590	28407
Distribution %	5.4	4.7	11.5	14.6	7.9	13.5	11.8	12.8	15.7	2.1	100.0

Source: See Chapters Three through Six for derivation.

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