AN EVALUATION OF THE PREDICTIVE VALUE OF BANK FAIR VALUES

BY

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A thesis
submitted to the Victoria University of Wellington
in fulfilment of the requirements for the degree of
Doctor of Philosophy

Victoria University of Wellington
2014

ACKNOWLEDGEMENTS

I am very grateful to my supervisors, Professor Tony van Zijl and Professor Mark Tippett for the unflinching support, priceless guidance and immense encouragement they provided to me throughout the writing of this thesis. Both Mark and Tony have gone to great lengths to ensure I succeed not just on the PhD, but in life too. I could not have asked for any better supervisors to have led me on my PhD journey. My gratitude also goes to Professor Keitha Dunstan (Bond University, Australia), Dr Ekoja B. Ekoja, Mr Emma Oki and Olayinka Moses (University of Jos, Nigeria), Iyinoluwa Ologe (Monash University, Australia), Dr Carolyn Cordery, Dr Bhagwan Khanna, Dr Thu Phuong Truong, Dr Noor Houqe, Kevin Simpkins and Jane Perry for their assistance during the period of my study at Victoria University of Wellington.

To every other member of staff and PhD colleagues of the School of Accounting and Commercial Law, Victoria University of Wellington, I say a big thank you for your profound support, advice and camaraderie. Special thanks to Nam Le, for your friendship, ideas and chitchat throughout our time together on the PhD.

I wish to express my gratitude to Victoria University of Wellington (VUW) for providing me with the VUW Doctoral Assistantship and PhD Submission Scholarship and the Steel family for granting me the R.W Steel Scholarship in Accounting. I am also grateful to the University of Jos, Nigeria for granting me a training leave for my PhD studies.

My sincere love and thanks goes to my church and nuclear families; in particular my wife- Yemisi and my daughters- Tomi and Ifeoluwa, whose love and support have been the bedrock of my success. I am also grateful to the ELIM Wellington family, my mum and brothers who have cheered me on all the way. To my late dad, this thesis is dedicated to your memory and to God; I could not have become what I am without You.

STATEMENT OF ORIGINAL AUTHORSHIP

I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of materials which have been accepted for the award of any other degree or diploma at Victoria University of Wellington or any other educational institutions, except where due acknowledgement is made in this thesis. Any contribution made to the research by others, with whom I have worked at Victoria University of Wellington or elsewhere, is explicitly acknowledged in this thesis.

I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.

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ABSTRACT

This thesis examines whether the net asset fair values of banks possess predictive ability for the banks' future cash flows and earnings. This is an important issue considering the arguments for and against the wider use of fair value accounting for banks' financial instruments and the claim by some that fair values during economic recessions (where markets may be illiquid) are irrelevant and largely unreliable. A number of studies have found that the explanatory power of bank fair values when compared to traditional historical cost are more value-relevant based on capital market reactions. However, there is a very limited literature on how bank fair values are related to the future performance (e.g. earnings and cash flow) of banks. This study fills this gap by providing empirical evidence on the relationship between U.S. bank fair value disclosures and banks' future performance as measured by operating cash flows and earnings over a three-period future horizon. Furthermore, the thesis provides evidence on the relationship between bank fair values, in terms of the levels classification introduced during the 2008 global financial crisis, and the future performance of banks, thus showing whether market illiquidity affected the underlying relationships.

The study examines two distinct periods. The first study period, 1996-2005, was based on annual data of banks with minimum total assets of $US150 million as of year 1996. The second study period from 2008-2010 (this period encompassed the global financial crisis period and also the levels classification of bank fair values according to SFAS 157), was based on quarterly data of banks with minimum total assets of $US150 million as of the first quarter of 2008.

The thesis provides strong evidence that there is a predictive relationship between bank fair values and future bank performance. The evidence is strong during the first study period from 1996 to 2005 where the current net asset fair values of on-balance sheet financial instruments of banks were significantly associated with future operating cash flows and operating earnings of such banks over a three-year future time horizon. However, the predictive relationship between net asset bank fair values and operating cash flows is stronger than the predictive relationship between net asset bank fair values and operating earnings.

In the second study period, from 2008 until 2010 the empirical results show strong evidence that there is a predictive relationship between level 1 and level 2 bank fair values and future operating cash flows. The findings from the empirical results were that the current quarter's level 1 and level 2 net asset fair values of banks were significantly associated with the future quarters' operating cash flows of such banks. The level 3 net asset fair values of such banks in most cases were not significantly

associated with the banks' future quarterly operating cash flows. The corresponding relationships for operating earnings were that the current quarter's level 1 net asset fair values of banks were positively associated with the future quarters' operating earnings of such banks. However, the level 2 net asset fair values of banks were negatively associated with the future quarters' earnings of such banks. This result is in contrast to the results obtained when the predictive relationship between level 2 bank fair values and future operating cash flows was evaluated, where it is found that both level 1 and level 2 net asset bank fair values are positively related to future quarterly bank cash flows. Further empirical analysis showed that a possible reason behind this disparity was that there was a structural change in the relationship between bank operating cash flows and operating earnings over the course of the first and second study periods, where, in particular, for the second study period (which includes the period of the global financial crisis) there was a systematic downward bias in operating earnings relative to the operating cash flows of the sampled banks. This in turn makes operating earnings a poor proxy for operating cash flows during the second study period.

The findings from this study provide confirmation that net asset fair values have predictive ability as argued by Ball (2008); Barth (2006b) and Tweedie (2008). The study findings that net asset fair values have predictive ability is consistent with the FASB's view that the asset values shown in firm financial statements should communicate information about the potential future financial performance of the affected firms (FASB 2010:17). Furthermore, the study also confirms that objectively determined bank fair values based on market prices rather than model based bank fair values provide greater predictive value in relation to future performance as measured by operating cash flows.

Lastly, this thesis showed that during the first study period (where there was no financial crisis) that bank size, capital adequacy and growth prospects, had little impact on the results obtained, while for the second study period, there were cases where bank size and bank capital ratios did have a significant impact on the predictive relationship between bank fair values and future cash flows.

The study contributes to the fair value accounting and accounting standard-setting literature and highlights that fair values have predictive ability, especially with respect to future operating cash flows of banks, both during and outside of periods of financial crisis.

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GLOSSARY AND ABBREVIATIONS

AAA	The American Accounting Association
AICPA	American Institute of Certified Public Accountants
APB	Accounting Principles Board
ASB	Accounting Standards Board of the United Kingdom
CoCoA	Continuously Contemporary Accounting
EDGAR	Electronic Data Gathering, Analysis and Retrieval
FASB	Financial Accounting Standards Board
FIFO	First in First out
FVA	Fair Value Accounting
GAAP	Generally Accepted Accounting Principles
GPFR	General Purpose Financial Reports
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IASC	International Accounting Standards Committee
IFRS	International Financial Reporting Standards
JWG	Joint Working Group of Standard Setters
LIFO	Last in First out
SEC	The United States Securities and Exchange Commission
SFAC	Statement of Financial Accounting Concepts
SFAS	Statement of Financial Accounting Standards
U.K.	The United Kingdom
U.S.	The Unites States

CHAPTER ONE

INTRODUCTION

During the recent global financial crisis from 2007 onwards, the issue of “Fair Value Accounting” (FVA), as laid down by international standard setters, notably the International Accounting Standards Board (IASB, hereafter) and the United States based Financial Accounting Standards Board (FASB, hereafter), has come under heavy scrutiny and criticism[1]. The issues involved strike at the core of the accounting profession and its place in the modern globalised economy. This is true of the profession’s financial reporting role and the impact different accounting measurement bases may have on financial market stability. Two main questions summarise the FVA debate and they can be described as “accounting to who” and “accounting for what?” These issues, though not new, have deepened with respect to the FVA debate during the global financial crisis and answers are being sought within and outside accounting circles to chart the course for the way forward.[2]

What value then is “fair”? And to whom is this value fair? These questions have generated significant debate over the years, but in this study I examine the above questions from the perspective of the FASB[3]. The FASB in its recent conceptual framework has taken the stand that accounting information should be primarily focused on existing and potential investors, lenders, and other creditors who cannot command

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[1] A number of discussion papers have criticised the role of FVA on valuation of financial institutions assets claiming it worsened the financial crisis. e.g. American Bankers Association (2008) and Wallison (2008).

[2] Statements from politicians, regulators and other market participants show significant interest in the accounting rules and principles related to FVA. The U.S. Congress, the G7’s Financial Stability Forum (FSF) and the Institute of International Finance (IIF) have all given opinions on FVA.

[3] The IASB and the FASB have worked together on the harmonisation of their fair value accounting related standards and Conceptual Frameworks.

reporting entities to provide information directly to them (FASB, 2010:7). The FASB believes that a single general purpose financial report will to a large extent meet the needs of these investors and lenders (FASB, 2010:7). Hence, in this thesis the concept of for whom "fair value is fair" focuses on the investor. What constitutes the fair value of an asset to an investor? Fair value estimates are expected to represent the present value of the expected future cash flows associated with an asset [or liability] (Barth, 2000:19; Ryan, 2008a:12). Consequently, fair value should be those values most value-relevant to investors when making investment decisions. A series of studies have established the greater relevance to the investor of fair values in relation to capital market reactions, especially when fair values are compared with the traditional historical/amortised cost concepts of accounting for net assets (Barth, 1994; Barth, Beaver, and Landsman, 1996; Eccher, Ramesh, and Thiagarajan, 1996; Song, Thomas and Han, 2010).

The FASB also states that the two fundamental qualitative characteristics of financial information are "relevance" and "faithful representation". According to the FASB (2010:16):

> *If financial information is to be useful, it must be relevant and faithfully represents [sic] what it purports to represent.*

Financial information is relevant if it is capable of making a difference in the decisions made by users, if it has "predictive value", "confirmatory value", or both. Financial information has predictive value if it can be used as an input to processes employed by users to predict future outcomes and it has confirmatory value, if it provides feedback about prior evaluations. For example, revenue information for the current year should be useful as a basis for predicting revenues in future years (predictive value) and revenue information of the current year should be comparable to predictions in past years (confirmatory value) (FASB, 2010:17).

If asset fair values are an estimate of the future shown today, they should possess predictive value unless the estimates are incorrect, since they are supposed to reflect the expected financial performance of such assets which can be measured either by cash flows or earnings. Hence, an important question is whether the cash flows provided by an asset in the future are associated with the fair values of such assets today? Also, it is worthwhile to consider whether there is a relationship between the future earnings from assets and the fair values of such assets today. This isolates the importance of the predictive value of net assets as a significant aspect of the relevance qualitative characteristic of accounting information in the context of the FASB Conceptual Framework.

Thus the purpose of this thesis is to examine whether the net asset fair values of banks possess predictive ability for the banks' future performance as measured by the banks' operating cash flows and earnings.

1.1 Motivation

During the global financial crisis, objections to the application of fair value accounting by financial institutions, especially by banks and their lobby groups, have increased (Laux and Leuz 2009; Ryan, 2008a:18).[4] The interesting issue though is that during the boom era (pre-the 1st quarter 2007) financial institutions did not lament the use of fair values as they have done recently. Robert Herz, then chairman of the FASB, mentioned that a group of financial institutions in 2006, under more favourable securities market

[4] A significant number of discussion articles were published in 2008 on fair value accounting in CFO.com making the topic the most popular of 2008 for discussion by the website. Many of the articles represented adversarial views by bankers on the use of fair values during the economic downturn.

conditions, called on the FASB for the choice of fair value measurements for parts of their balance sheets (Katz, 2008a). Since the financial crisis began the tune has changed from extolling the virtues of fair values to the many calls for its suspension. This call grew loud, especially with the application of SFAS 157: measurement of fair values, with regard to issues about illiquidity, prudential/regulatory guidelines compliance and references to forced selling of assets to raise capital, which has been argued to further depress prices (Ryan, 2008a; Plantin, Sapra and Shin, 2008).

Although the recent crisis has hit financial institutions on a significant scale, the reality, however, is that the primary attention of FASB standards is on investors and hence it is important to know whether fair values do have predictive value. Advocates of fair value accounting have responded to the bankers' protests by suggesting that fair values provided warning for the banks that the market was taking a downward turn, thus hinting at the performance predictive qualities of bank fair values (Ball, 2008; Tweedie, 2008). McGregor (2012), a former IASB board member, commented that in the wake of the global financial crisis a number of commentators had observed that the effect of the global financial crisis could have been much worse if accounting standards had not forced companies to recognise the effects of falling prices in their financial statements sooner than might otherwise have been the case. This statement affirmed the importance of fair value accounting as it is the only current accounting measurement basis that recognises falling prices in the financial statements.

This research is therefore motivated based on this background debate, as it seeks to find answers to the following specific research questions:

1. Do the fair values summarised in bank financial statements predict future cash flows and earnings (future financial performance)?
2. In particular, did bank fair values have predictive value in relation to banks' future financial performance during the 2007/2008 global financial crisis?

Robert Herz, then FASB chairman, was asked, *"Did SFAS 157 correctly sound an early alarm on the financial crisis-or did it make a bad situation worse?"* (Katz, 2008b). There have been a number of studies that have addressed the second part of the question relating to *procyclicality* (e.g. Badertscher, Burks, and Easton, 2011; Laux, 2012; Shaffer, 2010). In contrast, only a few studies have attempted to address the first part of this question dealing with *predictability in bad economic times*?

1.2 Theoretical Framework

The theoretical framework of this thesis is based on the conceptual ideal of decision-usefulness which underpins the fair value paradigm and the efficient market hypothesis, which gives credence to the fair value (based on exit prices) reporting approach espoused by the FASB and IASB. This leads on to the theoretical framework between the market value of bank equity and the fair values of its assets and liabilities as summarised in its published financial statements as developed in the academic literature. Agency theory is used to explain why managers have incentives to over (or under) estimate reported fair values and how this could lead to systematic biases in the fair values summarised in banks' published financial statements. The firm valuation model, based on the future cash flows a firm expects to generate, is used to explain how future cash flows are linked to the fair values summarised in a firm's financial statements for its assets and liabilities. Following on from this, I develop hypotheses connecting the fair values summarised in a firm's published financial statements, with its future cash flows and its future earnings. Specifically, the hypotheses I develop address the question of whether there is a significant relationship between the on-balance sheet financial instrument fair values reported by banks and their future cash flows and earnings. Also this relationship is considered in light of the 2008-2010 global financial crises and the levels classification of fair values under SFAS 157.

1.3 Research Methodology

This thesis employs two distinct study periods. The first covers the ten-year period from 1996 until 2005. The ending year of 2005 was selected in order to avoid contamination of the dataset with the second study period. The second study period runs from 2008 until 2010. The first study period from 1996 to 2005 employs annual data of U.S. banks with over $US150 million in total assets as of the year 1996. The second study period, 2008-2010, covers the global financial crisis which came into full effect in 2008 and bank financial statements prepared over this period reflected the requirements of SFAS 157, which was introduced in 2007.

For the first study period, 1996 until 2005, the final sample includes 1,229 firm-years of data for banks having one year ahead *(t+1)* future cash flows, 1,162 firm-years for banks having two year ahead *(t+2)* future cash flows and 942 firm-years for banks having three year ahead *(t+3)* future cash flows. The sample also includes 1,150 firm-years for banks having one year ahead *(t+1)* future operating earnings, 1,081 firm-years for banks having two year ahead *(t+2)* future operating earnings and 875 firm-years for banks with three year ahead *(t+3)* future operating earnings. In relation to the second study period, which employs quarterly data covering the period from 2008 until 2010, the final sample employs a total of 5,730 firm-quarters for banks having one quarter ahead *(t+1)* future cash flows and operating earnings, 5,105 firm-quarters for banks having two quarter ahead *(t+2)* future cash flows and operating earnings and 4,503 firm-quarters for banks having three quarter ahead *(t+3)* future cash flows and operating earnings.

For the first study period (1996-2005) bank fair values were measured as the fair values of financial instruments disclosed in the notes to the financial statements as mandated by SFAS 107. For the second study period (2008-2010), bank fair values were measured according to the levels classified fair values as mandated by SFAS 157. A set of multivariate linear regression models were developed and estimated using ordinary least squares in order to test the hypothesised relationships between bank fair values, future operating cash flows and future operating earnings. The data employed were transformed using the inverse hyperbolic sine function (Laubscher, 1961). This transformation was applied in order to render the data more compatible with the assumptions of the general linear regression model. Most important, however, is that in comparison with other common transformations the inverse hyperbolic sine transformation can deal with negative values.

1.4 Summary of key Findings

The empirical results summarised in this thesis provide strong evidence that there is a predictive relationship between bank fair values and future bank performance. The evidence is strong during the first study period, from 1996 until 2005, that current net asset fair values of on-balance sheet financial instruments of banks were significantly associated with the future years' operating cash flows and operating earnings of the banks. However, the evidence is stronger for the predictive relationship between bank fair values and operating cash flows than for the predictive relationship between bank fair values and operating earnings.

For the second study period, from 2008 until 2010, which employed quarterly data,[5] the empirical results provide strong evidence that there is a predictive relationship between level 1 and level 2 bank fair values and future operating cash flows. The findings from the empirical results were that the current quarter's level 1 and level 2 net asset fair values of banks were significantly positively associated with the future quarters' cash flows of the banks. The level 3 net asset fair values of the banks were mostly not significantly associated with the banks' future quarterly cash flows.

With regard to whether there is a predictive relationship between bank fair values and their future operating earnings during the second study period, the findings from the empirical results were that the current quarter's level 1 net asset fair values of banks were positively associated with the future quarters' earnings of such banks. However, the level 2 net asset fair values of banks were negatively associated with the future quarters' earnings of such banks. This result is in contrast to the results noted above, for the predictive relationship between level 2 bank fair values and future operating cash flows. Further empirical analysis showed that a possible reason behind this difference was that there was a structural change in the relationship between bank operating cash flows and operating earnings over the course of the first and second study periods, where, in particular, for the second study period (which includes the period of the global financial crisis) there was a systematic downward bias in operating earnings relative to the operating cash flows of the sampled banks. This in turn makes operating earnings a poor proxy for operating cash flows during the second study period.

Several robustness and sensitivity tests relating to the empirical procedures employed especially with respect to the impact of bank size, capital adequacy and growth

[5] This period encompassed the global financial crisis period and also the levels classification of bank fair values according to SFAS 157.

prospects were carried out. Overall, the robustness tests had little impact on the results obtained for the first study period. However, for the second study period, there were cases where bank size and bank capital ratios did have a significant impact on the predictive relationship between bank fair values and future cash flows. Also during the second study period the structural change in the relationship between bank operating cash flows and operating earnings had a perverse effect on the estimated regression equations relating bank fair values to operating earnings. This structural change in the relationship between bank operating cash flows and operating earnings during the second study period may have accentuated the impact that bank size and bank capital ratios have on the predictive relationship between bank fair values and earnings.

1.5 Organisation of the Thesis

The remainder of this thesis is organised as follows. Chapter two examines the history of standard setting by the FASB and the shift towards more fair value accounting as a measurement basis, particularly for financial instruments. It also assesses the case for and against reporting financial instruments at fair value in bank financial statements. The fair value accounting empirical research literature is reviewed in chapter three. This review compares the theoretical case for the implementation of fair value accounting to the other measurement bases. It also deliberates on the empirical literature, particularly in relation to the relevance of fair values in the stock market valuation of the banks comprising my sample. In chapter four, the hypotheses relating to bank net asset fair values and their future cash flows and earnings are developed. These hypotheses are all based on the decision-usefulness doctrine supported in the FASB and IASB Conceptual Frameworks, the efficient markets hypothesis and the market valuation model. Agency theory is also employed to explain why firm management may act opportunistically in determining the fair values to be reported in a firm's published financial statements. In chapter five, the sample selection process, data collection methods and the hypothesis testing procedures employed in the study of the relationship between U.S. bank fair value disclosures and their future operating cash flows and operating earnings are explained. Chapter six presents and discusses the descriptive statistics and multivariate regression results obtained from the hypothesis testing procedures with regard to the relationships between bank fair values, current year operating cash flows and future operating cash flows. In chapter seven, the descriptive statistics and multivariate regression results obtained from the hypothesis testing procedures with regard to the relationships between bank fair values, current year operating earnings and future operating earnings are presented and discussed. The thesis concludes in chapter eight with a summary and discussion of the key findings and their implications, as well as an overview of the contribution, limitations and suggested directions for future research.

CHAPTER TWO

ACCOUNTING STANDARDS, FAIR VALUE ACCOUNTING AND FINANCIAL INSTRUMENTS

This chapter examines the accounting standards setting environment and its relationship with fair value accounting and financial instruments. Section 2.1 discusses the Financial Accounting Standards Board's (FASB) Conceptual Framework and its emphasis on the decision-usefulness doctrine. In section 2.2 the FASB's stand on the primacy of relevance over reliability (both providing the basis for decision-usefulness) is explained. The replacement of the term reliability by the term representational faithfulness in the Conceptual Framework is also discussed. In section 2.3 the historical circumstances that led towards the adoption of more fair value oriented accounting in the U.S. are described. Section 2.4 reviews the meaning of fair value emphasising the FASB and International Accounting Standards Board's (IASB) market value requirement for fair value as the "exit price". A summary of fair value focused accounting standards under both the FASB and IASB regimes and the influence of the joint IASB/FASB harmonisation project on the definition of fair value in IFRS 13 is also discussed in this section. In Section 2.5 I examine the detailed requirements relating to the valuation of financial instruments under FASB and IASB accounting standards. I also consider the arguments which have been made both for and against the various requirements that appear in these standards. The chapter concludes in section 2.6 with a discussion of recent developments in fair value accounting; specifically, the role of fair value accounting during the 2007 global financial crisis, the procyclicality debate, which relates to the exacerbating effects of fair values on economic cycles and reactions to the additional guidance provided by the Financial Accounting Standards

Board in regard to the interpretation of the fair value accounting standards rules during this period. A summary of the chapter is provided in section 2.7.

2.1 FASB Conceptual Framework and the Decision-usefulness (Relevance) Doctrine

The Financial Accounting Standards Board (FASB) was established in 1973, replacing the Accounting Principles Board (APB) of the American Institute of Certified Public Accountants (AICPA). The FASB is a private, not-for-profit organisation whose primary purpose is to develop generally accepted accounting principles (GAAP) in the public interest within the United States. The Securities and Exchange Commission (SEC) has designated the FASB as the organisation responsible for setting accounting standards for public companies in the U.S.

The foundation on which the FASB achieves the purpose for which it was created is referred to as the Conceptual Framework. The FASB specifies in its Conceptual Framework the objectives of financial reporting and standard setting, as well as the criteria standard setters use in selecting among accounting alternatives (Barth, 2006a:9). According to the FASB, the Conceptual Framework is a coherent system of interrelated objectives and fundamental concepts that prescribes the nature, function, and limits of financial accounting and reporting and that is expected to lead to consistent guidance in relation to technical accounting and reporting issues (FASB, 2010). The FASB communicates the Conceptual Framework through its Statements of Financial Accounting Concepts (SFAC) and/or Concepts Statements.

The first Concept Statement issued by the FASB in 1978 was on the objectives of financial reporting by business enterprises. The primary objective of financial reporting highlighted in this statement was to provide information that is useful to present and potential investors and creditors and other users in making rational investment, credit, and similar decisions. It goes further to specify that financial reporting should provide information about the economic resources of an enterprise, the claims to those resources, and the effects of transactions, events, and circumstances that change its resources and claims to those resources (FASB, 1978). This primary basis is referred to as "decision-usefulness". It focuses the financial reporting objective on the information needs of investors and other users of financial statements when they make economic decisions relating to the reporting entity (Barth, 2006a:9). [6] Decision-usefulness emphasises the primary qualitative characteristic of accounting information called "relevance." Financial information is relevant if it has the capacity to make a difference in a decision by helping users to form predictions about the outcomes of past, present and future events or to confirm or correct prior expectations (FASB, 1980). It can thus be said that right from the establishment of the FASB the decision-usefulness doctrine has been a primary criterion from which accounting standards are generated and developed. Staubus (1999:163) remarked: "Decision-usefulness has been the organising criterion for accounting policy and accounting scholarship for over forty years". Williams and Ravenscroft (2009) imply further, that policy makers in choosing among data and alternative ways to present the selected data would select the reporting technique which produces the information most useful for economic decision-making by certain designated users. Hitz (2007) acknowledged that the decision usefulness paradigm was established as an official standard setting objective only with the formation of the FASB and the Conceptual Framework. However, this was a

[6] In financial reporting research this is also consistent with the information perspective (Beaver,1998; Barth, 2006a:11) which focuses on accounting as providing information for financial statement users about the firm's financial condition and performance.

crystallisation of earlier developments going back to the articulation of criteria for standard setting/financial reporting that was put forward in the AAA monograph *A Statement of Basic Accounting Theory* (hereafter ASOBAT) in 1966 (AAA, 1966), the Trueblood Report of 1973 (Hitz, 2007; Young, 2006) and APB Statement No. 4: Basic Concepts and Accounting Principles Underlying Financial Statements of Business Enterprises (Accounting Principles Board, 1970).[7]

The 1966 monograph ASOBAT made a significant contribution in cementing the decision-usefulness doctrine for standard-setting (Young, 2006; Hitz, 2007; Sutton, Cordery and van Zijl, 2010). ASOBAT viewed accounting as a financial information reporting system and the aim of the system was to provide economic information that would inform judgments and decisions by users of such information (Stamp, 1984). This essentially made relevance of financial information for information users the top priority of the accounting process. The contribution of APB Statement No. 4 (1970) to the decision-usefulness paradigm was that it formally articulated the move to promote the information perspective over that of stewardship in accounting standards (Beaver, 1998; Storey and Storey, 1988; Sutton, *et al.* 2010). The AICPA commissioned Trueblood Committee Report in 1973 provided postulates that would give direction to the subsequent FASB Conceptual Framework and also advanced arguments for decision-useful, relevant, investor-focused general purpose financial reports (Sutton, *et al.* 2010; Smith, 1996). The FASB's Conceptual Framework project drew heavily on the recommendations of the Trueblood Committee and progressively showed an increasing focus on prospective and decision-useful information that, while conceding

[7] An historical discussion of the influences that gave rise to the decision-usefulness paradigm can be found in Hendriksen and van Breda (1991, pp. 92-115, 126-131) and Young, 2006. A critique of the evolution of the decision-usefulness paradigm can be found in Williams and Ravenscroft (2009).

multiple users, increasingly prioritized investors and creditors as the target of general purpose financial reports (Sutton, *et al.* 2010; Parker, 1982; Giroux, 1999).

It is important to appreciate the role of the decision-usefulness doctrine which is key to the FASB's standard setting processes because this doctrine has significantly influenced the move towards more fair value accounting measurement in accounting. Standard setters have increasingly argued that fair value is more relevant (decision-useful) especially with regard to the measurement of financial instruments than the more traditional measurement metric referred to as historical cost.

2.2 The primacy of "Relevance" over "Reliability" and the move to "Representational Faithfulness"

In 1980 the FASB issued Statement of Financial Accounting Concepts No. 2 (SFAC No. 2) (FASB, 1980). In this statement it made clear that the two primary qualities that make accounting information useful for decision-making were "Relevance" and "Reliability". The FASB however acknowledged that the choice of an accounting alternative should produce information that is both more reliable and more relevant; however, it may be necessary to sacrifice some of one quality for a gain in the other (FASB, 1980).

Reliability was defined in SFAC No. 2 as "the quality of information that assures that information is reasonably free from error and bias and faithfully represents what it purports to represent" (FASB, 1980: 10). Evaluating accounting information choices on the basis of these two qualities led many to believe that relevance and reliability cannot be achieved simultaneously. Hence, there was a question as to what trade-offs are involved between them (Barth 2006a:9).

The FASB and the International Accounting Standards Board (IASB) started a joint project to converge their Conceptual Frameworks in 2005. One of the outcomes of this project was to eliminate the term reliability and replace it with the term "representational faithfulness". According to the FASB (2010:16):

> "If financial information is to be useful, it must be relevant and faithfully represents [sic] what it purports to represent."

This was done because the two boards concluded that the term reliability is widely misunderstood and representational faithfulness more accurately reflects what the term reliability was intended to portray (Barth, 2006a:10 ; Power, 2010).

Even with this change from reliability to representational faithfulness there still exists some tension between relevance and faithful representation because there have been arguments that the value(s) in the financial statements that may be relevant (in this sense of being focused on investors and shareholders) may not be the best value to fulfil all the characteristics that will make such a value representationally faithful. These characteristics include Completeness, Neutrality and Freedom from error/Verifiability. The reality is that values shown in financial statements are not precise; some are estimates, and these estimates may be the most relevant value available to shareholders. However, we may not be sure that these estimates are complete, free from error, neutral and hence, representationally faithful. This is why this tension exists. A particular area where this tension is very apparent in accounting today is the issue of fair value accounting applications by both the IASB and the FASB.

2.3 U.S. Standard-Setting history and the movement towards more Fair Value Accounting

According to Jensen (2007) the Historical Cost[8] measurement regime has been employed in the standards of U.S. GAAP from its inception. Hence, traditionally the historical cost basis of measurement has played a very significant role in the shaping of accounting standards. Also, following the creation of the Securities and Exchange Commission (SEC) in 1934 and until the 1970s, the SEC continued to support historical cost as the primary basis for accounting measurement by not supporting proposed methods for upward asset revaluations and restatements (Zeff, 2007). The Great Depression of the 1930s that began with the stock market crash of 1929 also influenced the SEC into requiring historical cost measurement as the method of valuation during this period. This was because overstatement of asset values was seen as being in part to blame for the market crash of 1929 and the follow on Great Depression (Barlev and Haddad, 2003).

However, from the 1970s fair value accounting started to gain more prominence in the standard–setting process. Whittington (2008) identified the fierce and unresolved debates with respect to the issue of inflation accounting[9] in the 1970s among standard-setters as a catalyst for the consideration of alternative measures to the historical cost paradigm; and fair value was a valid alternative to consider.

[8] Historical Cost accounting is an accounting principle requiring all financial statement items to be based on depreciated original cost. It is usually based upon the dollar amount originally exchanged in an arms-length transaction, an amount assumed to reflect the fair market value of an item at the transaction date.

[9] Accounting for asset values during inflationary periods was a vexing problem for standard setters as the historical cost values of such assets quickly became irrelevant to users of financial statements during these times.

The Savings and Loans Crisis in the U.S. during the 1980s brought into sharp focus the deficiencies of the historical cost accounting regime which was the prevalent reporting system at the time (Hitz, 2007). This crisis showed how with the help of the historical cost regime, these Savings and Loans companies were able to selectively trade their financial assets (Johnson and Swieringa, 1996). They did this by keeping the loss-making assets on their books at their historical costs (which were higher than their fair values) and sold the assets which were trading above their book values (historical costs). This was a process of 'cherry picking' or 'gains trading' (Hitz, 2007). These opportunistic practices prompted regulatory intervention by the SEC which among other things advised the FASB to develop an accounting standard for certain debt securities to be valued at their market value (fair value) rather than amortized cost (Wyatt, 1991; Cole, 1992; White, 2003). This regulatory reaction to the Savings and Loans Crisis provided the momentum for the implementation of fair value measurement and the movement towards an increase in fair value oriented accounting standards within the FASB and the IASB.

Also, with the decision-useful and investor-focused emphasis of financial information at the heart of the Conceptual Framework, fair value accounting has continued to be favoured as the best accounting measurement regime that meets these criteria. This was supported by the Jenkins (1994) Committee Report which assumed market efficiency and made the case for more user-focused financial statements and fair values (Sutton, *et al*. 2010)

Finally, in recent times the wave of more complex financial instruments, especially derivatives, have called into question the validity of historical cost as a measurement regime for financial statement items that can experience rapid changes in prices (Wharton, 2001). Siegel (1995) explains:

> "The impetus for change in accounting comes in part from a series of developments in the capital markets: marketing of and trading in complex financial instruments, including derivatives, investments in highly-leveraged and other high-risk securities, and expansion of the role of institutional investors. Some of these investments have resulted in substantial and highly-publicised losses, such as bank losses (and failures) resulting from loans on real estate with impaired value, losses by pension funds and municipalities resulting from leveraged investments and investments in derivatives."

In considering these complex financial instruments, historical cost measurements have been found to be considerably less helpful and relevant for users of such information. Hence, fair value accounting has been advocated as a better alternative measurement regime for these complex financial instruments (Siegel, 1995; Barth, 1994; Wyatt, 1991).

2.4 Fair Value, Fair Value focused standards and IASB Harmonisation

2.4.1 What is Fair Value?

In simple terms, fair value is the realisable value of an asset or liability in an orderly market. According to SFAS 157 (FASB, 2006a) and IFRS 13 (IASB, 2011) fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. In reality, though, fair value is quite a challenge to define as many factors come into play in determining what fair value is.

In its purest form, assuming a fully efficient, liquid and perfect market, fair value should equal market value (Level 1). However, in the real world, where markets are not completely liquid for some assets and liabilities, fair value as described by the FASB and the IASB could be estimated from the values of identical assets which are traded in a liquid market (Level 2) or estimated through model valuations (Level 3) where the inputs used are based on as much relevant market information as possible.

It is important to mention that the market value based on the FASB and IASB requirements, considered as fair value, is the "exit price"; i.e. the price at which an asset could be sold on the reporting date (SFAS 157, IFRS 13). Fair value estimates are expected to represent the present value of the expected future cash flows associated with a financial statement item (Barth, 2000:19; Ryan, 2008a:12; Whittington, 2008:157). Furthermore, the present value of the expected cash flows is determined by discounting at the current market rate of return, and it is considered to reflect all available information up to the measurement date (Chisnall, 2001).

Prior to the issue of IFRS 13, the IASB defined fair value differently from SFAS 157. In paragraph 9 of IAS 39, fair value was defined as "the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction".

Concerning the measurement issues involving fair value estimation, IAS 39 provides three classifications: Active markets for which quoted prices are available, inactive markets for non-equity instruments, and inactive markets for equity instruments. For financial instruments trading in active markets, the appropriate quoted price of an asset held (or liability to be issued) is the current bid price, whereas for assets to be acquired (or liabilities to be held), it is the current ask price. When current bid and ask prices are unavailable, the price of the most recent transaction can be used provided that there has not been a significant change in economic circumstances since the time of the transaction. Additionally, quoted prices can be adjusted if the firm can demonstrate it is not fair value (for example, distress sales). In the absence of an active market for a non-equity financial instrument, IAS 39 specifies that the preferred valuation technique must be the most commonly used procedure by market participants to price the instrument (for example, if the valuation technique has been demonstrated to be able to provide reliable estimates of fair value obtained in actual market transactions). The selected valuation technique needs to be consistent with recognized economic methodologies for valuing financial instruments, and the firm needs to calibrate the valuation technique periodically by testing it for validity using prices from any observable current market transactions in the same instrument (or based on any available observable market data). Finally, for equity instruments (and any linked derivatives) that do not have a quoted market price in active markets, IAS 39 requires that these instruments are to be measured at fair values only if the range of reasonable fair value estimates is not significant, and the probabilities of the various estimates can be reasonably assessed. Otherwise, the firm is precluded from measuring these instruments at fair value (IASB, 2003a, Yong, 2010).

The differences between the fair value definitions in SFAS 157 (IFRS 13) and IAS 39 include that SFAS 157's definition is explicitly based on the concept of an "exit price," whereas the IAS 39 definition of fair value is based on neither the exit price nor the entry price of a financial statement item. SFAS 157 uses the "market participants" view whereas the IAS 39 definition of fair value uses the concept of a "willing buyer and seller." In particular, SFAS 157 states that the fair value of a liability is the price that will be paid to transfer a liability, whereas IAS 39 defines the fair value of a liability as the amount for which it will ultimately be settled (Yong, 2010). As with SFAS 157, IAS 39 states that fair value estimation is not the amount that a firm would receive or pay in a forced transaction, involuntary liquidation, or distress sale (paragraph A69). Also in tandem with SFAS 157, paragraph 48 of IAS 39 regards the best evidence of fair value as quoted prices in an active market. Finally, while IAS 39 does not unequivocally classify valuation inputs into Level 1, Level 2, and Level 3 categories as specified in SFAS 157, it does stipulate that the chosen valuation technique should make maximum use of market inputs and depend as little as possible, on firm-specific inputs (Yong, 2010).

The adoption of IFRS 13 is significant as it can be seen that the IASB worked together with the FASB on these standards as part of the convergence project on the issue of fair value accounting, especially with regard to accounting for financial instruments, thereby settling the differences between the SFAS 157 and IAS 39 definitions highlighted above.

2.4.2 Fair-value focused standards issued by the FASB and IASB

The FASB in the U.S. has issued several standards that require disclosure or recognition of accounting amounts using fair values particularly with regard to financial instruments where such standards have been most significant in their effects. Landsman (2007) provides an overview of these standards. Two important disclosure standards are SFAS 107, *Disclosures about Fair Value of Financial Instruments* (FASB, 1991) and SFAS 119, *Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments* (FASB, 1994). SFAS 107 requires disclosure of fair value estimates of all recognised assets and liabilities, and as such, was the first standard that provided financial statement disclosures of fair value estimates of the primary balance sheet accounts, including securities, loans, deposits, and long-term debt. Furthermore, it was the first standard to provide a definition of fair value indicating the FASB's objective of obtaining quoted market prices wherever possible. SFAS 119 requires disclosure of fair value estimates of derivative financial instruments, including futures, forward contracts, swaps, and option contracts. It also requires disclosure of estimates of holding gains and losses for instruments that are held for trading purposes (Landsman, 2007).

The key fair value recognition standards issued by the FASB are SFAS 115, *Accounting for Certain Investments in Debt and Equity Securities* (FASB, 1993), SFAS 123 (Revised), *Share-based Payments* (FASB, 2004), and SFAS 133, *Accounting for Derivative Instruments and Hedging Activities* (FASB, 1998). SFAS 115 requires recognition at fair value of investments in equity and debt securities classified as held for trading and available-for-sale. Fair value changes for the former appear in income, and fair value changes for the latter are included as a component of accumulated other comprehensive income; that is, they are excluded from income. Those debt securities classified as held to maturity are recognised at amortised cost (Landsman, 2007). Hitz (2007) further explains that the revaluation gains and losses on trading securities and trading derivatives that are part of a fair value hedge are taken directly to income. However, for available-for-sale derivatives that are part of a cash flow hedge, the fair value changes are included in accumulated other comprehensive income.

SFAS 123 (Revised) requires the cost of employee stock options grants be recognised in income using grant date fair value by amortising the cost during the employee vesting or service period. This requirement removes election of fair value or intrinsic value cost measurement permitted under the original recognition standard, SFAS 123, *Accounting for Stock-based Compensation* (FASB, 1995). This standard is, however, not strictly a fair value standard, because what the standard refers to as grant date fair value is not based on the price of the options but on the amortisation of the cost of option grants on the grant date, which is the historical cost of the grants. Also, the standard requires vesting features be reflected in the grant date fair value estimate by adjusting the number of options rather than their price (Landsman, 2007).

SFAS 133 requires all freestanding derivatives be recognised at fair value. In particular, fair value changes in those derivatives employed for purposes of hedging fair value risks (e.g., interest rate risk and commodity price risk) are shown as a component of income, as are the changes in fair value of the hedged balance sheet item (e.g., fixed rate loans and inventories) or firm-commitments (i.e., forward contracts). If the so-called fair value hedge is perfect, the effect on income of the hedging relationship is zero. In contrast, fair value changes in those derivatives employed for purposes of hedging cash flow risks (e.g., cash flow volatility resulting from interest rate risk and commodity price risk) are shown as a component of accumulated other comprehensive income because this fair value hedge is not perfect as there is no recognised off-setting change in fair value of an implicitly hedged balance sheet item or anticipated transaction (Landsman, 2007).

The IASB adopted the fair-value focused International Accounting Standards (IAS) issued by its predecessor body, the International Accounting Standards Committee (IASC), but has also issued new fair value standards of its own (International Financial Reporting Standards (IFRS)). The IASC issued two key fair value standards, IAS 32: *Financial Instruments: Disclosure and Presentation* (IASB, 2003b) and IAS 39, *Financial Instruments: Recognition and Measurement* (IASB, 2003a). The former standard is principally a disclosure standard, and is similar to its U.S. GAAP counterparts, SFAS 107 and SFAS 119. IAS 39, describes how particular financial assets and liabilities are to be measured (i.e., amortised cost or fair value), and how changes in their values are to be recognised in financial statements. The scope of IAS 39 includes accounting for investment securities and derivatives, which are covered under SFAS 115 and SFAS 133, with some minor differences between IAS and U.S. GAAP.

In 2005 the IASB issued IFRS 7, *Financial Instruments: Disclosures* (IASB, 2005a). This standard requires disclosure of detailed information for recognised financial instruments, both those measured at fair value and those that are not. IFRS 7 builds on IAS 32 by requiring disclosure of fair value amounts at the end of each accounting period (year, quarter), how the fair values are to be determined, and the effect on income arising from each particular class of assets or liabilities (i.e., separate disclosure of recognised and unrecognised gains and losses). In addition, IFRS 7 mandates disclosure of qualitative information relating to financial instruments' liquidity, credit, and market risks (Landsman, 2007). Also in 2005, the IASB amended IAS 39 recognition, by describing conditions under which firms can elect fair value measurement for financial instruments (IASB, 2005b). Under this fair value option, entities can designate, at the time of acquisition or issuance, a financial asset or financial liability be measured at fair value, with value changes recognised in income. This option is available even if the financial asset or financial liability would ordinarily be measured at amortised cost, but only if fair value can be reliably measured. Once an instrument is designated as a fair value instrument, it cannot be reclassified. A goal of the fair value option is to mitigate the effects of income volatility arising from the mixed attribute model without having to apply hedge accounting. In 2007, the FASB issued SFAS 159, *The Fair Value Option for Financial Assets and Financial Liabilities* (FASB, 2007), which largely mirrors the IAS 39 fair value option. This standard included an amendment to SFAS 115.[10] Critics of the fair value option raise the concern that allowing two different entities to classify the same financial instrument in a different way will reduce cross sectional financial statement comparability (Landsman, 2007).

In 2009, the IASB issued Phase 1 of IFRS 9 (IASB, 2009), *Financial Instruments (Classification and Measurement)*. It was intended that this standard would replace IAS 39 in its entirety (after the other 2 phases of IFRS 9 are completed). This standard was created out of the need to simplify the application and interpretation of the requirements of IAS 39. It also came about as a response to the input received on the IASB's work in responding to the global financial crisis of 2008, coupled with conclusions and recommendations of the G20 leaders, the Financial Stability Board and the Financial Crisis Advisory Group (IASB, 2009).

As noted earlier, in 2006 the FASB issued SFAS 157, *Fair Value Measurements*, which provides a definition of fair value. IFRS 13, *Fair Value Measurement* (IASB, 2011) is a

[10] Some other standards have been issued by both the FASB and the IASB with elements of fair value recognition or disclosure. SFAS 87, *Employer's Accounting for Pensions* (FASB, 1985) which requires footnote disclosure of the fair value of pension plan assets and pension obligations associated with defined benefit plans. SFAS 158, *Employer's Accounting for Defined Benefit Pensions and Other Postretirement Plans* (FASB, 2006b) moved further to partially recognise the fair value of pension assets and liabilities in the body of the financial statements (Landsman, 2007). Also, IFRS 3, *Business Combinations* (IASB, 2008), which is identical to SFAS 141(Revised) (FASB, 2007b), requires a robust approach in ascertaining the fair value of net assets acquired in a business combination and hence goodwill. With regard to non-financial items, IAS 16, *Property, Plant and Equipment* (IASB, 2003c) permits the optional application of the revaluation model and IAS 38, *Intangible Assets* (IASB, 2004a) requires full fair value measurement, with re-measurement gains beyond historical cost taken as a revaluation surplus in other comprehensive income (Hitz, 2007). Also IAS 36, *Impairment of Assets* (IASB, 2004b), requires testing for impairment (including goodwill) which involves assessment of fair value in calculating recoverable amount. IAS 40, *Investment Property* (IASB, 2003d) provides an option for investment property to be carried at fair value, and for biological assets IAS 41, *Agriculture* (IASB, 2001) requires full fair value accounting with gains and losses taken directly to income (Hitz, 2007). The IASB has also issued IFRS 2, *Accounting for Share-based Payment* (IASB, 2004), which is similar to SFAS 123 (Revised) (FASB, 2004) in requiring firms to recognise the cost of employee stock option grants using grant date fair value.

product of the joint IASB/FASB harmonisation project and will effectively be the common standard for fair value measurements from 1 January 2013. It is largely consistent with SFAS 157 and it replaces the fair value measurement guidance contained in individual IFRSs, including IAS 39, with a single framework for fair value measurement (PWC 2011; KPMG, 2012). It also expands and articulates in more detail the concepts and principles behind fair value, including the introduction of new concepts such as the 'principal market' and also general descriptions of valuation approaches and techniques (KPMG, 2012). IFRS 13 also aligns the fair value measurement regime with the FASB's SFAS 157 (including the levels classification of estimation of fair value from level 1- active markets to level 3- based on models), emphasising the harmonisation project between the FASB and the IASB.

2.5 Financial Instruments Measurement, Valuation and Fair Value Accounting

2.5.1 What are financial instruments?

According to IAS 32 and IAS 39 a financial instrument is defined as "any contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity" (IASB, 2003a; IASB, 2003b). In SFAS 107 (FASB, 1991):

> "A financial instrument is defined as cash, evidence of an ownership interest in an entity, or a contract that both:
>
> a. Imposes on one entity a contractual obligation (1) to deliver cash or another financial instrument to a second entity or (2) to exchange other financial instruments on potentially unfavourable terms with the second entity; and

b. Conveys to that second entity a contractual right (1) to receive cash or another financial instrument from the first entity or (2) to exchange other financial instruments on potentially favourable terms with the first entity."

In examining financial institutions, Ryan (2007:4) explains that financial instruments include financial assets and liabilities but not the firm's own equity. Financial assets are contractual claims to receive cash or another financial instrument on favourable terms or ownership interests in another firm. Financial liabilities are contractual claims to pay cash or another financial instrument on unfavourable terms (Ryan, 2007:4).

Financial instruments can be categorized by form depending on whether they are cash instruments or derivative instruments. Cash instruments are financial instruments whose value is determined directly by the markets. They can be divided into securities, which are readily transferable, and other cash instruments such as loans and deposits, where both borrower and lender must agree on a transfer. Derivative instruments are financial instruments which derive their value from the values and characteristics of one or more underlying assets, market securities or indices. They can be divided into exchange-traded derivatives and over-the-counter (OTC) derivatives.

Alternatively, financial instruments can be categorized by "asset class" depending on whether they are equity based (reflecting ownership of the issuing entity) or debt based (reflecting a loan the investor has made to the issuing entity). If it is debt, it can be further categorised into short term (less than one year) or long term. Foreign Exchange instruments and transactions are neither debt nor equity based and belong in their own category.

2.5.2 The Measurement and Valuation of Financial Instruments

Financial instruments measured at amortised cost are simply based on the market prices at which assets were initially acquired and liabilities were initially incurred. In contrast, financial instruments measured at fair value are based on current market prices (Poon, 2004). For valuation based on amortised cost, the expectations of cash flows and priced risks determined at initiation are used to account for financial instruments throughout their lives (Ryan, 2007:5). Valuation using amortised cost is not as worrisome as the valuation process using fair value, simply because the initial market price is readily available on the transaction date and except for some circumstances where measures for impairment may be used to reduce this initial valuation, the amortised cost will largely remain unchanged over the life of given financial instruments.

The process is a bit more complicated with the measurement of financial instruments using fair value. Fair value utilises current market prices, and these may not be readily available in some situations. The FASB and IASB have issued SFAS 157 and IFRS 13 to clarify how to measure financial instruments using fair value principles.

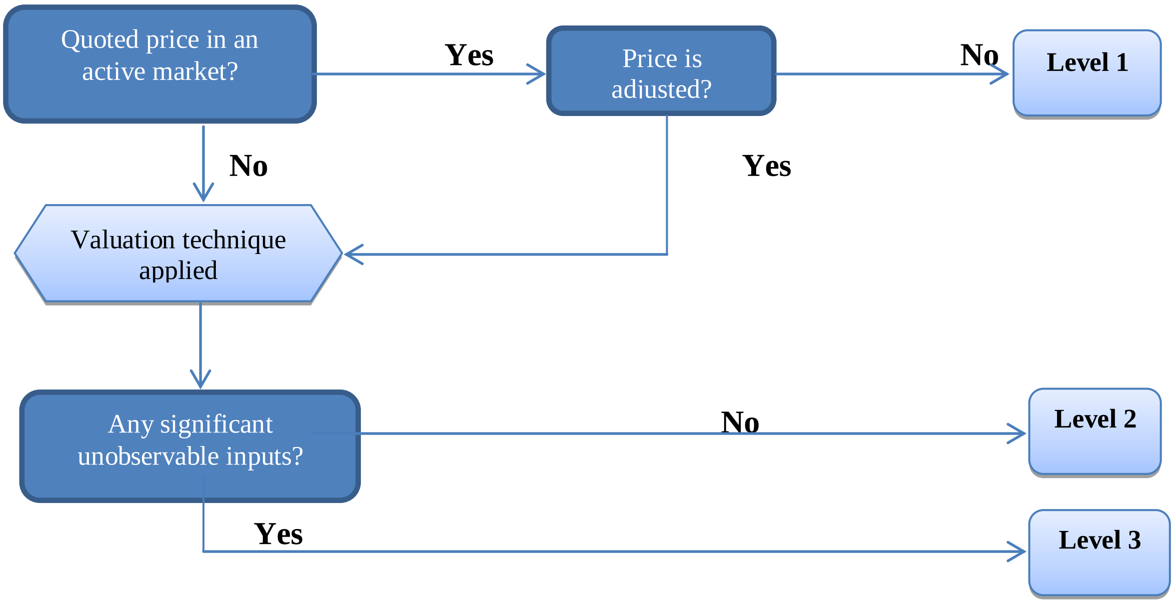
IFRS 13 sets out a fair value hierarchy that categorises the inputs to valuation techniques used to measure fair value into three levels[11]. This hierarchy gives the highest priority to quoted prices (unadjusted) in active markets for identical assets or liabilities (Level 1 inputs) and the lowest priority to Level 3 inputs which are based on unobservable inputs (van Zijl, 2011). Figures 2.1 and 2.2 put this hierarchy in perspective.

[11] This hierarchy was adopted from IFRS 7 into IFRS 13 and is consistent with the one described by the FASB in SFAS 157.

Figure 2.1 Fair Value Hierarchy	
Level 1	Inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities that the entity can access at the measurement date.
Level 2	Inputs are inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly.
Level 3	Inputs for the asset or liability that are unobservable, including the entity's own data, which are adjusted if necessary to reflect market participants' assumptions.

Source: International Accounting Standards Board (IASB), International Financial Reporting Standard 7 (IFRS 7), *Financial Instruments: Disclosures,* Paragraph 27A

Figure 2.2
Application of Fair Value Hierarchy Levels



Source: *IFRS Practice Issues: Fair Value Hierarchy* produced by the KPMG International Standards Group; December, 2009.

Paragraph 61 of IFRS 13 directs an entity to use valuation techniques that are appropriate in the circumstances and for which sufficient data are available to measure fair value, maximizing the use of relevant observable inputs and minimizing the use of unobservable inputs. Examples of markets in which inputs might be observable include exchange markets, dealer markets, brokered markets and principal-to-principal markets[12]. Paragraph 62 of IFRS 13 stipulates that the objective of using a valuation technique is to estimate the price at which an orderly transaction to sell the asset or to transfer the liability would take place between market participants at the measurement date under current market conditions. Paragraph 67 of IFRS 13 also stipulates that an entity must focus its valuation techniques on the use of relevant observable inputs; the use of unobservable inputs should be kept to a minimum. However, IFRS 13 is sensitive to the challenges placed on an entity to meet this requirement. Thus, in some cases, a single valuation technique will be appropriate (for example, when valuing an asset or a liability using quoted prices in an active market for identical assets or liabilities). In other instances, however, multiple valuation techniques will be appropriate (for example, when valuing a cash-generating unit). If multiple valuation techniques are used to measure fair value, the results are to be evaluated considering the reasonableness of the range of values indicated by those results. Paragraph 63 of IFRS 13 provides that the fair value measurement would be the point within that range that is most representative of fair value in the given circumstances.

Also, valuation techniques used to measure fair value are to be applied consistently. In particular, paragraph 66 of IFRS 13 provides that a change in a valuation technique or its application (for example, a change in its weighting when multiple valuation techniques are used, or a change in an adjustment applied to a valuation technique) is appropriate if the change results in a measurement that is equally or more representative of fair value in the circumstances. Paragraph 66 also provides that revisions resulting from a change in the valuation technique or its application are accounted for as a change in accounting estimate in accordance with IAS 8. However,

[12] These markets are explained in paragraph B34 of IFRS 13.

the disclosures in IAS 8 for a change in accounting estimate are not required for revisions resulting from a change in valuation technique or its application.

There are three widely used valuation techniques stated in IFRS 13. They are: the market approach, the cost approach, and the income approach.

• The **market approach** uses prices and other relevant information generated by market transactions involving identical or comparable (that is, similar) assets, liabilities or a group of assets and liabilities, such as a business [paragraph B5].

• The **cost approach** reflects the amount that would be required currently to replace the service capacity of an asset (often referred to as depreciated current replacement cost) [paragraph B8].

• The **income approach** converts future amounts (for example, cash flows or income and expenses) into a single current (that is, discounted) amount. When the income approach is used, the fair value measurement is determined on the basis of current market expectations about those future amounts [paragraph B10].

There is a significant difference between IAS 39 and IFRS 13/SFAS 157 with reference to the use of the bid and ask prices for fair valuation of financial assets and liabilities. IAS 39 required the use of "bid" prices for asset positions and "ask" prices for liability positions. Unlike IAS 39, paragraph 70 of IFRS 13 provides that the price within the bid-ask spread that is most representative of fair value in the circumstances is to be used as the fair value measure in the firm's financial statements (PWC, 2011; KPMG, 2012). Thus, IFRS 13 does not completely do away with the IAS 39 fair value principles; since the only stipulation that must be met under paragraph 71 of IFRS 13 is that such bid ask prices must be the most representative fair value in the circumstances.

Where such prices are not the most representative fair value, management may choose another price within the bid-ask spread that is most representative of fair value. Also, paragraph 71 of IFRS 13 does not prohibit the use of mid-market pricing or other pricing conventions that are used by market participants as a practical expedient for approximating fair values. However, once management has established which convention is to be used, it must follow its accounting policy consistently from thereon in.

2.5.3 The Case for fair value measurement of financial instruments

As mentioned earlier in section 2.3, financial instrument valuation is an area that has been plagued by controversy over many years - especially with regard to value-relevance. The increased complexity associated with today's financial instruments also begs the question as to how best to value these financial instruments in order to reflect the underlying economics associated with them (for example, simple European call options are equivalent to a long investment in the stock, partially financed through borrowing). The current answer to these questions being employed by standard setters is the mixed attribute model of historical/amortised cost and fair value valuation/measurement methods. However, there is a growing move towards the use of fair value as the preferred valuation method for financial instruments. Ryan (2007:5) makes the case that unlike non-financial firms, financial institutions typically hold sizable portfolios of financial instruments. These instruments regularly have correlated values, that is, they hedge or accentuate risks at the portfolio level. Full fair value accounting for all financial instruments in a portfolio is the simplest and most robust way to account for these correlations. Specifically, gains and losses on effective hedges of one financial instrument by another will be offset in net income. In contrast, gains and losses on ineffective hedges or speculative positions will not be offset.

Also, at the conceptual level, fair value is regarded as superior to amortised cost accounting. Fair value is seen as reflecting the market's assessment of current economic conditions, though this assumes that the fair value of a financial instrument is determined in open, competitive markets. Accounting on the fair value basis would reduce the anomalies of the existing mixed accounting approach and the need for complex and subjective hedge accounting (Chisnall, 2001; Poon, 2004). Another reason why fair value is the better option for financial instruments measurement is that amortised cost accounting uses old information and thus provides untimely measures of the value of financial instruments on the balance sheet (the non-relevance principle). This untimeliness resolves only as financial instruments amortize or when they are sold or repurchased. In contrast, fair values are based on current prices and hence, are more value relevant (Ryan, 2007:6). Fair value also restricts a firm's ability to manipulate net income through opportunistic realisation of gains or losses on the sale of financial assets or repurchase of financial liabilities - something that is very possible with amortised cost accounting. Such manipulation is particularly easy for financial institutions, since they usually hold numerous sets of matched positions, with one side of each matched position likely having appreciated and the other side having depreciated. Ellul, Jotikasthira, Lundblad and Wang (2012) in studying the insurance industry found evidence that historical cost accounting creates an altered incentive environment in which constrained financial institutions sell some assets to realise gains, while holding on to downgraded assets at historical cost.

Thus, in the complex and rapidly changing world of financial instruments where values are subject to ever changing sources of information and market prices for risk, fair value has been put forward as a better option for valuation and measurement of financial instruments as compared to amortised/historical cost accounting.

2.5.4 The Case against fair valuation and measurement of financial instruments

According to Landsman (2007), critics of SFAS 157 (and, by implication, IFRS 13) express concerns at both a conceptual and practical level. The main conceptual concern is that exit value may not appropriately capture the value of an asset (or liability) to a firm's shareholders - even if an active market exists for the asset. This can occur if there is a significant divergence between an asset's value-in-use and its exit value. An asset's value-in-use reflects management skill as well as how the asset is used in conjunction with the other assets with which it is combined to generate income. Ronen (2008) explains that exit values do not reflect the value of the assets' employment within the specific operations of the firm (which is value-in-use) and they do not properly measure the managers' ability to create value to shareholders. Horton and Macve (2000) also make the case that "Deprival value" is theoretically sounder than the concept of exit value for financial instruments measurement.[13] Another, conceptual case against fair valuation is that in the case of a financial instrument that would be held to maturity, fair value accounting yields unnecessary income volatility because the firm will receive or make all of the promised payments on the instrument, and so gains and losses will reverse over its life (Ryan, 2007: 136; Barth, Landsman and Wahlen, 1995). Chisnall (2001) argues that fair value takes us away from the earnings process as it bears little relationship to contracted future cash flows, since gains and losses would

[13] In practice though, level 2 and level 3 fair values as specified in SFAS 157 and IFRS 13 can be a mix of exit, entry, deprival and value-in-use values as long as such values are the best estimate of the market value of the financial instrument.

be recognised in accordance with short-term market movements and not when income has been earned or a loss incurred. Ryan (2007: 136) rebuts this argument as follows:

> "This argument ignores the fact that expected returns on financial instruments change over time and that these changes have economic meaning. For example, if a bank earns interest on a financial asset at a rate of 10% as promised, but the expected return on similar investments falls to 8% (or rises to 12%), then the bank has gained (lost), because the benchmark has changed. It is preferable to recognise gains and losses in a consistently timely fashion, as fair value accounting does, rather than in an inconsistently untimely fashion, as amortised cost accounting does …. It is also preferable to calculate interest using current interest rates, as fair value accounting does, rather than historical interest rates, as amortised cost accounting does, because current interest rates are better predictors of future interest rates and thus future net interest income than are historical interest rates."

Also, there is the conceptual case of the deterioration in a bank's credit standing which could result in the fall of the discounted value of its liabilities. This credit-rating downgrade could result in a bank recognising an accounting profit based on fair value accounting rules thus creating a situation where such a bank benefits from being unable to pay its debts (Barth, Hodder and Stubben, 2008:634-635; Barth and Landsman, 1995:103; Chisnall, 2001). IAS 39 was not as liberal on the fair valuation of liabilities when compared to IFRS 13 and SFAS 157. This is because IAS 39 insisted on the use of the "ask price" when measuring the fair value of liabilities. This approach is closer to the Chambers (1966) approach which insisted that liabilities should be measured at their face value rather than at their market values.[14] As noted earlier in 2.5.2, IFRS 13 and SFAS 157 removed the requirements to use bid and ask prices for actively-quoted financial assets and financial liabilities respectively, instead, granting the use of the most representative price within the bid-ask spread.

The other theoretical argument against fair value is that fair values are pro-cyclical in that they tend to exacerbate current financial trends, whatever they may be. This issue is discussed further in section 2.6.

There have been a number of criticisms of the SFAS 157 and IFRS 13 requirements as regards practical implementation issues. Firstly, when active markets do not exist for an asset or liability (for example loans which are not traded in an open market), then fair values will have to be based on Level 2 and Level 3 estimates. Level 2 and Level 3 estimates are generally subjective, and are potentially subject to manipulation (Landsman 2007; Ernst & Young, 2005). When fair values are not based on actual market prices, they must be determined by estimating synthetic prices that might be offered by hypothetical independent acquirers of the assets and/or liabilities who are participants in fictional markets (Benston, 2008). These derived values may be costly to determine and difficult to verify. Bernstein (2002) laments this development saying; "Financial reporting has become so complex, and involves so many judgements, that a large number of people are questioning whether financial statements are any longer meaningful".[15]

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[14] A summary of the Chambers approach is discussed in Chapter 3, section 3.1.

[15] The fact is that, estimates and subjective judgements have always been part of the financial reporting process, even under the historical cost accounting based system. The challenge is how to make sure that such estimates have reasonable representational faithfulness in terms of what they purport to represent. The FASB and IASB recognise these issues and most of the updated versions of the fair value standards are providing more guidance as to how the mark-to-model principles for fair value are to be employed in practice, in order to assure a significant degree of representational faithfulness.

Secondly, another practical difficulty is that such model based estimations may be difficult to audit (Landsman, 2007; Benston, 2008). In particular, comparability across firms with similar financial instruments may not be achievable, considering that similar instruments might have been valued differently given the use of different models for such valuations (Chisnall, 2001). Lastly, some financial instruments – such as credit card receivables, core deposits, leases, and insurance contracts are intricately linked with customer relationships or other nonfinancial items. Determining fair values for these instruments requires either including or excluding the nonfinancial factors from the fair value calculation, either of which can raise comparability and measurement problems (Ryan, 2007:139).

2.6 Fair Value Accounting, Financial Crisis and the recent Procyclicality Debate

The 2007 global financial crisis ignited a strong debate as to the role of fair value accounting in the financial stability of the global banking system. The on-going debate relates chiefly to whether the use of fair values, which focused on banks reflecting the market values of their assets by the FASB and IASB standards, did cause, or aggravate, the financial crisis in the sense of deepening a liquidity crisis where banks engaged in a fire sale of their assets in order to meet regulatory capital requirements. This process further depressed the market values of the affected assets as the financial markets went into panic mode, thus amplifying contagion effects. Theoretical models make the case that full fair value accounting can cause pro-cyclicality (Boyer, 2007; Allen and Carletti, 2008; Plantin, Sapra and Shin, 2008; Downing, 2011). However, in practice full fair value accounting is not implemented, as noted in the discussion on fair value accounting standards in section 2.4.2 above.

2.6.1 Evidence for and against the procyclical nature of FVA in the crisis of 2007-2009

Laux (2012) discusses and summarises the current literature on fair value accounting and financial stability, particularly in the context of the 2007 global financial crisis. He concludes that there is still no evidence that fair value accounting caused widespread fire sales of assets or contagion. Using a sample of 150 U.S. bank holding companies from 2004-2008, Badertscher, Burks, and Easton (2011) found that the fair value accounting losses that these banks recognised as a result of accounting rules had minimal effect on their regulatory capital, and that there is no evidence of a fire sale of securities during the crisis.[16] Véron (2008) argued that the problems encountered during the crisis related more to the dysfunction of the financial markets themselves rather than to the way in which fair values are reported in published financial statements.

On the other hand, Merrill, Nadauld, Stulz, and Sherlund (2012) employing a sample of 5,014 repeat transactions of non-agency residential mortgage-backed securities (RMBS) by U.S. insurance companies from 2006-2009, found that insurance companies that became more capital-constrained because of operating losses (uncorrelated with RMBS credit quality) and also fair value losses, sold comparable RMBS at much lower prices than other insurance companies during the crisis. This finding suggested some level of fire sale of RMBS by these insurance companies during the crisis. Khan (2010) studying U.S. banks found some evidence of an increase in the use of fair value accounting being positively associated with additional systemic risk (contagion) for

[16] Shaffer (2010); Laux and Leuz (2010); Ball (2008); Tweedie(2008); U.S. SEC (2008); Barth and Landsman (2010) all came to similar conclusions that fair value accounting as applied by accounting standards from 2007-2009 did not spark a fire sale in banks' assets. Neither did it exacerbate the financial crisis.

banks and that the increase in bank contagion is most severe during periods of market illiquidity. Poorly capitalised banks or banks with a relatively higher proportion of fair value assets and liabilities were also more exposed to the contagion effects. Also, Dontoh, Elayan, Ronen and Ronen (2012) came to the conclusion that fair value accounting did cause contagion. By investigating the effects of mark-to-market accounting write-downs by financial institutions on equity returns, trading volume, and credit default swap (CDS) premiums they considered whether the write-downs induced contagion effects on similar institutions without write-downs. They found that firms that write-down assets to their exit values in accordance with SFAS 157, not only experience significant abnormal negative returns and a spike in the premiums of CDS written on their obligations (indicating higher default probability), but that similar firms without write-downs simultaneously exhibit sympathetic and significant negative abnormal returns.[17]

2.6.2 Reaction to additional guidance provided for fair value accounting rules during the crisis

At the height of the financial crisis in 2008, the application of fair value accounting rules became very political as banks and financial institution lobby groups pressured political leaders in both the U.S. and Europe to get the FASB and IASB to make amendments to fair value standards for measuring financial assets (André, Cazavan-Jeny, Dick, Richard and Walton, 2009; Zhao, Haswell and Evans, 2012). This led the FASB (2008) in October 2008 to issue the FASB Staff Position (FSP) No. SFAS 157-3: *Determining the Fair Value of a Financial Asset When the Market for That Asset Is Not Active*, and in April, 2009 under pressure from the U.S. congress, the FASB (2009) also

[17] These studies suggest that fair values heightened systemic risk in the banking and insurance system. However, the studies only find some positive association between fair value exposed financial firms and additional systemic risk. Importantly, the studies do not suggest causality.

issued FSP No. SFAS 157-4: *Determining Fair Value When the Volume and Level of Activity for the Asset or Liability have Significantly Decreased and Identifying Transactions that are Not Orderly*. Both FSPs basically provided more discretion for reporting entities to use their own assumptions about future cash flows to come up with the value of an asset when market prices are unavailable. The FSPs also propose factors that suggest market illiquidity, thus providing reporting entities with the ability to deviate from market prices, when such illiquidity exists (Laux, 2012; Huizinga and Laeven, 2009; Zhao *et al.*, 2012). The IASB issued similar guidance in relation to IAS 39 and IFRS 7. This additional guidance in essence relaxed the fair value accounting rules by allowing reporting entities to retrospectively reclassify non-derivative trading and available-for-sale financial assets (both of which would have been previously measured at fair value) into held-to-maturity or loans and receivables categories under which assets are required to be measured at amortised cost (IASB, 2008b, paragraph IN8A, Zhao *et al.*, 2012).

Empirical researchers have found some evidence that the market responded positively to the relaxation of fair value accounting rules during the crisis. Bowen, Khan and Rajgopal (2011) find a positive (negative) stock market reaction to key events suggesting that policymakers in the U.S. would (would not) relax fair value accounting and impairment rules during the financial crisis. Bhat, Frankel, and Martin (2011) also find that the stock market reaction to the April 2009 fair value accounting rule change was more positive for banks which held more mortgage-backed securities (MBS) and higher nonperforming loans, suggesting that the feedback between MBS holdings and underlying asset markets can be aggravated by mark-to-market accounting.[18] Cheng

[18] Bischof, Brüggemann and Daske (2011) found, after analysing the stock market reaction to the IASB's amendments that granted banks the option to reclassify certain assets in order to avoid fair value accounting, that this option was used extensively during the crisis period.

(2012) found that U.S. banks' have utilised additional accounting discretion in the way they report mortgage-backed securities under the relaxed fair value accounting rules in FSP 157-3.

Despite, the challenges faced by standard-setters during the financial crisis regarding the application of fair value accounting rules, the consensus from regulatory bodies across developed economies is that fair value accounting, especially for financial instruments, remains the optimal financial reporting strategy. Voluminous discussion has ensued on fair value accounting and some improvements have been suggested, of which many have been incorporated in recent FASB and IASB standards. Other suggested improvements include additional supplementary disclosures such as the sensitivity of derivatives' fair values to changes in market risk variables, that would enhance transparency as fair value accounting is no panacea for transparency (Novoa, Scarlata, and Solé, 2009; Barth and Landsman, 2010; Laux, 2012); decoupling of prudential regulation and regulatory capital requirements from the financial reporting process targeted at investors (Song, 2011); and also, finding some common ground between accounting standard-setting and bank regulation in order to ensure that relevant information is provided to investors and the financial system stability is maintained (Barth and Landsman, 2010; Novoa, *et al.*, 2009).

2.7 Summary

The history of standard setting by the FASB shows a continuous shift towards more fair value accounting as a measurement basis, particularly for financial instruments. This shift has been founded on the decision-usefulness paradigm on which the FASB's Conceptual Framework is built. Events such as the Savings and Loans Crisis in the U.S. during the 1980s and also, the recent wave of more complex financial instruments have also helped propel fair value measurement into the consciousness of professional accounting standard setting bodies. Fair value focused accounting standards have had broader application in the measurement of financial instruments and there are arguments for and against this. At the conceptual level, fair value is seen as superior to amortised cost accounting because it reflects the market's assessment of current economic conditions and thus makes fair value a more relevant measurement metric than historical cost accounting. The case against fair valuation of financial instruments includes: the inadequacy of exit value from which fair value is derived to appropriately capture the value of an asset (or liability), unnecessary income volatility which fair value accounting may yield for financial instruments held to maturity and other practical implementation issues such as the difficulty of auditing fair values and also, the challenges of obtaining fair values when active markets do not exist for an asset or liability.

On the procyclical nature of fair value accounting, there seems to be some theoretical backing to support the exacerbating effects of fair values on cycles whether in boom times or in recessionary times. However, on whether fair value accounting exacerbated the global financial crisis from 2007-2009, the discussion suggests that it largely did not spark a fire sale in banks' assets. Indeed, even if there were some exacerbating effect of fair value accounting it would have been minor, considering the leverage practices of financial institutions at the time and also, the non-implementation of a full fair value accounting regime for financial instruments measurement and recognition at the time. Going forward the discussion about fair value accounting is tending towards more about how it can be improved upon rather than whether it should be rolled back.

The next chapter reviews the prior literature on fair value accounting with a focus on the theory of fair value accounting and the empirical literature on the value relevance of fair values.

CHAPTER THREE

REVIEW OF RELATED LITERATURE

Considering the arguments for and against the wider use of fair value accounting - especially for the measurement of financial instruments and also the approach taken by the international accounting standards setters on the subject - it is no surprise that a great deal of research has resulted, investigating various aspects of fair value accounting. This chapter reviews the literature relevant to fair value accounting with focus on the theory of fair value accounting and the empirical literature - particularly in relation to the value relevance of fair values. I commence the chapter in section 3.1 by providing a brief history of the concept of fair value in accounting. I then move on in section 3.2 to discuss the theory of fair value and its associated accounting measurement bases by illustrating the advantages and disadvantages of the various accounting measurement bases. The empirical literature on value relevance and fair value accounting based on the capital markets correspondence approach pre-SFAS 157 is discussed in section 3.3, while the literature related to value relevance and fair value accounting using the predictive ability approach is examined in section 3.4. Section 3.5 reviews the literature on fair values and managerial discretion while section 3.6 examines the 2001 U.S. economic recession. In section 3.6 I also examine the role played by fair value accounting in the 2007 global financial crisis. Section 3.7 examines the value relevance of fair values post-SFAS 157. The chapter concludes with summary comments highlighting the contributions and limitations of the academic and professional literature dealing with fair value accounting issues.

3.1 Brief Historical Background of the Fair Value Concept in Accounting

The concept of fair value has a long history in the accounting literature. Chambers (1991:14) concluded from his historical investigation that "from the time of Pacioli (in the 15^{th} century) onwards there are bookkeeping manuals, constitutive documents of partnerships and companies, and judicial dicta, to the effect that assets were or were expected to be presented by the currently dated market prices or selling prices". In the 20^{th} century the works of MacNeal (1939), Edwards and Bell (1961), Chambers (1966) and Sterling (1970) were the most significant in arguing for systems that would now be interpreted as forerunners of the application of fair value accounting procedures.

MacNeal's *magnum opus*, entitled *Truth in Accounting*, was published in 1939. In this book, MacNeal advocated the use of market-based valuations (also expressed as "economic value") in financial statements. Zeff (1982) commented that MacNeal was the first major accounting writer, at least in the English language literature, to advocate a market price system for financial statements. MacNeal wrote from the perspective of a practitioner rather than an accounting academic and using three different scenarios (that is, "fables") he highlighted the limitations of the historical cost accounting system. These fables were used to show from the small investor's perspective how the notions of realisation and conservatism can be misleading (MacNeal, 1939; Zeff, 1982). The fables also illustrated the problems that result when managers can "cherry-pick" by selling assets and realising income for assets that had increased in value and keeping assets that had experienced a decrease in market value at their historical costs. MacNeal's ideas were largely unwelcome in the accounting academic community at the time (Zeff, 1982). This was especially so given that his book was titled "Truth in Accounting", suggesting that his position was "the truth" and that the historical cost system favoured by the prominent scholars at the time led to fiction and untruth.[19] This did not endear him to either the practitioners of his day or to the ruling elite of scholars to whom "Truth in Accounting" was primarily addressed (Zeff, 1982; Hatfield, 1940). Zeff (1982) described MacNeal as a revolutionary in a non-revolutionary time. Belkaoui (1981) also writes that the notion of current exit price for asset measurement was introduced by MacNeal and further developed by Sterling and Chambers.[20]

Edwards and Bell (1961) made a significant contribution to the fair value dialogue by articulating the differences between *exit* and *entry* values[21] for the measurement of periodic profit. They also advocated clearly their preference for the use of entry values for accounting measurement purposes (Peasnell and Whittington, 2010). Edwards and Bell (1961, Chap. II) describe how a system that systematically collects current market data on its assets and liabilities and uses them to differentiate between holding and operating assets can be deployed for decision purposes at different levels within an organisation. They explain how to measure these current market values on which holding gains are based through the use of current replacement cost (entry value) and current realisable value (exit value).[22] Edwards and Bell advocate the use of entry rather than exit values primarily because they assumed that they were predominantly

[19] The dominant accounting measurement system at this time was historical cost. Prominent accounting academics during this period generally supported this measurement approach. Even where they objected to it, the realisation principle embedded in historical cost was upheld. These academics included William A. Paton, John B. Canning [though a current-cost/value accounting advocate, he did find MacNeal's identification of actual and imputed market prices for valuation very problematic and possibly too expensive to implement], Henry R. Hatfield, J. Hugh Jackson and Pearson Hunt (Zeff, 1982) .

[20] Chambers' Continuously Contemporary Accounting (*CoCoA*) is not just a particular interpretation of the fair value accounting procedures developed by the FASB and IASB. Under Chambers' system, liabilities are valued at their contractual face values and assets are valued at estimated actual selling prices.

[21] Peasnell and Whittington (2010) suggest that the terms exit and entry values were coined by Edwards and Bell (1961).

[22] Some important attributes of exit and entry values and other accounting measurement bases are provided in Table 3.1 on page 37.

concerned with the *long run* performance of a going concern. Thus, in this circumstance, they argue that it is more relevant to regard holding gains as future cost savings, to be realised as inputs of production, rather than as realisable by direct sale at exit value, which is more relevant to short-term performance assessment (Peasnell and Whittington, 2010).

Raymond Chambers was a significant figure in the theoretical development of the concept of fair value accounting, particularly based on exit prices. Chambers believed in the relevance of accounting information to its users and from his experiences at the time, he concluded that the information accountants provided fell short of meeting the needs of users (Al-Hogail and Previts, 2001). Chambers had similar concerns to those of MacNeal (1939) with regard to the usefulness of historical cost information to small investors. The irrelevance of conventional accounting information to its users at this time drove Chambers to develop the theory that came to be popularised as "Continuously Contemporary Accounting", also identified by the acronym, *CoCoA*[23] (Al-Hogail and Previts, 2001).

According to Al-Hogail and Previts (2001) Chambers utilised a scientific approach adopted from the physical sciences, to explore the notion of measurement[24] and concluded that accurate measurement requires the observation of both the initial state

[23] A significant portion of the elements of *CoCoA* was published in Chambers' major work, *Accounting, Evaluation and Economic Behaviour* in 1966. The theory was initially abbreviated as CCA, but was changed to *CoCoA* when the Sandilands Committee proposed its Current Cost Accounting system with the same abbreviation, CCA.

[24] Chambers theory made a distinction between measurement and valuation. Measurement is a function of accounting: accountants are to relate facts and communicate them to users. Valuation, on the other hand, is concerned more with expectations of future benefits that could be generated by the underlying asset; i.e., how such facts discovered by accountants are perceived by the user. Chambers argued that while a specific asset should be measured equally by different accountants (suggesting measurement is an objective activity), it might well be valued differently by two different users based on their unique perceptions of the utility of that asset (making valuation a subjective activity). Chambers' primary concern was measurement and his theory focused on how to measure accurately (Al-Hogail and Previts, 2001).

and terminal state of the object under investigation as well as the consideration of any necessary adjustments for changes in conditions during that period. This led to Chambers' criticism of conventional accounting practices that asset values at certain points of time were derived and measured based on cost allocations rather than based on actual observation of the true values of such assets. He also argued that changes in the purchasing power of monetary units were not taken into consideration by conventional accounting rules. Thus, Chambers (1966) argued that if a true and fair view of the changes in financial position is to be obtained, market prices and changes in the general price level should be reflected in financial statements and the calculation of net income. He further argued that only contemporary values are capable of reflecting the specific changes in asset values and as a result, all other measures of value are irrelevant. Chambers' view, based on economic theory and adaptive behaviour, was that a firm's financial position is based on its ability to adapt to changes in business conditions brought about by the volatile environment the firm operates in. In order for a firm to do this, it must either maintain or alter its operations; that is, its capacity for buying new assets or paying off current debts, when necessary (Al-Hogail and Previts, 2001).

Following on, Chambers argued that *buying or entry prices*, although relevant to the decision of selecting new assets, are not capable of showing such adaptive ability. For example, if a firm needs to generate a sum of money (thus, adapt to a new environment), its ability to operate would be limited to the sum of the monetary assets that it possesses and what its other assets could bring in to the firm; that is their *selling or exit prices*. Therefore, Chambers concluded that non-monetary assets should be restated to contemporary values using their net realisable values; that is, their exit prices (Al-Hogail and Previts, 2001).[25]

On the liabilities side of the balance sheet Chambers' *CoCoA* made the assumption that liabilities already have contractually stated monetary values and the amounts the firm owes to its vendors or bankers are immediately determined. The firm does not have to revalue the cash it has on hand and nor does it need to revalue the loans it has borrowed from the bank or the amounts it is contractually obligated to pay to its creditors.[26]

Chambers' *CoCoA* still remains a brilliant treatise on the use of exit prices for asset measurement in accounting. However, *CoCoA* has also been criticised. Such criticisms include: it contradicts the going concern assumption; underestimates the problem of limited availability of market prices; is inconsistent, as it allows for different valuation measures and it ignores the liability side of the balance sheet (Al-Hogail and Previts, 2001). These criticisms which Chambers strongly rejected continue to resonate in the fair value accounting dialogue until this day.

Robert Sterling was a contemporary of Chambers and shared Chambers' view on the use of exit prices for asset measurement. In his most noted work - *Theory of Measurement of Enterprise Income* - Sterling (1970) explained the notion of income in the context of the financial affairs of a single wheat trader. He analysed what

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[25] A contemporary interpretation of the Chambers (1966) system of Continuously Contemporary Accounting is to be found in Davidson and Tippett (2012). Davidson and Tippett (2012) use the methods of continuous time finance to illustrate how the market value of a firm's equity will be a non-linear combination of the present value of the cash flows the firm expects to receive under its existing operations and the adaptation value that arises from the firm's ability to change its existing operations in order to embrace more lucrative investment opportunities.

[26] Essentially Chambers made the case that liabilities should be settled at their face values and that firms should not be able to benefit from their own financial difficulties such as the experience of a downgrade in a firm's credit-worthiness which could lead to the reduction in the market (that is, fair) value of a firm's debt.

information was germane to financial actions, identified the important elements of income and the characteristics of these elements that were commonly required for informed financial decision-making. He then considered many different decision models and decision makers and concluded that exit values were most relevant to decisions as compared to any other valuation alternative (Lee and Wolnizer, 2012). Sterling, like Chambers, emphasised that the accounting numbers stated in financial statements must correspond to the empirical phenomena they purport to represent and that aggregations of them must meet the empirical test of "additivity" i.e., the empirical veracity of aggregating individual measurements of an attribute (Sterling 1979, 162-174). This underlines his fundamental criticism of conventional accounting practice based on fictitious cost allocations which he called "calculational-nonempirical" (Sterling 1977, 236, 249-250) and referred to it as not being measurement. Based on his wheat trader model, Sterling (1970) concluded that, although his exit value solution in this case was not generalizable beyond this model, it is at least relevant to a specific type of business in practice and therefore, preferable to the prevalent unresolved general situation (Lee and Wolnizer, 2012; Sterling, 1970). Sterling subsequently advocated the use of exit values that recognised and represented the subject matter of business activity in relevant and reliable accounting terms. This case was made particularly for valuing the trading assets of a trading firm (Sterling, 1979).

3.2 Theory of Fair Value and Accounting Measurement bases

There are various accounting measurement bases. However, these can be broadly sub-divided into cost-based measures, market based measures and a hybrid of some description. Jensen (2007) discusses the different measurement bases found in U.S. GAAP. These include: Historical Cost Accounting (Unadjusted Historical Cost), Price-

Level Adjusted Historical Cost Accounting, Entry Value (Current cost, replacement cost) Accounting, Current exit value (Liquidation, Fair value) Accounting, Economic Value (Discounted Cash Flow, and Present Value) Accounting. Table 3.1 below, presents a summary of the advantages and disadvantages of these measurement bases in the context of the decision-usefulness doctrine of the FASB:

TABLE 3.1: Advantages and Disadvantages of Various Accounting Measurement Bases				
Historical Cost Accounting (Unadjusted Historical Cost) [HCA]	**Price-Level Adjusted Historical Cost Accounting (PLA)** - the FASB in 1979 issued SFAS 33 for company financials to be adjusted for inflation, however it failed to get traction as the U.S. had low inflation rates during the period and follow-up studies suggested that financial analysts and investors did not find the new information relevant.	**Entry Value (Current cost, replacement cost) Accounting** - Entry value is a buyer's acquisition cost (net of discounts) plus transaction fees and installation expenses. This can also be referred to as replacement cost and in the sense of SFAS 33 referred to as Current Cost. This standard was later rescinded by the FASB.	**Current exit value (Liquidation, Fair value)** - Exit value is the seller's liquidation value (net of disposal transaction costs). Whereas entry value is what it will cost to replace an item for a buyer, exit value is the value in disposing of the item.	**Economic Value (Discounted Cash Flow, Present Value) Accounting** - These apply in situations where future cash inflows and outflows can be reliably estimated and are attributable to the particular asset or liability being valued on a discounted cash flow basis. U.S. GAAP allows this for example when computing the fair values of derivative financial instruments.
Advantages i. Survival Concept: The belief that HCA has met the Darwin survival test for at least the period subsequent to the discovery of double entry bookkeeping. U.S. GAAP has employed the HCA concept in its standards from its inception. ii. It agrees with the matching concept. Hence, costs of resources consumed in production should be matched with revenues of the products and services of the production function. iii. HCA possesses the attribute of leaving an Audit trail. iv. Predictive Value: Empirical studies suggest that Historical cost earnings today are reasonable predictors of future historical cost earnings. This is contestable considering it depends on the settings from which the study is being carried out. v. Accuracy: HCA measurement is believed to be more accurate, relative to alternatives, more uniform, consistent and less prone to measurement error. **Disadvantages**	**Advantages** i. Attempts to perfect historical cost accounting by converting costs to a common purchasing power unit of measurement. ii. Impacts on Return on Investment calculations in many industries even in times of low inflation. iii. Is essential in periods of hyperinflation. iv. Uses a readily available and reasonably accurate government-generated consumer price index (CPI) (usually the price index for urban households). **Disadvantages** i. No general consensus on the exact price-index to use.	**Advantages** i. It conforms to capital maintenance theory that argues in favour of matching current revenues with what the current costs are of generating those revenues. ii. If the accurate replacement cost is known and can be matched with current selling prices, the problems of finding indices for price-level adjustments are avoided. **Disadvantages** i. Discovering accurate replacement	**Advantages** i. In the case of financial assets and liabilities, historical costs may be meaningless relative to exit values. For example a forward contract or swap generally has zero historical cost but may be valued at millions at the current time. Failure to require fair value accounting provides all sorts of misleading earnings management opportunities for firms. ii. Exit value does not require arbitrary cost allocation decisions such as whether to use FIFO or LIFO or what depreciation rate is best for allocating cost over time. iii. In many instances exit value accounting is easier to compute than entry values. For example it is easier to estimate what an old computer will bring, in the used computer market than to estimate what the cost of 'equivalent' computing power is in the new computer market. **Disadvantages** i. The exit value is the seller's liquidation value of a particular asset or liabilities at a particular time and place. It may differ greatly from 'valuation in use' among a larger set of items in an entire department, division, or company as a whole. ii. Operating assets are bought to use rather than sell. Thus if no consideration is being given to selling or abandoning a manufacturing plant,	**Advantages:** i. Economic value is based upon management's intended use (Value-in-Use) for the item in question rather than upon some other use such as exit or entry value. ii. Economic value conforms to the economic theory of the firm. **Disadvantages:** i. Complications in the models used to perform such valuations.

i. Simplistic, especially for complex schemes such as off balance sheet financing and complex contracting issues e.g. derivatives whose historical cost may be zero at the outset but the fair value in future maybe millions of dollars. ii. HCA is highly limited during hyperinflation periods in the economy as it can overstate earnings during this period and understate how a firm is maintaining its capital assets. It also creates mix-up when one uses Last In First Out (LIFO) at different periods with other inventory valuation techniques. iii. HCA assumes a going-concern. When this is not the case the relevance of HCA diminishes significantly. iv. HCA is also subjected to a barrage of underlying subjective estimates such as depreciation estimates, allocation of joint costs, allocation of indirect costs, bad debt reserves, warranty liabilities, pension liabilities, etc.	ii. No common index across nations as nations differ in terms of effort to derive price indices. iii. Empirical studies in the U.S.A have not shown PLA accounting data to have better predictive powers than historical cost data not adjusted for inflation.	costs is difficult in times of changing technologies and newer production alternatives. ii. Discovering current costs is prohibitively costly if firms have to repeatedly find current replacement prices on thousands or millions of items. iii. Accurate derivation of replacement cost is very difficult for items having high variations in quality. iv. Use of ‘sector’ price indices as surrogates compounds the price-index problem of general price-level adjustments. v. Current costs tend to give rise to recognition of holding gains and losses not yet realised.	recording the fluctuating values of the land and buildings creates a misleading fluctuation in earnings and balance sheet volatility. iii. Difficulties come in valuing assets that are not separable. For example, assets such as software, knowledge databases and web servers may be impossible to unbundle from the firm as a whole and may have immense value if the entire firm is sold, but they may have no market as unbundled assets. iv. Exit value accounting records anticipated profits well in advance of transactions; hence it may be far from conservative in its approach. v. Value of a subsystem of items differs from the sum of the value of its parts. Hence liquidation or fair values of the subsystems may not be a true reflection of the value of the system of these net assets. vi. Appraisals of exit values are both too expensive to obtain for each accounting report date and are highly subjective and subject to enormous variations of opinion. vii. Exit values are affected by how something is sold. If quick cash is needed, the best price may only be half of what the price would be after waiting for the right time and the right buyer. viii. Financial contracts that for one reason or another are deemed to be ‘held-to-maturity’ items may cause misleading increases and decreases in reported values that will never realised. A good example is the market value of a fixed-rate bond that may go up and down with interest rates but will always pay its face value at maturity no matter what happens to interest rates. ix. Exit value markets may often be thin and inefficient markets.	ii. It is virtually impossible to estimate cash flows except when they are contractually specified. iii. Even when cash flows can be reliably estimated, there are endless disputes regarding the appropriate discount rates. iv. Endless disputes arise as to assumptions underlying economic valuations.

Adapted from Jensen R.E. (2007). “Fair Value Accounting in the U.S.A”, in Walton P. (ed). *The Routledge Companion to Fair Value and Financial Reporting*. U.K.: Routledge, Taylor & Francis.

Other measurement bases include Value-in-Use (Barth and Landsman, 1995; Beaver and Demski, 1979) which looks similar to level 3 fair values based on models and managers' estimations, and the Deprival value method which provides an algorithm for choosing a measurement method (rather than prescribing one universal method) that is grounded in the economics of the firm (Baxter, 1975; Whittington, 2008). Deprival value (alternatively, described as Value to the Business) asks the question: what would the owner of an asset lose if they were deprived of this asset? In other words, it is a measurement of the additional value accruing to the business as a result of owning the asset (van Zijl & Whittington, 2006).

Whittington (2008) describes the IASB's (albeit implicit) move in following the FASB in the prescription of fair value principles and practices to be as a result of the unresolved debate in the 1970's where standard setters were unable to find a solution to the inflation accounting problem that was acceptable to users and preparers of published financial statements. Also, the move by standard setters in making decision-usefulness the primary focus of General Purpose Financial Reports (GPFR), has swept away the traditionalist view that published financial statements arise out of the need to satisfy narrowly defined legal and stewardship requirements. Hitz (2007) highlights that the FASB and IASB are shifting in measurement paradigms from cost-based measures to market-based measures because they believe market values incorporate, in an efficient and virtually unbiased manner, market consensus expectations about future cash flows. Barth (2006b) argues that fair value accounting is the only comprehensive and internally consistent approach the IASB has been able to identify.

Penman (2007) using a demand approach from the shareholder's perspective considered the pluses and minuses of fair value accounting and asks:

"Does fair value enhance the task of equity valuation and stewardship assessment"?

He argues that at a conceptual level, fair value accounting is a plus as equity value is read from the balance sheet with no further analysis needed, while the income statement reports realisations for determining value at risk. However, he takes issue with the implementation of fair value accounting using exit prices. This is where the minuses come in. As usually discussed in the literature, fair value accounting works well, for both valuation and stewardship, with investment funds (where shareholders trade in and out of the fund at net asset value). This case is instructive, for it is the situation where the one-to-one relationship between exit prices and fair value to shareholders holds. That one-to-one condition fails, however when a firm holds net assets whose value comes from execution of a business plan rather than fluctuations in market prices, even when exit prices are observed in active markets. Asset and liability matching problems confound the problem further. Overlay the minuses of estimated fair values when actual prices are not observed, and the minuses do add up. Finally, Penman (2007) argues that historical cost accounting, which he termed as "historical transaction accounting", can produce earnings from which the value of the firm can be extrapolated. Hence, he agrees that although historical cost has its own implementation problems, especially through difficulties of revenue and expense matching, he thinks fair value accounting has its own problems - particularly with regard to asset and liability matching problems. Penman (2007) expresses particular concern with regard to implementation of fair values - especially levels 2 and 3 - fair values as this is where the one-to-one relationship between values and associated market prices may not exist.

It is also argued that the process of firm valuation can be done with historical cost earnings without significant difference from valuations made using fair value accounting.

Whittington (2008) also discusses the link between the objectives of financial reporting and fair value accounting. He articulates the view that the differences between the fair value accounting view of financial reporting and views of financial reporting based on alternative measurement bases may be summarised in terms of the following table:

<table>
<tr><th colspan="4">TABLE 3.2: The Fair Value View Versus The Alternative View</th></tr>
<tr><td colspan="2">The Fair Value View
This is a view that is apparent in many of the proposed revisions of the Conceptual Framework. Some of its features are also in the existing framework. This broad view would be supported by a significant number (but not necessarily a majority) of members of the FASB and the IASB, and possibly by a majority of the staff who have worked or are working on the frameworks of the two Boards. Because of its articulation by professional standard setters (albeit with individual differences of view on some aspects) this has been more clearly expressed in a “joined” up’ systematic way than has the Alternative View.</td><td colspan="2">The Alternative View
This view is not as articulated as the fair value view, considering that it consists of diverse views of people and institutions commenting on specific valuation issues often from a practical perspective.</td></tr>
<tr><th>The main features of the Fair Value View are:</th><th>The implications of the Fair Value View are:</th><th>The main features of the Alternative View are:</th><th>The implications of the Alternative View are:</th></tr>
<tr><td>• Usefulness for economic decisions is the sole objective of financial reporting.
• Current and prospective investors and creditors are the reference users for general purpose financial statements.
• Forecasting future cash flows, preferably as directly as possible, is the principal need of those users
• Relevance is the primary characteristic required in financial statements.
• Reliability is less important and is better replaced by representational faithfulness, which implies a greater concern for capturing economic substance, and less with statistical accuracy.
• Accounting information needs ideally to reflect the future, not the past, so past transactions and events are only peripherally relevant.
• Market prices should give an informed, non-entity specific estimate of cash flow potential, and markets are generally sufficiently complete and efficient to provide evidence for representationally faithful measurement on this basis.</td><td>• Stewardship is not a distinct objective of financial statements, although its needs may be met incidentally to others.
• Present shareholders have no special status amongst investors as users of financial statements.
• Past transactions and events are relevant only insofar as they can assist in predicting future cash flows.
• Prudence is a distortion of accounting measurement, violating faithful representation.
• Cost (entry value) is an inappropriate measurement basis because it relates to a past event (acquisition) whereas future cash flow will result from future exit, measured by fair value.
• Fair value, defined as market selling (exit) price, as in SFAS 157 (FASB, 2006a), should be the measurement objective.
• The balance sheet is the fundamental financial statement, especially if it is fair valued.
• Comprehensive income is an essential element of the income statement: it is consistent with changes in net assets reported in the balance sheet.</td><td>• Stewardship, defined as accountability to present shareholders, is a distinct objective, ranking equally with decision usefulness.
• Present shareholders of the holding company have a special status as users of financial statements.
• Future cash flows may be endogenous: feedback from shareholders (and markets) in response to accounting reports may influence management decisions.
• Financial reporting relieves information asymmetry in an uncertain world, so reliability is an essential characteristic.
• Past transactions and events are important both for stewardship and as inputs to the prediction of future cash flows (as indirect rather than direct measurement).
• The economic environment is one of imperfect and incomplete markets in which market opportunities will be entity-specific.</td><td>• The information needs of present shareholders, including stewardship requirements must be met.
• Past transactions and events are relevant information and together with reliability of measurement and probability of existence, are critical requirements for the recognition of elements of accounts, in order to achieve reliability.
• Prudence, as explained in the current IASB Framework and in the ASB’s Statement of Principles can enhance reliability.
• Cost (historic or current) can be a relevant measurement basis, for example as an input to the prediction of future cash flows, as well as for stewardship purposes.
•Financial statements should reflect the financial performance and position of a specific entity, and entity specific assumptions should be made when these reflect the real opportunities available to the entity.
• Performance statements and earnings measures can be more important than balance sheets in some circumstances (but there should be arithmetic consistency— articulation—between flow statements and balance sheets).</td></tr>
</table>

Source: Whittington, G. (2008). Fair Value and the IASB/FASB Conceptual Framework Project: An Alternative View. *ABACUS*, 44(2), 139-168.

According to Whittington (2008) fair value may be seen as "alright in theory but not in practice", considering it assumes that markets are efficient and complete. Hence, he argues that accepting fair value as a "super system" without reservations would be naive and simplistic, noting that earlier advocates of a somewhat different system of fair value accounting in Chambers (1966) and Sterling (1970) would not have been unqualified supporters of fair value principles and practices endorsed by the FASB. The Alternative View on the other hand sounds "practical but not alright in theory" considering that it arose from a variety of people with diverse views commenting on specific issues often from a practical standpoint (Whittington, 2008).

Whittington (2008) argues further that neither of the above conclusions would be correct considering that the two views make different assumptions about the nature of the economic environment, and he argues that it is the accuracy of these assumptions that determines the relevance of the respective views of accounting standards.[27] He argues that it is important to recognise that theories are not likely to offer panaceas such as a universally valid single measurement method and that it would be better instead to work in a more limited way to solve specific problems. He believes that the Alternative View documented in Table 3.2 is consistent with this type of theorizing and that it offers a more fruitful and practical approach than the fair value view. He subsequently recommended the use of the "deprival value" approach to accounting measurement as he believes the quest of standard setters to find one "pure" measurement method has resulted in them dismissing the deprival value concept as a hybrid approach that is incompatible with the "pure" fair value principles which they espouse.

[27] In contrast, Friedman (1953) argues that it is logically invalid to reject a theory on the ground that it is based on assumptions that do not hold up empirically. Rather, he argues that the only valid way to assess the validity of a theory is to test whether its predictions are supported by the empirical evidence.

Hitz (2007) also takes issue with the suggestion that "fair value" will be decision-useful in all possible settings. He agrees that there is a theoretical case for fair value measurement for assets traded in highly liquid markets with observable market prices – that is, so called level 1 fair value measurement. He questions, however, the model-based valuations and says that the basis for estimation of fair value in level 3 implicitly includes private information and entity-specific information; hence, "value-in-use" is advocated rather than fair value. Hitz (2007) points out that the IASB and FASB definition of fair value can be taken as the exit market price that would arise under close-to-ideal market conditions, in a transaction between knowledgeable, independent and economically rational parties, which interact on the basis of an identical information set (complete information). Fair value is also distinguished from "Value-in-Use" as it does not include value arising from entity-specific competitive advantages; that is, no private information is involved (SFAS 157, paragraph.C32; JWG, 2000, paragraph. 4.5; IASB, 2006, paragraphs. 42-45). Hitz (2007) also notes that the standard setters are taking an "economic view" of measurement grounded in modern neo-classical finance theory that distinguishes traditional expected cash flow and residual earnings approaches. The fair value paradigm rests on the decision-usefulness paradigm which takes the market price as the relevant metric. This is based on the "information aggregation hypothesis" which says the market price aggregates in an efficient and unbiased manner the consensus expectations of investors in the market concerning the cash flow patterns of the assets and liabilities appearing in a firm's financial statements. Hence the fair value accounting paradigm as articulated by the FASB/IASB believes in the Efficient Market Hypothesis - at least the semi-strong form level. Hitz (2007) argues that although fair value earnings is conceptually closer to economic income than is historical cost earnings, the systematic differences indicate a situation where mismatching occurs due to unrecognised assets and goodwill and this impairs fair value income's capacity to accurately express economic reality. He also argues that fair value earnings may introduce artificial volatility into financial statements and may not be persistent, hence impacting on the ability to predict future earnings. He suggests that this issue needs to be clarified going forward.

With regard to non-financial items, Hitz (2007) argues that until the notion of fair value income and its contribution to decision-usefulness is clarified, the transaction-based income concept (that is, historical cost) should be sustained for non-financial items. Further, he contends that since fair value measurements based on valuation models do not inform about consensus expectations, the conceptual backing appears particularly weak for fair value measurement of non-financial items. Also, because of the reliability concerns associated with level 2 and level 3 fair value measurements Hitz (2007) contends that the fair value paradigm should not be generalized to property, plant and equipment and intangibles (that is, non-financial items).

Plantin, *et al.* (2008) developed a parsimonious theoretical model that compares the real effects of the historical cost and mark-to-market measurement regimes. The implications of this model were that for short-lived assets, marking-to-market induces lower inefficiencies than historical cost accounting. The converse is true for long-lived assets. Also, for liquid assets, mark-to-market induces lower inefficiencies than historical cost accounting. The converse is true for illiquid assets. And, lastly for junior assets, mark-to-market induces lower inefficiencies than historical cost accounting. The converse is true for senior assets. Plantin, *et al.* (2008) conclude by saying that a full implementation of the mark-to-market regime may not necessarily improve welfare, citing the theory of the second-best perspective when there are multiple imperfections in the world. They posit that because long-lived, illiquid and senior assets are attributes of key balance sheet items of banks and insurance companies it is no surprise why these institutions are vocal opponents to mark-to-market accounting.

Barth (2006b), a strong proponent of fair value accounting, argues that more estimates of the future should be included in today's financial statements. She believes that this would make financial statements achieve the decision-usefulness goal of financial reporting. Basing her discussion on the fundamental pillar of "decision-usefulness" as the primary objective of financial reporting and asserting that the IASB and FASB Conceptual Frameworks are built on this, she writes:

> "It seems self-evident that financial statement amounts that reflect current economic conditions and up-to-date expectations of the future will be more useful in making those [economic] decisions, which are made in the current economic environment."

She argues that under current accounting standards, almost all amounts recognized in financial statements reflect some estimates of the future considering the definition of assets and liabilities which represent expected future inflows and outflows of economic benefits.

Barth (2006b) then moves the debate forward as to how such future estimates can be included in financial statements today. She starts by explaining that the measurement attribute determines how such future estimates can be incorporated in today's financial statements. For example, *fair value* necessitates including expectations of future cash flows that market participants would include, discounted at the rate that market participants would use to discount them. Whereas *entity-specific value* requires the inclusion of expectations of future cash flows that the entity expects to receive, discounted at a rate that reflects the entity's cost of capital, even if these differ from those of other entities. Thus, why the increased focus on fair value? Barth (2006b) argues that fair value accounting meets the qualitative characteristics of useful financial statement information based on the decision-usefulness doctrine. Fair values are relevant because they reflect present economic conditions, i.e. the conditions under which users will make their decisions. They are comparable because the fair value of any particular asset or liability depends only on the characteristics of the asset or liability and not on the characteristics of the entity that holds the asset or liability or when it was acquired. Fair values enhance consistency because they reflect the same type of information in every period. Fair values are timely because they reflect changes in economic conditions when those conditions change. In addition, fair values can be viewed as fulfilling a stewardship role for financial reporting because the financial statements reflect the values of assets at the entity's disposal.

Barth (2006b) also discusses the issue of income measurement under fair value accounting principles. She argues: "Asset and liability measurement affects income measurement. As the framework makes clear, the focus on measuring assets and liabilities is not because the IASB believes that the balance sheet is more important than the income statement. Quite the contrary, the focus reflects the importance of the income statement." She goes further to elaborate that the Framework adopts the Hicksian view of income (Hicks, 1946) which says the income for a particular period equals the change in wealth for that period. Thus in a financial reporting context, the key to measuring income is to measure changes in recognised assets and liabilities (FASB and IASB 2005). However, because not all expected future benefits are recognized in financial statements, financial reporting does not literally implement the

Hicksian view. Accounting income is not the change in total wealth for the period; it is the change in recognized net assets, other than changes arising from equity transactions. The direct link between asset and liability measurement and income measurement means that expectations of the future that are incorporated into measures of assets and liabilities today are recognized in income today, not in the future when the cash flows actually occur. Income in any given period includes the following: changes in expectations between the beginning and the end of the period, differences between expectations and realizations during the period, and the unwinding of the discount rate. Whittington (2008) has argued, however, that the Hicksian theory being relied upon by the IASB and FASB for measuring income is only applied in a static context and not in the dynamic sense of which it seems the financial market and real world transactions take place.

According to Barth (2006b):

> "… using fair value as the measurement attribute would result in income reflecting how the entity performed given the assets at its disposal relative to other market participants' expected performance. This is because fair value measures assets and liabilities based on what market participants expect an entity to achieve. Thus, if the entity makes better use of the assets, then income will be greater than the return expected based on the riskiness of its net assets; if it makes worse use of assets, then income will be less than the expected return."

With regard to *predictability*, Barth (2006b) acknowledges that if more estimates of the future are included into today's financial statements, that accounting income will be less predictable. However, Barth (2006b) argues that the role of financial reporting is to provide information that is useful to users in making economic decisions; and this inevitably means that the information provided in financial statements must be useful in predicting the future cash flows of the entity. Thus, what matters is whether accounting income has predictive ability with respect to future cash flows, not whether accounting income itself, is predictable.

3.3 Value-Relevance and Fair Value Accounting

Value-relevance studies in Accounting examine whether there is a significant association between a particular financial statement item and the equity market values or share prices of firms (Barth, Beaver, and Landsman, 2001; Beaver, 1998). In relation to the value-relevance of fair values much has been debated on the validity of such studies in providing guidance for standard-setters and policy makers. Holthausen and Watts (2001) argue that inferences made from value-relevance studies about whether a set of accounting numbers influence the stock price (market value) of a firm cannot guide for standard-setting without a descriptive theory that explains such empirical associations - especially from the standard-setters perspective. They argue that before inferences can be made for standard-setting, the authors of these studies need to specify the objective of standard setting and how using the empirical association criterion helps standard setters achieve that objective. If the specified objective and the association criterion do not explain or predict standard setters' actions, it is incumbent on the authors to explain (i) why standard setters do not pursue that objective and (ii) why pursuit of that objective is relevant and feasible. In Holthausen and Watts (2001) review of 55 published papers which performed relative association and incremental association studies and explicitly or implicitly set out to make recommendations for standard setting, they expressed this overriding concern:

> “Regardless of the completeness of their explanation, all value-relevance papers assume the primary purpose of financial reporting (financial statements and disclosures) is equity valuation. Those papers assume the purpose is to provide either: (i) measures of equity value or measures associated with equity values; or (ii) information relevant for equity valuation.”

Holthausen and Watts (2001) argue that this view does not describe accounting practice as there are other objectives/influences of financial statements such as contracting, litigation etc. They assert that even if the value-relevance literature’s tests effectively inform us about accounting’s role in providing inputs to equity investor valuation, those tests still ignore the other roles of accounting and other forces that determine accounting standards and practice. To the extent accounting standards and practice are shaped by other roles and forces that are not perfectly correlated with the valuation role, the value-relevance literature misses key attributes of accounting. Hence, the value-relevance literature’s concentration on valuation and lack of development of a descriptive theory of accounting and standard-setting limits its implications and thus, can provide few inferences for standard setting and policy makers.

Other concerns raised by Holthausen and Watts (2001) include: the indirect tests employed by individual studies. As an example, Holthausen and Watts (2001) consider the commonly used procedure of taking particular asset and relating its value directly with the stock market value of the firm as a whole. They argue that this procedure assumes that the weighted average discount rate for the firm as a whole will be the same as the discount rate for individual assets. They note, however, that this is a highly dubious assumption.[28] They also claim that the FASB statements themselves allude to a wide variety of users of financial statements with diverging reasons for wanting access to accounting information. This supports their argument that the focus of value relevance papers on the role played by financial statements in equity valuation is completely misplaced. However, Holthausen and Watts (2001) acknowledge that the setting of the investigation of the relevance and reliability of the fair value of investment securities held by banks is perhaps the most favourable setting given the nature of the problems they outlined.

I argue below, that the FASB has made considerable progress since 2001[29] in clarifying its conceptual framework - so much so that it now clearly specifies[30] that the aim of the FASB standards is to provide decision useful information to groups and individuals who cannot demand the information from the firms themselves. This in turn will mean that published financial statements prepared under FASB standards are focussed toward equity investors (FASB, 2010:7).

Barth *et al.* (2001) in their response to Holthausen and Watts (2001) claimed there were several misconceptions articulated in Holthausen and Watts (2001) regarding value relevance research. They endeavoured to clarify these misconceptions as follows:

1. Value relevance research provides insights into questions of interest to standard setters and other non-academic constituents. Although there is no extant fully articulated and widely supported theory of accounting or standard setting, the

[28]Holthausen and Watts (2001) also question the valuation principles of intangible assets at fair value especially considering that these assets may not be separable and saleable. Holthausen and Watts (2001) note that a good example is given by customer loyalty.

[29] When Holthausen and Watts (2001) was published.

[30] This clarification is expressed by the FASB in its Statement of Financial Accounting Concepts No. 8.

FASB articulates its concepts of accounting and standard setting in its Concepts Statements. Using well-accepted valuation models, value relevance research attempts to operationalize key dimensions of the FASB's approach.

2. A primary focus of the FASB and other standard setters is equity investment. Although financial statements have a variety of applications beyond equity investment[31], the possible contracting uses of financial statements does not diminish the importance of value relevance research, which focuses on equity investment.

3. Empirical implementations of extant valuation models can be used to address questions of value relevance, despite the simplifying assumptions underlying the models.

4. Value relevance research can accommodate conservatism, and can be used to study the implications of conservatism for the relationship between book values and/or fair values and equity values. In fact, value relevance research is a basis for establishing that some financial accounting practices are perceived by equity investors as conservative.

5. Value relevance studies are designed to assess whether particular book values and/or fair values reflect information that is used by investors to value equity. Because ''usefulness'' is not a well-defined concept in accounting research, value relevance studies typically do not and are not designed to assess the usefulness of book values and/or fair values.

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[31] A good example is provided by the use of financial statement information in the setting of management compensation and debt contracts.

6. Finally, they argue that econometric techniques can be and are applied to mitigate the effects of common estimation issues arising in value relevance studies that otherwise could limit the validity of the inferences drawn from such studies.

3.3.1 The Value Relevance and Reliability of fair values based on a capital markets correspondence approach pre- SFAS 157

Given that the FASB has been moving towards more use of fair values in its standards since the 1980's, it is not surprising that there is significant interest in studies which assess the capital market's reaction to the fair values which appear in firms' published financial statements. Barth (1994) investigates how disclosed fair value estimates of banks' investment securities and securities gains and losses based on those estimates are reflected in share prices in comparison with historical costs. Using a "horse race" regression model with the market value of equity as the dependent variable while fair values and book values (for historical cost) were employed as explanatory variables, she found that the fair value estimates of such securities were more value-relevant when compared to their historical cost equivalents. She also employed a returns model to examine the value-relevance of investment securities fair value gains and losses. The findings indicate that banks' investment securities fair values are relevant and reliable to investors, and that bank share prices act as if the fair values have more information content than historical costs. The evidence also suggests that historical costs provide no explanatory power incremental to fair values. However, the regression coefficients associated with fair value securities gains and losses were, insignificantly different from zero. This suggests that fair value securities gains and losses are not value-relevant and that they have less relevance and reliability than other components of the income (profit and loss) statement. The reason for this insignificance was put down first, to the estimation errors associated with the banks' fair value measurement procedures. This raises reliability concerns for fair value estimates. Second, the issue of correlated omitted variables suggests that securities gains and losses may have been offset by unrecognised gains and losses on other assets and liabilities.

Ahmed and Takeda (1995), following Barth (1994), argued that after controlling for the effects of other (on-balance sheet) net assets, the unrealised gains and losses and realised gains and losses of banks' investment securities had significant positive effects on bank stock returns. This is consistent with the omitted variables bias explanation for the insignificant effects of unrealised gains and losses on bank stock returns observed in Barth (1994). They employed a market valuation model with emphasis on the change in the market value of investment securities decomposed into realised gains and losses and the change in unrealised gains and losses during the period. These decompositions were incorporated into a changes market valuation of equity model (bank returns) after incorporating proxies to control for the effects of other on-balance sheet net assets resulting from interest rate changes. They found that after controlling for the interest rate sensitivity of other (on-balance sheet) net assets, changes in unrealised gains and losses have a significant positive effect on bank stock returns. Furthermore, they found that realised gains and losses have a significantly positive effect on bank stock returns in normal periods, but in periods of low earnings and capital ratios the coefficient on realised gains and losses is significantly lower.

Petroni and Wahlen (1995) used a sample of 56 publicly-held property-liability insurers operating over the period from 1985 until 1991 and empirically assessed the relationship between the fair values of equity and fixed maturity debt securities and share prices of property-liability insurers, after controlling for the historical cost of these securities. They found that property-liability share prices can be explained by fair values of equity investments and U.S. treasury investments. However, fair value disclosures for other types of investment securities (e.g. municipal and corporate bonds) do not explain share prices beyond historical costs. Their results suggest that the reliability of fair value estimates for different types of securities affects the value-relevance of the related disclosures.

Carroll, Linsmeier, and Petroni (2003) studied the value-relevance of fair value accounting relative to historical cost accounting for financial instruments held by a sample of 143 closed-end mutual funds over the period from 1982 until 1997 to provide evidence on the reliability of fair value measurements. They found a significant association between stock prices and the fair value of investment securities and between stock returns and fair value security gains and losses even after controlling for historical costs. To examine whether differences in the perceived reliability of the investment security fair values affected investors' assessments of the efficacy of the information, they examined the association between stock price metrics and fair values across different fund types including publicly held equity securities from G7 countries, equity securities other than those publicly held from G7 countries, U.S. government or municipal securities and corporate bonds. They found in all cases that there is a significant association between the stock price metrics and fair values suggesting that the need to estimate fair values for securities traded in thin markets, such as private or non-G7 equities [32] does not cause the incremental value-relevance of fair value information to be eliminated. Their findings, they believe, make the correlated omitted variables explanation plausible for the insignificance of fair value estimates in prior

[32] This is what level 3 fair values under SFAS 157 today would look like.

value-relevance studies. Carroll *et al.* (2003) obtain empirical results that complement those obtained by Petroni and Wahlen (1995) showing that fair value estimates could be reliable even in non-active markets.

Eccher *et al.* (1996) using fair value data disclosed under SFAS 107: "Disclosures about Fair Value of Financial Instruments", for a sample of U.S. bank holding companies (with $US150 million in total assets or more) for 1992 and 1993 suggest that the difference between fair values and the book values of financial instruments are associated with market-to-book ratios. The findings however were strongest for securities as other financial instrument fair value disclosures (e.g. net loans, deposits and long-term debt) were only value-relevant in restricted settings. They also benchmarked their findings with control variables based on the "CAMELS" international bank-rating system which represents "C" for Capital adequacy; "A" for Asset quality; "M" for Management quality; "E" for Earnings; "L" for Liquidity and "S" for Sensitivity to market risk. Nelson (1996) also conducted a similar analysis using SFAS 107 data but could not find a significant association between reported fair values of loans, deposits, long-term debt or net-off balance sheet financial instruments with the market value of equity. She found incremental explanatory power for the reported fair values of investment securities relative to their book values (historical cost) only in a limited setting before controlling for return on equity (ROE) and growth in book value. Her results suggest that the value-relevance of investment securities' fair values noted in prior research may have been driven by the omission of proxies for future profitability from the models.

Barth, Beaver, and Landsman (1996) on the other hand provide evidence that fair value estimates of loans, securities and long-term debt disclosed under SFAS 107 provide significant explanatory power for bank share prices beyond that provided by related book values. They found, in contrast to Eccher *et al.* (1996) and Nelson (1996) that the differences between disclosed fair values and book values of securities, loans and long-term debt are value-relevant, but those for deposits and off-balance sheet items are not. They obtained relatively stronger findings using a set of conditioning variables specific to the banking industry and the provisions of SFAS 107 and by permitting the coefficient on the fair value of loans to vary according to the financial condition of the bank. In particular, proxies for the core deposit intangible asset, nonperforming loans and interest-sensitive assets and liabilities when included, permitted the coefficient on the book value of equity to vary according to the composition of banks' assets and liabilities. They employed a proxy for regulatory capital to test the financial health across banks based on a "first difference" specification (meaning the change between 1992 and 1993 amounts) and varied this equation on the regulatory capital proxy. Sensitivity checks used in this study include employing December share prices instead of the April share prices that they had used in earlier regressions and also reducing the number of conditioning variables. They also ran a regression using the market value of equity as the dependent variable and book value of equity as an additional independent variable. Finally, in another regression they also included proxies for profitability and growth. The results were robust to these additional tests.

Venkatachalam (1996), utilising banks' derivatives disclosures under SFAS 119, employed a similar model to Eccher *et al.* (1996) with the market value of equity as the dependent variable and the net market value of off-balance sheet assets and liabilities included as one of the explanatory variables. The findings suggest fair value estimates for derivatives help explain the cross-sectional variation in bank share prices and that fair values have incremental explanatory power over and above the notional amounts of derivatives. Park, Park, and Ro (1999) analysed a pooled sample of 222 U.S. bank holding companies encompassing 455 firm-years from 1993 until 1995 and showed that securities' value differences (fair value less book values) based on the SFAS 115 intent-based classification of securities - available-for-sale (AFS) and held-to-maturity (HTM) - explains the market value of bank equity when both the levels and changes in the value differences were considered. Their findings show that value differences of AFS securities are more closely related than HTM securities to value differences of bank equity and that the explanatory power of value differences significantly increases when AFS and HTM securities are examined separately, rather than in aggregate. They also find that value differences of AFS securities are related to one-year-ahead earnings, while in comparison, there is no evidence that HTM securities are related to one-year-ahead earnings.

However, Khurana and Kim (2003) using a relative model[33] for fair value disclosures under SFAS 107 and SFAS 115 for a sample of bank holding companies (BHCs) from 1995 to 1998 could not detect a discernible difference in the informativeness of bank fair value measures, relative to historical cost measures for their entire sample. They did find that for small BHCs and those with no analyst following, that the historical cost measures of loans and deposits are more informative than fair values. In contrast, fair value of available-for-sale securities explains equity values more than historical cost. They concluded that their results are consistent with the notion that fair value is more (less) value relevant when objective market-determined fair value measures are (not) available. They also suggested that simply requiring fair value as the reported measure for financial instruments may not improve the quality of information for all

[33] That is comparing the relative explanatory power (R^2) of fair values and historical cost in explaining equity values.

BHCs unless appropriate estimation methods or guidance can be established for financial instruments that are not traded in active markets. This final point is one of the reasons for the issuance of SFAS 157.

Mozes (2002) using a residual-income valuation framework for analysing SFAS 119 derivative fair values showed that the estimated coefficient for the relationship between fair value-book value differences and equity-market values was an inverse function of the valuation multiple for residual earnings. Hence, a negative or insignificantly estimated coefficient on the fair value-book value difference variable could arise even if the fair value-book value differences have a positive relationship with the firm's market value of equity. This finding highlighted that the type of valuation model used in the research design could account for the sensitivity of the results.

Beatty, Chamberlain and Magliolo (1996) studied stock returns of U.S. bank holding companies and insurance companies from an *ex ante* perspective during periods surrounding the adoption of SFAS 115. They found from their event study that bank share prices were negatively affected by events relating to adoption of the standard but found little share price reaction for insurance companies. They attributed their finding to problems with the standard's market value accounting approach. They further found, based on the cross-sectional analysis of event period returns, that banks with more frequently traded investments, longer maturing investments, and investments that were more fully hedged against interest rate changes were the most negatively impacted by the standard.

Cornett, Rezaee, and Tehranian (1996) investigate the impact of twenty-three pronouncements related to fair value accounting rules (SFAS 105, 107 and 115) on equity prices of financial institutions. Like Beatty *et al.* (1996) they document that the announcements that signalled an increased (decreased) probability of issuance of fair value accounting standards produced negative (positive) abnormal stock returns for sample banks. Further, the magnitude of the stock price returns was negatively related to a bank's primary capital ratio and positively related to the ratio of the book value of the investment portfolio to total assets and the ratio of the difference between the market and book value of the investment portfolio to total assets.

Barth and Clinch (1998) employed a sample of the 100 largest companies listed on the Australian Stock Exchange (ASX) as measured by the market value of equity as of June 30 1996 and another randomly selected sample of 250 publicly traded firms each with a market value of equity greater than A$10million as at 30 June, 1996. They then investigated the extent to which different types of re-valued assets of Australian firms are associated with share prices and non-market based estimates of firm value. The non-market based estimates of firm value are based on the present value of analysts' forecasts of future earnings. Their study examines whether the relevance, reliability, and timeliness of Australian asset revaluations differ across types of assets (investments, property, plant and equipment (PPE), and intangibles), or by source or age of the re-valued amount, and whether price and return associations mirror the ability of re-valued amounts to reflect anticipated future profitability. They also investigate whether asset impairments, a type of revaluation permitted under U.S. GAAP, exhibits different relationships with firm value from other asset revaluations, which are not permitted under U.S. GAAP. Their findings suggest that re-valued amounts for financial, tangible and intangible assets are value relevant. They found strong and consistent evidence for relevance in the case of intangible assets and less consistent evidence for PPE, although they found stronger value relevance for plant and equipment than for property suggesting that re-valued amounts for operating assets are more value relevant than for assets less directly related to operations. However, they found little evidence to show that director and independent appraiser-based valuations are viewed differently by investors. This suggests that directors' private information may enhance value estimates despite their potential self-interested financial statement management incentives. With regard to timeliness, they found that several year-old re-valued amounts were value-relevant and finally, their evidence suggests that both upward and downward revaluations are value relevant, although the discretionary nature of asset write-ups through earnings can affect their value relevance. Their results were robust to testing for differences in firm size (large and small firms), analyst following (analyst and no-analyst samples) and low and high asset turnover.

Dietrich, Harris, and Muller (2000) studied the reliability of mandatory annual fair value estimates for the U.K. investment property industry. Employing all firms in the U.K. investment property industry (76 firms) between the years 1988-1996, they found that appraisal estimates understate actual selling prices and are considerably less biased and more accurate measures of selling price (fair value) than respective historical costs. Their results also indicate that the reliability of appraisal estimates (fair values) increase when monitored by external appraisers and Big 6 auditors.

Danbolt and Rees (2008) employed British real estate and investment funds data in order to assess whether fair values are more value relevant than historical costs. The study compared the real estate setting where valuation is more subjective as compared to investment funds. They found that fair value income is considerably more value relevant than historical cost income. However, in the presence of changes in fair value accounting balance sheet values, income measures become largely irrelevant.

Taken together the above studies have looked at the value relevance and reliability of bank fair values and other fair value disclosures in some other industries with the findings, on balance, suggesting that fair value disclosures, especially for actively traded securities, are relevant to the determination of share prices. They also suggest that the fair values are sufficiently reliable (based on the information inputs) to be relevant.

3.4 The Value-relevance of Fair values - The Predictive ability approach

Predictive value is a desirable attribute of an asset (FASB 2010:17). The FASB holds the view that the asset values shown on the financial statements of a firm should be able to communicate some information about the potential future financial performance of the firm (FASB 2010:17). Fair values are regarded as having that attribute (Ball, 2008; Barth, 2006; Tweedie, 2008). However, fair value critics argue that such values, especially where markets are illiquid, are so unreliable as to have no predictive value whatsoever (Leone 2008). It can thus be inferred that the better their predictive ability the more relevant and representationally faithful fair values are likely to be. Financial information has predictive value if it can be used as an input to processes employed by users to predict future outcomes. For example, revenue information for the current year should be useful as a basis for predicting revenues in future years (FASB, 2010:17). Predictive value in the context of the FASB Conceptual Framework is not the same as predictability and persistence as used in statistics which measures the accuracy with which it is possible to forecast the next number (such as analysing forecast errors) in a series and the tendency of a series of numbers to continue to change in the same way as it has changed in the past (FASB, 2010:25).

Studies related to the prediction of future cash flows and earnings have concentrated on non-financial firms and also on whether current earnings and cash flows can predict future operating cash flows (Dechow, Kothari and Watts, 1998; Greenberg, Johnson and Ramesh, 1986; Lorek and Willinger, 1996; Finger, 1994). Barth, Cram, and Nelson (2001) disaggregated earnings into cash flows and six major accrual components and related these components to future cash flows. They found that the cash flow and accrual components of current earnings had significantly more predictive ability for future cash flows than aggregate earnings.[34] Likewise, Kim and Kross (2005) examined whether the ability of earnings to predict future cash flows has been deteriorating or improving over time - in particular, over a period of 28 years from 1973 until 2000. They found that the relationship between current earnings and future cash flows has generally been strengthening over the time period considered in their study. Unlike the capital markets value-relevance line of research and also the cash flow prediction studies reviewed earlier, evaluating the effects of fair values, revaluations of assets/liabilities and whether they possess predictive value with regard to future cash flows as well as earnings have not been addressed extensively in the literature.

Aboody, Barth, and Kasznik (1999) studied the effects of upward revaluations of fixed assets from 1983 until 1995 by U.K. firms (excluding financial institutions) on their future performance over the subsequent one, two and three years, as measured by operating income (earnings) and cash flow from operations. They found a significant association between revaluations and future performance. These results show that current year revaluations (revaluation balances) were significantly positively related to future stock returns. The relationship between revaluations and future performance

[34] Farshadfar and Monem (2012) and Cheng and Hollie (2008) also provide further evidence on whether the components of accruals and operating cash flows help improve the predictive ability of earnings for forecasting future cash flows.

were weaker for higher debt-to-equity ratio firms and also weaker for cross-listed firms, particularly in a more volatile economic period.

Barlev, Fried, Haddad, and Livnat (2007) investigated the motives for asset revaluations in a sample drawn from 35 countries that permit asset revaluations. They also examined the post-revaluation effects on future performance across their sample in a similar way to that of Aboody *et al.* (1999). They found that the motivations for and effects on future performance of such revaluations are not uniform across various country classifications. Using financial firms as their setting, Evans, Hodder and Hopkins (2014) studied investment securities of U.S. banks and found that the accumulated fair value adjustments (i.e. the difference between the fair value and amortized cost) for investment securities of a sample of U.S. commercial banks during the period from 1994 until 2008 were positively associated with the realized income from investment securities in the following period. This suggests that bank fair values have predictive ability for future realized income. Cantrell, McInnis and Yust (2013) looked at the ability of U.S. bank loan fair values to predict credit losses relative to the ability of net historical costs recognised under U.S. GAAP. Overall, they found that net historical loan costs are a generally better predictor of credit losses than loan fair values. Historical cost information was found to be more useful in predicting future net chargeoffs, non-performing loans and bank failures over both short and long time horizons. Two other working papers also look at fair values and the future financial performance of firms. Chen, Sommers, and Taylor (2006) found that the correlation between market data (which they referred to as fair value accounting) and future cash flows was significantly lower than the correlation between accounting book values, earnings and future cash flows. Their conclusion was that full fair value accounting would be detrimental to the predictive ability of accounting numbers. Their sample covers the 20 year period from 1984 until 2003 and they employed all firm-year observations from the merged CRSP/COMPUSTAT database. The model employed comprehensive income as a proxy for fair value adjustments and also used the market capitalisations of firms as fair values. They regressed cash flows from operations a year ahead on comprehensive income and fair values from the previous year and found a lower R^2 compared to when the book value of equity (historical cost) is related to future cash flows.

Hill (2009) focused on financial institutions and evaluated whether financial institutions' current earnings under the SFAS 115 regime (fair value accounting) could predict future cash flows. She found that when fair value assets are a significant proportion of a firm's total assets that the inclusion of fair value adjustments in earnings improves the ability of annual earnings to predict future cash flows. The study focused on how current earnings (net income before extraordinary items) interacted with an indicator variable (*SFAS115*) which was 1 for firm years after the implementation of SFAS 115 and 0 otherwise. The study did not expressly test for a relationship between the fair value components of the banks' net assets and the banks' future cash flows or future earnings. Rather, it looked at how current earnings in a fair value environment (SFAS 115 regime) affected future cash flows. Her study was also subject to limitations such as omitted variables bias and the instability of the market during the time period under investigation and thus included more subjective applications of fair values.[35]

Bratten, Causholi and Khan (2012) examine whether the extent to which a bank holding company has applied fair value accounting impacts the ability of reported

[35] Another issue was the inability to add back depreciation to the cash flows computed because of lack of data and not making adjustments for early adoption of SFAS 115 by some banks.

earnings to predict future cash flows and future earnings. They employ a balance sheet approach (which employs the ratio of total assets and liabilities reported on a fair value basis to the total assets reported by the bank) and an income statement approach (which employs the use of two alternative measures of reported income - net income [that excludes many fair value adjustments] and comprehensive income which includes such fair value adjustments). Their findings suggest that increased application of fair value accounting in financial reporting enhances the ability of earnings to predict future cash flows. However, they find mixed evidence with respect to fair values improving the ability of earnings to predict future earnings. They also find that the ability of fair value accounting to enhance the predictive ability of earnings varies with firm and economic characteristics associated with the reliability and relevance of fair value estimates.

Overall my review of the relevant literature shows that there is mixed evidence on the ability of bank fair values to predict future cash flows and earnings. However, an answer to this issue is important to the fair value accounting debate going forward.

3.5 Fair Values and Managerial Discretion

Beaver and Venkatachalam (2003)[36] examined the capital market pricing coefficient of the non-discretionary, discretionary and the noisy components of a sample of 300 U.S. commercial bank loan fair values. They found that the pricing coefficient associated with the discretionary loan component of fair values was negative when managerial intent showed opportunistic behaviour. They also found evidence that the relevance and reliability of loan fair values differs across the three components.

[36] Nissim (2003) found evidence that banks manage their loan fair values. The estimated extent of such overstatement of loan fair values was negatively associated with regulatory capital, asset growth, liquidity and the gross book value of loans but positively associated with changes in the rate of credit losses.

Bernard, Merton, and Palepu (1995) looked at the Danish experience with mark-to-market accounting for banks. Using a sample of 1,035 observations for all Danish banks covering the period from 1976 until 1989, they found no compelling evidence that price adjustments (which include the major realized and unrealized gains and losses on investments and some off-balance sheet positions) are manipulated, especially for the purpose of avoiding regulatory intervention. In addition to this, they found that the Danish mark-to-market accounting system produced numbers that are more reliable indicators of value (and hence, have value-relevance) than the historical-cost numbers reported in the U.S. system. However, they did acknowledge the vast differences between the U.S. and Denmark in terms of the number of banks, complexity of asset structures and also political, regulatory and auditing practices and conventions.

Danbolt and Rees (2008), using U.K. data on real estate and investment funds, suggests that fair values are highly relevant and largely unbiased when the fair values are unambiguous - such as investment companies' fair values which can be obtained in a fairly straightforward manner. However for real estate funds whose fair values could be ambiguous and not clear-cut, value relevance will be lower and biased accounting in the form earnings manipulation may occur. Dietrich *et al.* (2000) also found that managers choose among permissible accounting methods to report higher earnings, that they time asset sales to smooth reported earnings changes, smooth reported net asset changes and boost fair values prior to raising new debt.

3.6 Fair Value Accounting and the last two Economic Recessions

During the 2001 economic downturn the FASB standards on fair value of financial instruments, SFAS 107, 115, 119 and 133 were on issue.[37] In contrast to 2001, the recent recession has evoked a fierce debate about fair value accounting and the implementation of SFAS 157 - in particular in relation to banks. It is hard to disagree with the comment of Ryan (2008a):

> "It almost seems that the credit crunch was sent to serve as FAS 157's trial by fire".

This has led researchers to address the following questions:

1. Were bank fair values value-relevant during the recession (based on capital market reactions)?
2. Is fair value accounting pro-cyclical?

The first question is the same question that other researchers have tried to answer in respect of other periods for (mainly) non-bank entities. However, this question was asked using the new SFAS 157 classification of fair values, in order to estimate the relative weights of level 1 fair values based on observable inputs (mark-to-market), level 2 fair values based on observable inputs of identical assets and level 3 fair values based on models and subjective valuations of firms. An important objective of this empirical work is to find which of the three levels was most value-relevant and under

[37] Eccher *et al.* (1996) had mentioned the definition problem of fair values in their study stating that fair value estimates were subject to measurement error and managerial discretion since the set of generally accepted principles for fair value accounting was *not well defined.* The recent SFAS 157- Fair Value Measurements, was drawn up to address this particular problem. However, the levels classification only shifted such fair value estimation challenges to the level 3 classification of fair values emphasising that there will always be some values that cannot be objectively determined from an active and fully efficient market.

what circumstances could such value-relevance, especially for level 3 valuations, be increased. The second question relates to the effects (if any) of fair value accounting during economic crises on the stability of the economy, contagion effects and systemic risk; basically asking did fair value accounting (SFAS 157) make a bad situation (i.e. the global financial crisis) worse? These issues were discussed in more detail in section 2.6 of Chapter 2.

3.6.1 The 2001 U.S. Economic Recession: The Dotcom Bubble

In 2001 a decade of U.S. economic growth came to an end. Aggregate industrial production slowed and the huge investment in the high-tech sector following technological advances in software development, wider use of the internet and soaring growth in online companies started to slow. The U.S. business cycle had peaked in March 2001 and the U.S economy went into decline from that point onwards for the next 2 quarters. The National Bureau of Economic Research declared that the recession commenced in April 2001 (NBER, 2001) and effectively lasted for the next 2 quarters with unemployment rising marginally, especially in the manufacturing, transportation, communication, utilities and construction industries (Washington State, 2002). This recession was short and the finance, insurance and real estate sectors were largely isolated from it, which is in stark contrast to the 2007 recession which saw these sectors at the centre of the economic recession (Schuermann, 2004).

3.6.2 The 2007 Global Financial Crisis

The 2007 recession started with a crisis in the subprime mortgage market but developed into a liquidity and credit crisis. As Ryan (2008b) puts it:

> "The subprime crisis began in earnest in February 2007 and has entered its second year with a vengeance. In July 2007, the subprime crisis ended a three-year period of unprecedented global liquidity and spawned the credit crunch. Since then, market illiquidity has become broad and severe in several distinct waves over time, and now extends well beyond subprime positions …. Notably, there have been observable feedback effects between the subprime crisis and the credit crunch. As firms have announced losses on subprime positions, debt markets have become averse to holding those positions and increasingly illiquid, causing the fair values of the positions to decline further and become more difficult to measure".

The U.S. economy and indeed the global economy are both still reeling from the effects of the recession and fair value accounting has been blamed by some for exacerbating the crisis (Boyer, 2007; Wallison, 2008). However, others have said it did not cause the crisis and neither did it make it worse; instead, it did provide warning signals of the approaching crisis which was waiting to happen in any case considering the risky and high leverage practices of financial institutions at the time (Ball, 2008; Tweedie, 2008).

3.7 Value Relevance of fair values - Post SFAS 157

Song, Thomas and Han (2010), using quarterly reports of banking firms in 2008, found that the value relevance of level 1 and level 2 fair values was greater than the value relevance of level 3 fair values. They also found evidence that the value relevance of fair values, particularly level 3 fair values, was greater for firms with strong corporate governance.[38] Goh, Ng and Yong (2009) obtained similar results to those of Song *et al.*

[38] Fiechter and Novotny-Farkas (2011) using a global sample of 322 banks that apply IFRS found that the pricing of fair values varies with firm-specific and institutional factors and also, that fair values experienced a substantial discount during the 2007 financial crisis. Liao, Kang, Morris and Tang (2010)

(2010) concluding that investors priced mark-to-model assets (level 3 fair values) lower than other fair values and investor pricing of such assets also declined over the course of 2008 as market concerns about illiquidity and information risk associated with such assets increased. Kolev (2008), employing the first 2 quarters of 2008, also found evidence that investors still found level 3 fair values value-relevant; they just found level 3 fair values less value-relevant when compared to level 1 and 2 fair value estimates. Other fair value accounting studies post SFAS 157 discuss whether the greater information risk associated with the levels classification of financial instruments' fair values leads to higher costs of capital (Riedl & Serafeim, 2011); examine whether banks used discretion in loan loss provisions and fair value estimates to manage earnings during the 2008 financial crisis (Fiechter and Meyer, 2011) and also whether the amendment made by the IASB to IAS 39 to grant companies permission to abandon fair value recognition for selected financial assets was utilised by companies and whether this was beneficial to them (Bischof *et al.*, 2011).[39]

It is important to note that SFAS 157 did not increase the number of assets to be fair valued. It only gave additional guidance on existing assets already subject to valuation at fair value (Shaffer, 2010:6). Hence, it would be a useful exercise to compare the effects of the new standard on the predictive value of bank fair values pre SFAS 157 and post SFAS 157.

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found for a sample of U.S. banks that information asymmetry (proxied by bid-ask spread) was positively and significantly associated with total fair value net assets (based on the levels classification of SFAS 157) and loan loss provisions. However, the effect of the loan loss provisions on information asymmetry among equity investors was stronger than the influence of fair value accounting during the 2008 global financial crisis.

[39] Studying SFAS 159 (which was introduced after SFAS 157), which granted an option to firms to have full discretion over electing to report specified financial instruments at fair value on a contract-by-contract basis, Guthrie, Irving, and Sokolowsky (2011) could not find evidence of systematic opportunistic election among the sample of adopters of the fair value option. They also found that in only a few cases concentrated among early adopters with an earnings shortfall did such firms experience a significant improvement in their current or future earnings.

3.8 Summary

The literature review presented in this chapter compared the theoretical case for the implementation of fair value accounting to the other measurement bases which have been suggested in the literature. It also reviewed the empirical literature particularly in relation to the value relevance of fair values. It also considered the principal features of the 2001 and 2007 economic recessions and the impact that fair value accounting procedures might have had in prolonging the adverse effects of these recessions.

The theoretical developments surrounding fair value accounting suggest that fair values - especially when derived from active markets - are more relevant to the users of financial statements when compared to historical costs. Prior research on the period before the introduction of SFAS 157 in November, 2007 found that the explanatory power of bank fair values when compared to traditional historical costs are more value-relevant based on capital market reactions. There is however a very limited literature on the relationship between fair values and the future performance of firms in terms of future cash flows and earnings. Even where there is, as for example in Aboody *et al.* (1999), the focus is on non-financial firms and the evidence from the papers looking at the predictive ability of financial firms' fair values is mixed and contradictory.

The literature subsequent to SFAS 157 which coincided with the 2007 global financial crisis focused on whether the levels classification of fair values was value-relevant. The results generally support the hypothesis that there is a more significant association between level 1 and level 2 classified fair values than level 3 fair values. Recall that level 3 fair values are derived on the basis of models rather than in an active market situation. This literature has not examined whether these levels classified fair values have a direct relationship with the future cash flows and earnings of firms. In particular, the existing research has not considered the relationship between banks' reported fair values and their future performance over the period coinciding with the global financial crisis and also, how market illiquidity could impact on such a relationship. The next chapter develops hypotheses to address these and several other gaps identified in the literature review.

CHAPTER FOUR

THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

The literature review in chapter three shows that there has been limited research on the relationship between banks' reported fair values and their future performance. Even where studies have endeavoured to look at this issue, the results have provided mixed and often inconsistent evidence. Moreover, no study has examined the relationship between levels classified bank fair values (based on SFAS 157) and banks' future cash flows and earnings over the period of the financial crisis between 2008 and 2010. Based on the summary of the literature provided in chapter three and with the application of the efficient market hypothesis, the market valuation model in concert with agency theory and the theory of managerial incentives, this chapter develops hypotheses to examine the link between bank financial instrument fair value disclosures and bank financial performance with respect to future cash flows and future earnings.[40]

Specifically, the hypotheses developed in this chapter address whether there is a significant relationship between the on-balance sheet financial instrument fair values reported by banks and their future cash flows and earnings. Also this relationship is considered in light of the 2008-2010 global financial crises and the levels classification of fair values under SFAS 157. The analysis begins in section 4.1 with a discussion of the conceptual ideal of decision-usefulness which underpins the fair value paradigm and the efficient market hypothesis and which gives credence to the fair value (based on exit prices) reporting approach espoused by the FASB and IASB. I then summarise and discuss the theoretical framework between the market value of bank equity and the

[40] Future cash flows and future earnings are 1, 2 and 3 year ahead earnings/cash flows for annual data and 1, 2 and 3 quarters ahead for quarterly data. Hence if the "current" year was 1996, future cash flows and earnings would be cash flows and earnings in years: 1997, 1998 and 1999, respectively; while if the "current" quarter was April 2008 - June 2008, future cash flows and earnings would be for the quarters ending in September 2008, December 2008 and March 2009, respectively.

fair values of assets and liabilities as summarised in bank published financial statements as it has been developed in the academic literature. In section 4.2, agency theory is used to explain why managers have incentives to over (or under) estimate reported fair values and of how this could lead to systematic biases in the fair values summarised in bank published financial statements. Section 4.3, develops a valuation model based on the future cash flows a firm expects to generate and links these cash flows to the fair values summarised for the firm's assets and liabilities in its financial statements. Section 4.4, uses the valuation model formulated in section 4.3 to develop testable hypotheses about possible relationships between a firm's prospective cash flows and/or earnings and the fair values summarised in the firm's published financial statements. In this section the hypothesis regarding the levels classification of fair values under SFAS 157 and their association with the future quarterly performance of banks during the 2008-2010 global financial crises was also developed. A summary of the chapter is provided in section 4.5.

4.1 Decision-Usefulness, Efficient Market Hypothesis and Firm Value

As discussed in Chapter two, the Conceptual Frameworks developed by both the FASB and the IASB are based on the principle of decision-usefulness. This is highlighted in the primary quality that accounting information must be useful for decision-making and for it to be useful, such information must be relevant. As explained by Hitz (2007), standard setters have taken an economic view of measurement and this favours the fair value paradigm that utilises the market price as the relevant metric. The reason that market price is assumed to be relevant is because of the efficient market hypothesis - at least at the semi-strong form level (Hitz, 2007). In simple terms, the efficient markets hypothesis states that a market in which prices fully reflect all available information is regarded as efficient (Sharpe, 1964; Fama, 1970, 1991; Praetz, 1975). The market price is believed to reflect available information based on the "information aggregation hypothesis" which says that the market price aggregates in an efficient and unbiased manner the expectations of investors in the market concerning the cash flow patterns of the assets and liabilities appearing on a firm's financial statements (Hitz, 2007). Ball and Brown (1968: 160-161) summarise this idea in the following terms:

> "An impressive body of theory supports the proposition that capital markets are both efficient and unbiased in that if information is useful in forming capital asset prices, then the market will adjust asset prices to that information quickly and without leaving any opportunity for further abnormal gain. If, as the evidence indicates, security prices do in fact adjust rapidly to new information as it becomes available, then changes in security prices will reflect the flow of information to the market. An observed revision of stock prices associated with the release of the income report would thus provide evidence that the information reflected in income numbers is useful."

Thus, under the semi-strong form of the efficient markets hypothesis, the market price of a firm's equity will reflect the fair values of its assets and liabilities as summarised in its published financial statements. This simple idea has had a profound impact on the theoretical framework which informs the value relevance models that have been employed by researchers and others to test for the impact of fair value disclosures. This model is usually motivated in terms of the following simple valuation identity:

$$MVE_t = \sum_{i=1}^{N} MVA_{it} - \sum_{i=1}^{M} MVL_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Here MVE_t is the market value of equity at time *t*, MVA_{it} represents the market value of asset *i* at time *t*, *N* is the number of asset classifications appearing on the firm's balance sheet at time *t* (Eccher, *et al.*, 1996; Barth, 1991; Barth, 1994), MVL_{it} represents the market value of liability *i* at time *t* and *M* is the number of liability classifications appearing on the firm's balance sheet at time *t*. The basis for this approach is that the present value of the expected future cash flows of a firm can be represented by aggregating the individual market values of its assets minus its liabilities.

This approach is also emphasized in how fair value is defined conceptually by both the IASB and the FASB as the "exit price" of a firm's individual asset and liability classifications which in turn, should equate to a firm's market price. The evidence for this is extensive in the U.S. banking industry as banks have been required to disclose the estimates of the fair values of their financial assets and liabilities since 1992, following the introduction of SFAS 107. Since a bank's balance sheet consists mostly of financial instruments, we can restate equation 1 in terms of their fair value estimates under SFAS 107 as follows:

$$MVE_t = \sum_{i=1}^{N} a_{it}FVA_{it} - \sum_{i=1}^{M} b_{it}FVL_{it} \dots\dots\dots\dots\dots\dots\dots \quad (2)$$

where FVA_{it} is the fair value of asset *i* at time *t*, FVL_{it} is the fair value of liability *i* at time *t* and the market's valuation coefficients based on the banks' reported fair values are measured by a_{it} and b_{it}, respectively. The market's valuation coefficients measure the way the market values the estimated fair values disclosed by banks as such disclosures may not be taken at face value by market participants. Moreover, this model can be expanded as a result of the levels classification based on the fair value hierarchy introduced by SFAS 157 in November, 2007. Thus, when the above model is modified in order to take account of the levels classification we have:

$$MVE_t = \sum_{i=1}^{N_1} a1_{it}L1FVA_{it} + \sum_{i=1}^{N_2} a2_{it}L2FVA_{it} + \sum_{i=1}^{N_3} a3_{it}L3FVA_{it} -$$

$$\sum_{i=1}^{M_1} b1_{it}L1FVL_{it} - \sum_{i=1}^{M_2} b2_{it}L2FVL_{it} - \sum_{i=1}^{M_3} b3_{it}L3FVL_{it} \quad \ldots\ldots\ldots\ldots\ldots.. (3)$$

where $L1FVA_{it}$ is the level 1 fair value asset i (based on quoted prices) at time t and N_1 is the number of level 1 asset classifications, $L2FVA_{it}$ is the level 2 fair value asset i (based on identical asset prices) at time t and N_2 is the number of assets classified level 2, and $L3FVA_{it}$ is the level 3 fair value asset i (based on modelled prices) at time t and N_3 is the number of level 3 asset classifications. Moreover, $L1FVL_{it}$ is the level 1 fair value liability i (based on quoted prices) at time t and M_1 is the number of level 1 liability classifications, $L2FVL_{it}$ is the level 2 fair value liability i (based on identical liability prices) at time t and M_2 is the number of level 2 liability classifications and $L3FVL_{it}$ is the level 3 fair value liability i (based on modelled prices) at time t and M_3 is the number of level 3 liability classifications. Finally, $a1_{it}$, $a2_{it}$, $a3_{it}$, $b1_{it}$, $b2_{it}$ and $b3_{it}$, are the valuation coefficients for each level of fair value asset and liability classification, respectively. As previously noted in chapter two, the FASB brought in the levels classification because it believed there were issues regarding the reliability of some fair value estimates. Hence, we can expect that the valuation coefficients $a1_{it}$ to $b3_{it}$, would differ in accordance with the levels classification of the fair value estimates. In other words, level 1 fair value estimates would be expected to have a valuation coefficient close to 1 while level 3 fair value estimates may have a valuation coefficient that is significantly different from 1. The fair value estimates are expected to utilise the market values of the individual assets and liabilities as inputs in the estimation process as much as possible in order to abide by the spirit of the exit price definition of fair values. However, some of these estimates are subject to managerial discretion and measurement errors. This in turn means that the moral hazard of managerial incentives could be manifested in the estimation process.

4.2 Agency Theory, Managerial Incentives and Financial Performance

Agency theory describes the relationship in which one party (the principal) delegates work to another (the agent), to perform the specified work (Eisenhardt, 1989). Jensen and Meckling (1976) describe this relationship as a contract where the shareholders (the principal) engage the managers (the agent) to manage the firm's operations in an efficient and effective way. A major problem that can result from this agency relationship is the problem of information asymmetry between the managers and shareholders, as managers may possess superior information about the current and expected future performance of the firm when compared to the information available to shareholders. This information asymmetry presents a situation where the managers are incentivised to project a favourable picture of the firm in order to maximise the financial performance of the firm which in turn would likely benefit the managers in compensation terms and possibly longer tenure at the helm of the firm's affairs. This problem could be further entrenched where moral hazard arises when managers have incentives to maximise their own interests at the shareholders' expense.

As mentioned in section 4.1 above, banks are required to disclose the estimated fair values of their financial assets and liabilities and an argument could be made that bank managers may have incentives to show fair value estimates that promote their own interests. This in turn would more than likely lead to biases in the information summarised in a firm's published financial statements.[41] Evidence for this is provided by Beaver and Venkatachalam (2003) who partition U.S. commercial bank loan fair values into non-discretionary, discretionary and noisy components. They found that the pricing coefficient associated with the discretionary loan component of fair values was negative when managerial intent showed opportunistic behaviour. Similarly, Nissim (2003) found evidence that banks manage their loan fair values. The estimated extent of such overstatement of loan fair values varied with regulatory capital requirements and changes in the rate of credit losses. Studies have also shown that when certain accounting information is very subjective in nature and managers' discretion over it is allowed, that managers may be more likely to generate intentional biases in their estimates of accounting aggregates (e.g., Aboody, Barth and Kasznik, 2006; Bartov, Mohanram and Nissim, 2007).

Thus, if bank managers estimate fair values (especially for model-based estimations) that reflect their own biases, and considering that such fair values should closely reflect the expected future cash flows of the net assets of the banks, then one can predict that the more the fair value estimates are incorrectly estimated the more divergent will be the relationship between the estimated fair values and the realised future cash flows that would be generated by the current net assets today. Hence, the more measurement error that exists in the estimation of fair values which could be as a result of managerial discretion and also from genuine measurement error, especially where inputs into the estimation process are not readily available (for example if markets are illiquid, thus making quoted prices difficult to obtain), the less will be the association between the

[41] The direction of the bias would depend on a number of factors. For example if executive compensation is based on the rate of return, then net equity may be understated, earnings may be overstated or net equity may be understated and earnings overstated.

current estimated fair values and the actual future performance of the net assets (in terms of future earnings and future cash flows).

Moreover, the relationship between future earnings and current fair values could also be clouded by managers' ability to distort a firm's reported earnings through the manipulation of discretionary accruals. Accruals arise from the timing difference between the transaction event and the transfer of cash and can be implemented by either deliberate accounting selection or discretionary accounting estimations (Dechow and Schrand, 2004:41). Here, Watts and Zimmerman (1978) develop a positive accounting theory which suggests that managers have incentives to choose accounting policies that maximise their personal wealth. In particular, Watts and Zimmerman (1978) summarise empirical evidence which is compatible with the hypothesis that managers are motivated to choose accounting policies which will decrease the tax payments made by the firm and/or reduce the costs incurred by the firm, thereby increasing the firm's earnings and the benefits they receive under the firm's earnings related compensation plans. Likewise, Cook, Huston and Kinney (2011) show that manufacturing firms use different methods of inventory valuation (and in particular, the allocation of overheads in product costing) to shift fixed costs between cost of goods sold and inventory accounts, thereby managing the firm's earnings either upwards or downwards according to whether it is in the firm management's own personal interest to do so. Furthermore, Hagerman and Zmijewski (1979) summarise empirical evidence which is compatible with the hypothesis that managers choose accounting policies in relation to inventory, depreciation, and pension cost amortization in order to manipulate the firm's earnings in such a way as to increase the benefits arising under their compensation packages.

There is also a steadily expanding empirical literature which shows that managers use accounting judgments in order to manipulate discretionary accruals. Here, Bishop and Eccher (2000) provide evidence that firms manage their depreciation charges (and in particular, estimates of the useful lives of long-lived assets) in order to manipulate the firm's earnings to their own advantage. Moreover, McNichols and Wilson (1988) and Jackson and Liu (2010) find that managers use provisioning (specifically, the provision for bad debts and/or allowances for uncollectible accounts) to manipulate corporate earnings. In particular, Jackson and Liu (2010) use U.S. data covering the period from 1980 until 2004 and show that firms manage their bad debt provisioning in order to increase reported earnings to a level where it either meets or exceeds analysts' earnings forecasts for the firm. Similarly, Shen and Huang (2011) use data relating to 441 firm year observations of Australian commercial banks covering the period from 1991 until 2001 and show that Australian banks manage their loan loss provisions for capital management and earnings management purposes. Shen and Huang (2011) conclude in particular that the reported earnings of Australian banks may not provide a true reflection of their underlying profitability. The important point here is that management's ability to manipulate the accruals component of the firm's earnings figure will more than likely cloud the relationship between current fair values and future earnings. This contrasts with the firm's statement of cash flows where there is much less potential for manipulation by management. Given this, one would expect there to be a much tighter relationship between a firm's current fair values and its future operating cash flows, than would be the case with future operating earnings. This intuition is in fact borne out by the empirical results summarized in chapters six and seven of this thesis.

4.3 Future Cash flows, Future Earnings and Fair Values

Prior discussion shows that fair value estimates are expected to represent the present value of the expected future cash flows associated with an asset or liability (Barth, 2000:19; Ryan, 2008a:12). Thus, if such fair values are the current expression of future net asset performance, there should be a positive association between today's firm fair values and future firm performance, as measured by *ex post* realised operating income and cash flows from operations. This suggested positive relationship however, could be called into question if there is measurement error in the way fair value estimates have been derived or if the estimates of fair values are biased due to manipulation by managers, where such estimates are subjectively estimated.

The economic value of an equity security is equal to the present value of its expected future cash flows, which must also be equal to the market value of the equity security's net assets. This in turn will mean that:

$$MVE_t = \sum_{\tau=t+1}^{\infty} \frac{C_\tau}{(1 + r)^{\tau - t}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(4)}$$

where MVE_t is the market value of equity at time t, C_τ is the expected future cash flow generated by the equity investment at time τ and r is a discount rate. Following Beaver (1998:48-50), I define the permanent cash flow, P_{t+1}, as the constant cash flow whose present value is equivalent to the present value of the expected cash flows generated from the given equity investment. It then follows that:

$$MVE_t = \sum_{\tau=t+1}^{\infty} \frac{C_\tau}{(1 + r)^{\tau - t}} \equiv P_{t+1} \sum_{\tau=t+1}^{\infty} \frac{1}{(1 + r)^{\tau - t}} = \frac{P_{t+1}}{r} \quad \ldots\ldots\ldots\ldots\ldots \text{(5)}$$

Moreover, one can decompose the cash flow earned by an equity security into its permanent component and a deviation (error term) as follows:

$$C_{\tau} = P_{t+1} + \varepsilon_{\tau} \quad \ldots\ldots (6)$$

where ε_{τ} is the error term in relation to the difference between the permanent cash flow and the future cash flow at time τ. One can substitute this latter result into equation 5 in which case we have:

$$MVE_t = \frac{C_{\tau} - \varepsilon_{\tau}}{r} \quad \ldots\ldots (7)$$

for $\tau = t+1, t+2, t+3,$______ .Now without loss of generality consider the one period ahead cash flow in which case we have $\tau = t+1$. Based on the relationships defined in equations 2 through 7 above we then have:

$$\frac{C_{t+1} - \varepsilon_{t+1}}{r} = \sum_{i=1}^{N} a_{it} FVA_{it} - \sum_{i=1}^{M} b_{it} FVL_{it}$$

However, this in turn will be equal to:

$$C_{t+1} = \sum_{i=1}^{N} ra_{it} FVA_{it} - \sum_{i=1}^{M} rb_{it} FVL_{it} + \varepsilon_{t+1} \quad \ldots\ldots (8)$$

Now if one defines the valuation coefficients $\alpha_{it} = ra_{it}$ and $\beta_{it} = rb_{it}$ then we have:

$$C_{t+1} = \sum_{i=1}^{N} \alpha_{it} FVA_{it} - \sum_{i=1}^{M} \beta_{it} FVL_{it} + \varepsilon_{t+1} \quad \ldots\ldots (9)$$

A similar model can be estimated using earnings, as studies have shown that a firm's earnings tend to track a firm's cash flows into the future (Modigliani and Miller, 1961; Kim and Kross, 2005; Dechow, Kothari and Watts, 1998). We would then have:

$$E_{t+1} = \sum_{i=1}^{N} \gamma_{it} FVA_{it} - \sum_{i=1}^{M} \delta_{it} FVL_{it} + \eta_{t+1} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (10)$$

where E_{t+1} is the firm's earnings for the period from time t until time $(t + 1)$, γ_{it} and δ_{it} are valuation coefficients, η_{t+1} is a stochastic error term and the other variables have the same meanings as attributed to them in the cash flow equations (5) through (9).

4.4 Statement of Hypotheses

As argued in sections 4.1 and 4.3, bank reported fair values are expected to have an association with bank future performance. However, this relationship might be compromised if banks report fair values that have been incorrectly estimated due to measurement errors and/or opportunistic behaviour on the part of firm management. Fair value estimation may be further compromised by financial crises where markets become illiquid and valuation parameters become more volatile. Also, given that it has been repeatedly argued that fair values are an extremely important metric for judging future firm performance, I now advance the following hypotheses as the basis for the empirical work that is reported in the later chapters of this thesis:

H1a: The current net asset fair values of on-balance sheet financial instruments of banks are significantly associated with the future years' cash flows of such banks.

H1b: The current net asset fair values of on-balance sheet financial instruments of banks are significantly associated with the future years' earnings of such banks.

Isolating the 2008-2010 global financial crisis period, which also coincided with the introduction of the levels classification of bank fair values as mandated by SFAS 157, I also advance the following hypotheses:

H2a: The current quarter's level 1, level 2 and level 3 net asset fair values of banks are significantly associated with the future quarters' cash flows of such banks.

H2b: The current quarter's level 1, level 2 and level 3 net asset fair values of banks are significantly associated with the future quarters' earnings of such banks.

4.5 Summary

In this chapter, I develop the hypotheses relating bank net asset fair values and their future cash flows and earnings that are to be empirically assessed in subsequent chapters of this thesis. These hypotheses are all based on the decision-usefulness doctrine supported in the FASB and IASB Conceptual Frameworks (FASB, 1980; Staubus, 1999; Hitz, 2007), the efficient market hypothesis and the market valuation model. Agency theory was also employed to explain why firm management may act opportunistically in determining the fair values to be reported in a firm's published financial statements. In the next chapter the research methodology used to assess the validity or otherwise of the hypotheses developed in this chapter will be explained.

CHAPTER FIVE

RESEARCH METHODOLOGY

This chapter describes the research methodology employed to test the hypotheses developed in chapter four about the relationships that exist between bank fair values and the future performance of banks, particularly in terms of the banks' operating cash flows and earnings. Section 5.1 explains the process for selecting the two different study periods on which my empirical analysis is based. The data sources drawn on for the empirical work are outlined in section 5.2. Section 5.3 discusses the selection process for the sample data. The measures of bank fair values, cash flows and earnings are described in section 5.4. The hypothesis testing procedures are discussed in section 5.5 with emphasis on the model specifications for the various cross-sectional regression models employed. The regression diagnostics and robustness analyses that were conducted are also explained in this section. The chapter concludes in section 5.6 with a summary of the research methodology employed.

5.1 Study Period

There are two distinct periods of study for this thesis. The first covers the ten-year period from 1996 to 2005. The second covers the period from 2008 to 2010. The first period of study from 1996 to 2005 employs annual data of U.S. banks with over $US150 million in total assets as of the year 1996. The year 1996 was chosen as the starting point because, SFAS 107, SFAS 115 and SFAS 119[42] - which were key fair value recognition and disclosure standards that relate to U.S. banks - were in place in 1996 and the sample group of banks were already reporting in the notes to their financial statements the fair value estimates of their on-balance sheet financial

[42] These standards were put in place for compliance by U.S. banks by the FASB between years 1991 and 1994.

instruments. Appendix one provides an example of a financial statement extract of one of the sample banks, reporting their fair value estimates in 1996. The ending year of 2005 was selected in order to avoid contamination of the dataset with the second study period. This second period covers the global financial crisis which came into full effect in 2008 and bank financial statements prepared over this period reflect the requirements of SFAS 157, which was introduced in 2007. Considering that the study involves the prediction of future period cash flows and earnings, it is important for the empirical analysis that at least every current firm year net fair value disclosure has corresponding cash flows and earnings information at a minimum level of one period ahead and up to a maximum of three periods ahead.[43] Thus, for example, the annual data for 1996-2005 requires the current net fair value disclosures for 2005 will be related to the future cash flows and earnings in 2006 and 2007.

The second study period from 2008-2010 employs quarterly data on banks of a similar size to those included in the annual dataset covering the period from 1996 until 2005. The period 2008-2010 is unique as U.S. banks were mandated from November 2007 to implement the levels classification of fair value measurement, showing level 1, level 2 and level 3 fair value assets and liabilities in their financial statements as defined in SFAS 157. Appendix two provides an example financial statement extract for one of the sample banks, for the first quarter of 2008, reporting their fair value estimates based on the SFAS 157 levels classification. This second period of study also overlaps with the global financial crisis which adversely affected both the U.S. banking industry and the entire global financial system. This crisis is regarded as having caused illiquidity in the U.S. banking system (Ryan 2008b), and thus obtaining quoted prices for assets and

[43] Data availability is a constraint on the number of periods ahead that one can test the relationship between fair values and future earnings and cash flows. However, with 3 periods into the future, a sample size large enough to guarantee the "degrees of freedom" necessary to conduct my empirical analysis can be obtained.

liabilities that should be classified as level 1, especially, may have been challenging at this time. The combination of the SFAS 157 levels classification for fair value disclosures and the recession resulting from the financial crisis provides the opportunity to investigate the relationship between current quarterly net fair values disclosed under the SFAS 157 levels classification and future quarterly cash flows and earnings. Similar to the requirement imposed on the annual data, every current firm quarter net fair value disclosure based on the levels classification must have corresponding cash flows/earnings at a minimum level of one quarter ahead and up to a maximum of three quarters ahead. Thus the third quarter of 2010 is the last quarter of the study period as the current net fair value disclosures for that quarter would be related to the corresponding future cash flows/earnings in the fourth quarter of 2010. According to the National Bureau of Economic Research (NBER) (2010) the Global financial crisis bottomed out in June 2009 and a gradual economic recovery began. Thus, evaluating how the net level fair value disclosures related to future cash flows and earnings could further provide insights as to the strength of this relationship through both the recessionary quarters and also, the subsequent recovery quarters during this period.

5.2 Data Sources

Selection of data for the first study period from 1996-2005 started with identification of the U.S. banks included from 1996 to 2005 in the COMPUSTAT Bank Fundamentals Annual database. The form 10-K EDGAR files (annual reports) of the identified banks were then searched using the DirectEdgar software extraction engine to obtain fair value disclosures, operating cash flows and earnings information. Financial data such as total assets, tier 1 capital, number of common shares issued, etc. was collected from the COMPUSTAT Bank Fundamentals Annual database. For the second study period from 2008-2010, quarterly data on the fair value of assets and liabilities was obtained from the COMPUSTAT Bank Fundamentals Quarterly database. The other financial information required for the study was also obtained from the same database.

5.3 Sample Selection

U.S. research studies on the value relevance and predictive ability of fair values have usually been based on financial institutions only: mainly bank holding companies (Eccher *et al.*, 1996; Park *et al.*, 1999; Khurana & Kim, 2003; Bratten *et al.*, 2012), commercial banks (Evans *et al.*, 2014) and a mix of various other U.S. banking institutions (Barth, 1994; Song *et al.*, 2010; Barth *et al.*, 1996; Hill, 2009). The preference for banking institutions for this type of study is largely because the banks' balance sheets are made up of the financial instruments which constitute their main line of business. The fair values of these banks' financial assets and liabilities are required by FASB accounting standards to be disclosed in their published financial statements. Moreover, the fair values summarised in these statements could be higher or lower than their historical/amortised costs. On the other hand non-financial entities normally do not have a significant amount of financial assets and liabilities on their balance sheets. These non-financial entities instead, have mostly non-financial items, and FASB standards require these to be carried at their historical cost subject to cumulated depreciation and any impairment adjustments (Hitz, 2007).

With regard to the benchmark size of the banks included in the sample, SFAS 107 implemented a size criterion for financial institutions required to report the fair values of their financial assets and liabilities. This requirement was that institutions shall be obliged to meet the reporting requirements of SFAS 107 if they have total assets in excess of $US150 million (FASB, 1991; Eccher *et al.*, 1996). Despite the minimum size of $US150 million in total assets, there remains an exhaustive set of banks included in the sample as some U.S. banking institutions can be very large with a national presence across the country, while other banks operate on a smaller scale, regionally or in a single state. To differentiate the sample banks based on their relative size, the sample is divided into two groups: 'large banks' with total assets above the median total assets of the sample banks and 'small banks' with total assets below the median (Song *et al.,* 2010; Evans *et al.,* 2014).

5.3.1 Sample Selection: First Study Period, Annual Data: 1996-2005

The COMPUSTAT Bank Fundamentals Annual database provided 512 banks with total assets of $US150million and above as of 1996. The search of 10-K EDGAR files (annual reports) of these banks for fair values of on-balance sheet financial instruments and the required operating cash flows resulted in the deletion of 267 banks as the relevant data were not available. Moreover, the absence of fair value data and related operating earnings resulted in a total of 282 banks being eliminated from the original sample.

The resulting two samples were cross-referenced to the COMPUSTAT Bank Fundamentals Annual database in order to match operating cash flows and operating earnings with additional (mainly, control) variables. After this procedure, there were 238 banks[44] in the sample with future cash flows at time *t+1,* 231 banks[45] with future cash flows at time *t+2* and 212 banks[46] with future cash flows at time *t+3*. The operating earnings sample comprised 223 banks[47] having future operating earnings at

[44] These banks are listed in appendix three.
[45] These banks are listed in appendix four.
[46] These banks are listed in appendix five.
[47] These banks are listed in appendix six.

time *t+1,* 216 banks[48] with future operating earnings at time *t+2* and 195 banks[49] with future operating earnings at time *t+3*.

In terms of firm-years the final samples have a total of 1,229 firm-years for banks having future cash flows at time *t+1*, 1,162 firm-years for banks having future cash flows at time *t+2* and 942 firm-years for banks having future cash flows at time *t+3*. There were also 1,150 firm-years for banks having future operating earnings at time *t+1,* 1,081 firm-years for banks having future operating earnings at time *t+2* and 875 firm-years[50] for banks with future operating earnings at time *t*+3. More detailed information about the sample selection process is summarised in Table 5.1.

[48] These banks are listed in appendix seven.
[49] These banks are listed in appendix eight.
[50] Details regarding these firms years are shown in the appendices three to eight.

Table 5.1 **Sample Selection Procedure for first study period (1996-2005)**						
Selection Criterion	Number of Observations					
Sample banks over a three-year future horizon	Banks with Cash flows at *t+1*	Banks with Cash flows at *t+2*	Banks with Cash flows at *t+3*	Banks with Earnings at *t+1*	Banks with Earnings at *t+2*	Banks with Earnings at *t+3*
Banks with total assets of $US150 million and above as of 1996 information in COMPUSTAT Bank Fundamentals Annual Database	512	512	512	512	512	512
Less: Banks without associated disclosures for fair values of on-balance sheet financial instruments, future operating cash flows and operating income from their 10-K EDGAR filings.	(267)	(267)	(267)	(282)	(282)	(282)
Less: Banks without additional variables information in COMPUSTAT Bank Fundamentals Annual Database	(7)	(14)	(33)	(7)	(14)	(35)
Total banks in the final sample	238	231	212	223	216	195
Total sample firm-years over a three-year future time horizon	1,229	1,162	942	1,150	1,081	875

5.3.2 Sample Selection: Second Study Period, Quarterly Data: 2008-2010

The data for this section of the study was fully obtainable from the COMPUSTAT Bank Fundamentals Quarterly Database. This provided a uniform set of data for both the future cash flow and future earnings relative to the levels classified fair value data.

The banks included in this sample had minimum total assets of $US150 million, and were thus of a similar size to the banks included for the first study period from 1996 to 2005. Based on the initial extraction from the database a total number of 647 banks were identified. After checking for the relevant fair value data, cash flows, operating earnings and other relevant information, 22 banks were deleted leaving a final sample of 625 banks having future cash flows and operating earnings at time *t+1*. For banks having future cash flows and earnings at *t+2*, 45 banks had to be deleted from the initial set of 647 banks because of incomplete information, thus providing a final sample of 602 banks. Lastly, for banks having future cash flows and earnings at *t+3*, 72 banks had to be deleted, leaving a total of 575 banks.

In terms of firm-quarters, the final sample covers a total of 5,730 firm-quarters for banks having future cash flows and operating earnings at time *t+1*, 5,105 firm-quarters for banks having future cash flows and operating earnings at time *t+2* and 4,503 firm-quarters for banks having future cash flows and operating earnings at time *t+3*. A tabulated summary, grouping banks based on the number of firm-quarters they have in the sample relative to the three future quarter periods, is presented in Table 5.2.

Table 5.2: SAMPLE BANKS FOR QUARTERLY DATA FROM 2008 -2010

SAMPLE BANK GROUPS FOR QUARTER *t + 1*	**Firm**	**Firm-Quarters**
Number of banks which have 11 firm-quarters included in the sample	434	4774
Number of banks which have 10 firm-quarters included in the sample	19	190
Number of banks which have 9 firm-quarters included in the sample	7	63
Number of banks which have 8 firm-quarters included in the sample	17	136
Number of banks which have 7 firm-quarters included in the sample	23	161
Number of banks which have 6 firm-quarters included in the sample	16	96
Number of banks which have 5 firm-quarters included in the sample	21	105
Number of banks which have 4 firm-quarters included in the sample	14	56
Number of banks which have 3 firm-quarters included in the sample	24	72
Number of banks which have 2 firm-quarters included in the sample	27	54
Number of banks which have 1 firm-quarters included in the sample	23	23
TOTAL	625	5730

SAMPLE BANK GROUPS FOR QUARTER *t + 2*	**Firm**	**Firm-Quarters**
Number of banks which have 10 firm-quarters included in the sample	434	4340
Number of banks which have 9 firm-quarters included in the sample	19	171
Number of banks which have 8 firm-quarters included in the sample	7	56
Number of banks which have 7 firm-quarters included in the sample	17	119
Number of banks which have 6 firm-quarters included in the sample	23	138
Number of banks which have 5 firm-quarters included in the sample	16	80
Number of banks which have 4 firm-quarters included in the sample	21	84
Number of banks which have 3 firm-quarters included in the sample	14	42
Number of banks which have 2 firm-quarters included in the sample	24	48
Number of banks which have 1 firm-quarters included in the sample	27	27
TOTAL	602	5105

SAMPLE BANK GROUPS FOR QUARTER *t + 3*	**Firm**	**Firm-Quarters**
Number of banks which have 9 firm-quarters included in the sample	434	3906
Number of banks which have 8 firm-quarters included in the sample	19	152
Number of banks which have 7 firm-quarters included in the sample	7	49
Number of banks which have 6 firm-quarters included in the sample	17	102
Number of banks which have 5 firm-quarters included in the sample	23	115
Number of banks which have 4 firm-quarters included in the sample	16	64
Number of banks which have 3 firm-quarters included in the sample	21	63
Number of banks which have 2 firm-quarters included in the sample	14	28
Number of banks which have 1 firm-quarters included in the sample	24	24
TOTAL	575	4503

5.4 Measures of Bank Fair Values, Cash flows and Earnings

5.4.1 *Bank Fair Values for the annual data from 1996 to 2005*

The fair values for banks in this part of the study are the fair values of on-balance sheet financial instruments reported, in accordance with the disclosure requirements of SFAS 107, in the notes to the financial statements section of the form 10-K reports (the banks' annual report), submitted by the banks to the Securities and Exchange Commission as summarised in the EDGAR database.

5.4.2 *Bank Fair Values for the quarterly data from 2008 to 2010*

In this section of the study, the fair values were the levels-classified fair value disclosures as mandated from November 2007 by SFAS 157. Level 1 classified fair values are derived from the quoted prices of the respective assets and liabilities. Level 2 classified fair values are obtained by using the quoted prices of similar assets and liabilities, where the quoted prices (that is, level 1 fair values) of the given assets and liabilities are not obtainable. Level 3 classified fair values are obtained by the use of model estimation with as much market information as is possible serving as inputs in the estimation process. This model estimation can only be employed where quoted and other prices cannot be used to determine the fair value of the given asset or liability. The levels classified fair values are taken from the quarterly filings of the financial institutions that are included in the COMPUSTAT Bank Fundamentals Quarterly database.

5.4.3 *Cash flows*

Given that the purpose of this study is to examine the relationship between current fair values and the future performance of banks, the measure for cash flows employed in the empirical analysis is cash flows from operating activities or the operating cash flow. This measure represents the net cash banks bring in from on-going regular business activities and is a measure of how well a bank's business is performing on a day to day basis. It is the net cash flow arising from operating activities and it includes interest received, fees and commissions received and other income received in the ordinary course of bank business. To arrive at the net cash provided by operating activities some deductions are made. These include interest paid, cash paid to suppliers and employees, other expenses incurred in the ordinary course of business, and income taxes paid. Mulford and Comiskey (2009) find that, in a study of the fifteen largest independent, publicly traded commercial banks in the U.S. as of December 31, 2008, there was sufficient consistency in the reporting of cash to conclude that the analysis and comparison of operating cash flows across the various banks is a meaningful exercise.

5.4.4 *Earnings*

Following Aboody *et al.*, (1999), the proxy utilised as a measure of performance for the purpose of this study is operating income (i.e. net profit before taxes), which is defined for a bank to be total interest income plus non-interest income less total interest expense, non-interest expense and provision for loan losses. Income tax expense is excluded because of the focus on the operating performance of the banks.

5.5 Hypotheses Testing Procedures

The hypotheses are tested using ordinary least squares to estimate cross-sectional multivariate regression models. The variables involved are continuous in nature and the cross-sectional equations estimated are used to make inferences about the hypothesised relationships between net asset bank fair values and their future cash flows and earnings. The variables employed in the regression models were transformed by the inverse hyperbolic sine function [arsinh(x)] and hence the prefix *AS* was inserted before each transformed variable as shown in the model specifications. Table 5.3 presents the model specifications employed for the annual data covering the period 1996-2005 and Table 5.4 presents the definition of variables.

Table 5.3
Model specifications for the relationships between bank fair values and their future cash flows and earnings for annual data covering the period 1996 to 2005

Future Cash flow model specifications from time *t+1* to *t+3*	
Model 1a	$ASCF_{t+1} = a_0 + a_1ASNFVA_t + a_2ASCF_t + \alpha_t$
Model 1b	$ASCF_{t+1} = b_0 + b_1ASFVA_t + b_2ASFVL_t + b_3ASCF_t + \beta_t$
Model 2a	$ASCF_{t+2} = c_0 + c_1ASNFVA_t + c_2ASCF_t + \gamma_t$
Model 2b	$ASCF_{t+2} = d_0 + d_1ASFVA_t + d_2ASFVL_t + d_3ASCF_t + \delta_t$
Model 3a	$ASCF_{t+3} = e_0 + e_1ASNFVA_t + e_2ASCF_t + \varepsilon_t$
Model 3b	$ASCF_{t+3} = f_0 + f_1ASFVA_t + f_2ASFVL_t + f_3ASCF_t + \zeta_t$
Future Operating Income model specifications from time *t+1* to *t+3*	
Model 4a	$ASOP_{t+1} = g_0 + g_1ASNFVA_t + g_2ASOP_t + \eta_t$
Model 4b	$ASOP_{t+1} = h_0 + h_1ASFVA_t + h_2ASFVL_t + h_3ASOP_t + \theta_t$
Model 5a	$ASOP_{t+2} = i_0 + i_1ASNFVA_t + i_2ASOP_t + \iota_t$
Model 5b	$ASOP_{t+2} = j_0 + j_1ASFVA_t + j_2ASFVL_t + j_3ASOP_t + \kappa_t$
Model 6a	$ASOP_{t+2} = k_0 + k_1ASNFVA_t + k_2ASOP_t + \lambda_t$
Model 6b	$ASOP_{t+2} = l_0 + l_1ASFVA_t + l_2ASFVL_t + l_3ASOP_t + \mu_t$

Thus, in Model 1a, a_0, a_1 and a_2 are the estimated regression coefficients whilst α_t is the stochastic error term. Similarly, in Model 1b, b_0, b_1, b_2, and b_3 are the estimated regression coefficients whilst β_t is the stochastic error term. The coefficients and stochastic error terms associated with all the other models are to be similarly interpreted.

Models 1a, 2a and 3a are used to test the performance impact of the net difference between the on-balance sheet fair value of assets and the on-balance sheet fair value of liabilities on the future operating cash flows of the sampled banks in the future years *t+1, t+2* and *t+3*, respectively. Models 1b, 2b and 3b are employed to test the performance impact of the total on-balance sheet fair value of assets and the total on-balance sheet fair value of liabilities on the future operating cash flows of the sampled banks in the future years *t+1, t+2* and *t+3*, respectively.

In contrast to this, Models 4a, 5a and 6a are used to test the performance impact of the net difference between the on-balance sheet fair value of assets and the on-balance sheet fair value of liabilities on the future operating earnings of the sampled banks in the future years *t+1, t+2* and *t+3*, respectively. Moreover, Models 4b, 5b and 6b are utilised to test the performance impact of the total on-balance sheet fair value of assets and the total on-balance sheet fair value of liabilities on the future operating earnings of the sampled banks in the future years *t+1, t+2* and *t+3*, respectively.

Table 5.4 presents the definitions of the dependent variables (Panel A) and independent variables (Panel B) in relation to Models 1a through 6b.

Table 5.4 **Definitions of Dependent and Independent Variables for annual data covering the period 1996 to 2005 (Panel A).**	
Panel A: Dependent Variables	
$ASCF_{t+1}$	Cash flow from operations in Year 1 (Future Cash flows in the next year)
$ASCF_{t+2}$	Cash flow from operations in Year 2 (Future Cash flows in 2 years' time)
$ASCF_{t+2}$	Cash flow from operations in Year 3 (Future Cash flows in 3 years' time)
$ASOP_{t+1}$	Operating Income in Year 1 (Net Income before Tax in the next year)
$ASOP_{t+2}$	Operating Income in Year 2 (Net Income before Tax in 2 years' time)
$ASOP_{t+3}$	Operating Income in Year 3 (Net Income before Tax in 3 years' time)

Table 5.4 **Definitions of Dependent and Independent Variables for annual data covering the period 1996 to 2005 (Panel B).**	
Panel B: Independent Variables	
$ASNFVA_t$	This is the summation of ten classes of fair value financial instrument assets and six classes of fair value of financial instrument liabilities that are on the balance sheet of the selected banks.[51] This figure can range from large positive values (where the assets are more than the liabilities) to large negative values (where liabilities exceed assets).
$ASFVA_t$	This is the summation of ten classes of fair value financial instrument assets that are on the balance sheet of the selected banks.
$ASFVL_t$	This is the summation of six classes of fair value of financial instrument liabilities that are on the balance sheet of the selected banks.
$ASCF_t$	Current year Cash flow from operations.
$ASOP_t$	Current year Operating Income (Net Income before Tax at time t).

The regression models include the current year cash flow from operations and the current year operating income as an independent variable[52] as there is an expected relationship between the current year cash flows from operations (and current earnings)

[51] A description of each of the specific financial instrument asset and liability classes included in the summation is provided in section 5.5.2, Table 5.8: Panel B, where a model based on the individual financial instrument asset and liability classes is developed.

[52] There is an extant and largely unresolved debate about the potential biases that can arise in parameter estimation with the use of lagged variables. See Wilkins (2014) for an in-depth discussion of this issue.

and associated future cash flows (and future earnings) (Aboody *et al.*, 1999). Thus, by including the current cash flow from operations and earnings in the models as independent variables, I control for the time-series properties of operating cash flows and earnings that can affect future operating cash flows and earnings.

Table 5.5 presents the model specifications used for the quarterly data for the period 2008-2010.

Table 5.5 **Model specifications for the relationships between bank fair values and their future cash flows and earnings for quarterly data covering the period 2008 to 2010**	
Future Cash flow model specifications from time *qt+1* to *qt+3*	
Model 7a	$ASCF_{qt+1} = m_0 + m_1ASNFVAL1_{qt} + m_2ASNFVAL2_{qt} + m_3ASNFVAL3_{qt} + m_4ASCF_{qt} + \nu_{qt}$
Model 7b	$ASCF_{qt+1} = n_0 + n_1ASASSETSL1_{qt} + n_2ASASSETSL2_{qt} + n_3ASASSETSL3_{qt} + n_4ASLIABL1_{qt} + n_5ASLIABL2_{qt} + n_6ASLIABL3_{qt} + n_7ASCF_{qt} + \omega_{qt}$
Model 8a	$ASCF_{qt+2} = o_0 + o_1ASNFVAL1_{qt} + o_2ASNFVAL2_{qt} + o_3ASNFVAL3_{qt} + o_4ASCF_{qt} + \upsilon_{qt}$
Model 8b	$ASCF_{qt+2} = p_0 + p_1ASASSETSL1_{qt} + p_2ASASSETSL2_{qt} + p_3ASASSETSL3_{qt} + p_4ASLIABL1_{qt} + p_5ASLIABL2_{qt} + p_6ASLIABL3_{qt} + p_7ASCF_{qt} + \psi_{qt}$
Model 9a	$ASCF_{qt+3} = q_0 + q_1ASNFVAL1_{qt} + q_2ASNFVAL2_{qt} + q_3ASNFVAL3_{qt} + q_4ASCF_{qt} + \chi_{qt}$
Model 9b	$ASCF_{qt+3} = r_0 + r_1ASASSETSL1_{qt} + r_2ASASSETSL2_{qt} + r_3ASASSETSL3_{qt} + r_4ASLIABL1_{qt} + r_5ASLIABL2_{qt} + r_6ASLIABL3_{qt} + r_7ASCF_{qt} + \rho_{qt}$
Future Operating Income model specifications from time *qt+1* to *qt+3*	
Model 10a	$ASE_{qt+1} = s_0 + s_1ASNFVAL1_{qt} + s_2ASNFVAL2_{qt} + s_3ASNFVAL3_{qt} + s_4ASE_{qt} + \varphi_{qt}$
Model 10b	$ASE_{qt+1} = t_0 + t_1ASASSETSL1_{qt} + t_2ASASSETSL2_{qt} + t_3ASASSETSL3_{qt} + t_4ASLIABL1_{qt} + t_5ASLIABL2_{qt} + t_6ASLIABL3_{qt} + t_7ASE_{qt} + \tau_{qt}$
Model 11a	$ASE_{qt+2} = u_0 + u_1ASNFVAL1_{qt} + u_2ASNFVAL2_{qt} + u_3ASNFVAL3_{qt} + u_4ASE_{qt} + \phi_{qt}$
Model 11b	$ASE_{qt+2} = v_0 + v_1ASASSETSL1_{qt} + v_2ASASSETSL2_{qt} + v_3ASASSETSL3_{qt} + v_4ASLIABL1_{qt} + v_5ASLIABL2_{qt} + v_6ASLIABL3_{qt} + v_7ASE_{qt} + \xi_{qt}$
Model 12a	$ASE_{qt+3} = w_0 + w_1ASNFVAL1_{qt} + w_2ASNFVAL2_{qt} + w_3ASNFVAL3_{qt} + w_4ASE_{qt} + \Psi_{qt}$
Model 12b	$ASE_{qt+3} = x_0 + x_1ASASSETSL1_{qt} + x_2ASASSETSL2_{qt} + x_3ASASSETSL3_{qt} + x_4ASLIABL1_{qt} + x_5ASLIABL2_{qt} + x_6ASLIABL3_{qt} + x_7ASE_{qt} + \Omega_{qt}$

In Model 7a, m_0, m_1, m_2, m_3 and m_4 are the estimated regression coefficients whilst v_{qt} is the stochastic error term. Similarly, in Model 7b, n_0, n_1, n_2, n_3, n_4, n_5, n_6, and n_7 are the estimated regression coefficients whilst ω_{qt} is the stochastic error term. The coefficients and stochastic error terms associated with all the other models are to be similarly interpreted.

Using Models 7a, 8a and 9a, I test for the relationships among the net levels classification of fair value assets and liabilities at level 1, level 2 and level 3 based on SFAS 157 and how they impact individually on the future operating cash flows of the sampled banks in the future quarters *qt+1, qt+2* and *qt+3*, respectively. Models 7b, 8b and 9b are employed to test the relationships among the total individual level classified fair value assets and liabilities and how they relate to the future operating cash flows of the sampled banks in the future quarters *qt+1, qt+2* and *qt+3*, respectively.

The operating income models, Models 10a, 11a and 12a are used to test for relationships among the net levels classification of fair value assets and liabilities at level 1, level 2 and level 3, based on SFAS 157 and how they impact individually on the future operating earnings of the sampled banks in the future quarters *qt+1, qt+2* and *qt+3*, respectively. Furthermore, Models 10b, 11b and 12b are utilised to test the relationships among the total individual level classified fair value assets and liabilities and how they relate to the future operating earnings of the sampled banks in the future quarters *qt+1, qt+2* and *qt+3*, respectively.

Table 5.6 presents the definitions of the dependent variables (Panel A) and independent variables (Panel B) in relation to Models 7a-12b.

Table 5.6 Definitions of Dependent and Independent Variables for quarterly data covering the period 2008 to 2010 (Panel A).	
Panel A: Dependent Variables	
$ASCF_{qt+1}$	Cash flow from operations in Quarter 1 (Future Cash flows in the next quarter)
$ASCF_{qt+2}$	Cash flow from operations in Quarter 2 (Future Cash flows in 2 quarters' time)
$ASCF_{qt+3}$	Cash flow from operations in Quarter 3 (Future Cash flows in 3 quarters' time)
ASE_{qt+1}	Operating Income in Quarter 1 (Net Income before Tax in the next quarter)
ASE_{qt+2}	Operating Income in Quarter 2 (Net Income before Tax in 2 quarters' time)
ASE_{qt+3}	Operating Income in Quarter 3 (Net Income before Tax in 3 quarters' time)

Table 5.6 Definitions of Dependent and Independent Variables for quarterly data covering the period 2008 to 2010 (Panel B).	
Panel B: Independent Variables	
$ASNFVAL1_{qt}$	This is the net fair value of level 1 assets i.e. The difference between the fair value of level 1 assets and the fair value of level 1 liabilities.
$ASNFVAL2_{qt}$	This is the net fair value of level 2 assets i.e. The difference between the fair value of level 2 assets and the fair value of level 2 liabilities.
$ASNFVAL3_{qt}$	This is the net fair value of level 3 assets i.e. The difference between the fair value of level 3 assets and the fair value of level 3 liabilities.
$ASASSETSL1_{qt}$	Fair value of level 1 assets.
$ASASSETSL2_{qt}$	Fair value of level 2 assets.
$ASASSETSL3_{qt}$	Fair value of level 3 assets.
$ASLIABL1_{qt}$	Fair value of level 1 liabilities.
$ASLIABL2_{qt}$	Fair value of level 2 liabilities.
$ASLIABL3_{qt}$	Fair value of level 3 liabilities.
$ASCF_{qt}$	Current quarter Cash flow from operations.
ASE_{qt}	Current quarter Operating Income.

Prior research studies usually provide for the potential effects of firm size on the regression estimates. In particular, the logarithm of total assets is included as an additional variable in such regression equations in order to control for the influence of firm size (Aboody *et al.*, 1999; Eccher *et al.*, 1996). Bratten *et al.* (2012) checked for the influence of bank size by classifying banks with total assets in excess of $US10 billion as 'large' banks whilst banks with total assets of less than $US10 billion were classified as 'small' banks. However, to allow for the impact of size, I follow the approach of Song *et al*. (2010) and Evans *et al*. (2014) by estimating the regression equations with two subsamples of banks based on their relative sizes which were grouped as 'large banks' with total assets above the median total assets of the entire sample of banks and 'small banks' with total assets below the median.

Prior studies check for the influence of capital adequacy and leverage of banks. Eccher *et al*. (1996) utilised the banks' equity divided by total assets as a control variable, while Cheng (2012) and Song *et al*. (2010) used the Tier 1 capital ratio which is calculated as the total risk-based capital divided by total risk-weighted assets as a proxy for capital adequacy based on regulatory requirements. In this study I use the Song *et al*. (2010) approach in evaluating the potential impact of capital adequacy on the regression estimates by differentiating the sample banks based on their relative Tier 1 capital ratio and dividing the sample into two groups: 'Highly capitalised banks' with Tier 1 capital ratio above the median total Tier 1 capital ratio of the entire sample of banks and 'Low capitalised banks' with Tier 1 capital ratio below the median.

5.5.1 Data Transformation and Regression Diagnostics

The "inverse hyperbolic sine function [arsinh(x) or $\sinh^{-1}(x)$]" was used to transform the data employed in my regression analysis. The rationale for this was to stabilise the variance of the error terms in the regression equations in order to satisfy the ordinary least squares assumptions (Sokal and Rohlf, 1981:859). Considering the scale effects involved in these kinds of datasets and with the possibility of very large bank values driving the regressions results, scaling the data either by total assets or the number of shares on issue has often been used in prior studies (Song *et al.*, 2010; Aboody *et al.*, 1999; Barth and Clinch, 2009). Also, in order to reduce problems with skewness and possible heteroscedasticity, continuous positive variables are often transformed by use of the logarithmic function.

In this study I use the inverse hyperbolic sine function [arsinh(x)] which is defined as [$\log(x + \sqrt{x^2 + 1})$] to transform the data, because in contrast to the logarithmic function, the arsinh function can accommodate negative and zero values for all variables. For large positive values of x the arsinh function approaches the value log (2x) (Anscombe, 1948; Laubscher, 1961; Sokal and Rohlf, 1981:859). This transformation also help to significantly reduce skewness in all the variables used in my regression equations and thus makes the distribution closer to the normal distribution. Figures 5.1 and 5.2 compare the properties of the arsinh function and the logarithmic function.

Figure 5.1: Inverse hyperbolic sine function graph over the domain –5 ≤ x ≤ 5.
f(x) = arsinh(x)

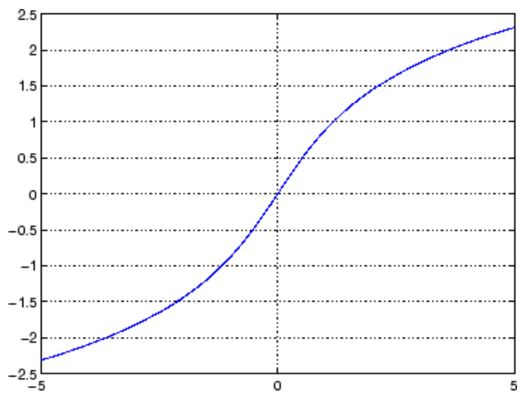
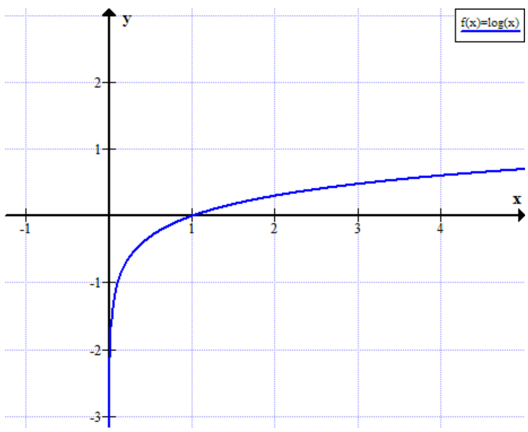


Figure 5.2: Logarithmic function graph.
f(x) = log(x)



I note here that although use of the inverse hyperbolic sine function to transform the variables reduces the impact that heteroscedasticity might have on the veracity of the regression procedures, nevertheless, the "t" statistics for the coefficient estimates were based on the corrected standard errors obtained from the White robust adjustment procedure (White, 1980).

I also checked the matrix of correlation coefficients across the independent variables for evidence of co-linear independent variables, and also used the variance inflation factor (*Vif*) to obtain a direct assessment of the presence of multicollinearity. Values of *Vif* lower than 10 are usually considered to be acceptable (Coenders and Saez, 2000). A third check was made using the condition number (Belsley, Kuh and Welsch, 1980; Belsley, 1982; Coenders and Saez, 2000). The condition number is the square root of the ratio of the largest eigen-value to the smallest eigen-value of the correlation matrix comprising the independent variables in the regression analysis. Belsley *et al.* (1980) suggest that a large condition number for the correlation matrix reflects the existence of one or more linear dependencies among the columns of the matrix. Values of the condition number lower than 30 are usually considered to be acceptable (Coenders and Saez, 2000). Also, considering that residuals could be correlated across years, quarters or across firms, I alternatively correct standard errors and related t-statistics using Petersen's (2009) clustering procedure, based on firms and years for the annual data from 1996 to 2005 and firms and quarters for the quarterly data from 2008 to 2010. Petersen (2009) shows that this standard error adjustment using the clustering effect by two dimensions produces less-biased standard errors in the parameter estimates of the regression models. Furthermore, I performed a Wald F test in order to assess whether there is a difference between the population coefficients associated with the levels classified fair value assets and liabilities based on SFAS 157 as estimated in the multivariate regression models covered during the second study period.

5.5.2 *Sensitivity and Robustness Analysis*

To check the robustness of the results obtained from estimation of the regression models, I invoked several test procedures. First, I re-estimated the regression models with alternative data transformations applied, namely deflation by the balance sheet value of total assets and the balance sheet value of issued common shares.

Second, I included a growth factor (Song *et al*., 2010; Eccher *et al.*, 1996) as a control variable in my regression equations. The growth factor was represented by the growth in bank total assets and also, the growth in bank net loans.

Third, the data employed in the regression analysis was investigated for outliers. This was done by evaluating the studentized residuals associated with the variables. Following, Belsley *et al.* (1980) and Fox (1991) the studentized residuals computed from a regression equation with an absolute value of greater than 2 could raise concerns, while studentized residuals with an absolute value of greater than 3 are considered to be outliers. I therefore re-estimated the regression models after deleting observations with studentized residuals with an absolute value greater than 3.

Fourth, for the first study period with annual data from 1996 to 2005, I estimate cross-sectional regression models using the fair values of specific classes of assets and liabilities to see what influence the fair value of these classes of assets and liabilities have on cash flows and earnings in the future years of $t+1$, $t+2$ and $t+3$, respectively. Table 5.7 presents the model specifications using the fair values of the specific classes of assets and liabilities, for the annual data relating to the period 1996 to 2005.

Table 5.7 Model specifications for the relationships between specific fair values of classes of assets and liabilities and their future operating cash flows and operating earnings for annual data covering the period 1996 to 2005.	
Future Operating Cash flow model specifications from time t+1 to t+3	
Model 13a	$ASCF_{t+1} = a_{j0} + a_{j1}ASCASH_t + a_{j2}ASFEDE_t + a_{j3}ASFHLB_t + a_{j4}ASINVA_t + a_{j5}ASINVM_t + a_{j6}ASINVT_t + a_{j7}ASLHS_t + a_{j8}ASLOAN_t + a_{j9}ASMSR_t + a_{j10}ASOSTA_t + a_{j11}ASDEPO_t + a_{j12}ASFFP_t + a_{j13}ASFBAD_t + a_{j14}ASLTD_t + a_{j15}ASOTNEG_t + a_{j16}ASSTD_t + a_{j17}ASCF_t + \alpha_{jt}$
Model 13b	$ASCF_{t+2} = b_{j0} + b_{j1}ASCASH_t + b_{j2}ASFEDE_t + b_{j3}ASFHLB_t + b_{j4}ASINVA_t + b_{j5}ASINVM_t + b_{j6}ASINVT_t + b_{j7}ASLHS_t + b_{j8}ASLOAN_t + b_{j9}ASMSR_t + b_{j10}ASOSTA_t + b_{j11}ASDEPO_t + b_{j12}ASFFP_t + b_{j13}ASFBAD_t + b_{j14}ASLTD_t + b_{j15}ASOTNEG_t + b_{j16}ASSTD_t + b_{j17}ASCF_t + \beta_{jt}$
Model 13c	$ASCF_{t+3} = c_{j0} + c_{j1}ASCASH_t + c_{j2}ASFEDE_t + c_{j3}ASFHLB_t + c_{j4}ASINVA_t + c_{j5}ASINVM_t + c_{j6}ASINVT_t + c_{j7}ASLHS_t + c_{j8}ASLOAN_t + c_{j9}ASMSR_t + c_{j10}ASOSTA_t + c_{j11}ASDEPO_t + c_{j12}ASFFP_t + c_{j13}ASFBAD_t + c_{j14}ASLTD_t + c_{j15}ASOTNEG_t + c_{j16} ASSTD_t + c_{j17}ASCF_t + \gamma_{jt}$
Future Operating Income model specifications from time t+1 to t+3	
Model 14a	$ASOP_{t+1} = d_{j0} + d_{j1}ASCASH_t + d_{j2}ASFEDE_t + d_{j3}ASFHLB_t + d_{j4}ASINVA_t + d_{j5}ASINVM_t + d_{j6}ASINVT_t + d_{j7}ASLHS_t + d_{j8}ASLOAN_t + d_{j9}ASMSR_t + d_{j10}ASOSTA_t + d_{j11}ASDEPO_t + d_{j12}ASFFP_t + d_{j13}ASFBAD_t + d_{j14}ASLTD_t + d_{j15}ASOTNEG_t + d_{j16} ASSTD_t + d_{j17}ASOP_t + \delta_{jt}$
Model 14b	$ASOP_{t+2} = e_{j0} + e_{j1}ASCASH_t + e_{j2}ASFEDE_t + e_{j3}ASFHLB_t + e_{j4}ASINVA_t + e_{j5}ASINVM_t + e_{j6}ASINVT_t + e_{j7}ASLHS_t + e_{j8}ASLOAN_t + e_{j9}ASMSR_t + e_{j10}ASOSTA_t + e_{j11}ASDEPO_t + e_{j12}ASFFP_t + e_{j13}ASFBAD_t + e_{j14}ASLTD_t + e_{j15}ASOTNEG_t + e_{j16} ASSTD_t + e_{j17}ASOP_t + \varepsilon_{jt}$
Model 14c	$ASOP_{t+3} = f_{j0} + f_{j1}ASCASH_t + f_{j2}ASFEDE_t + f_{j3}ASFHLB_t + f_{j4}ASINVA_t + f_{j5}ASINVM_t + f_{j6}ASINVT_t + f_{j7}ASLHS_t + f_{j8}ASLOAN_t + f_{j9}ASMSR_t + f_{j10}ASOSTA_t + f_{j11}ASDEPO_t + f_{j12}ASFFP_t + f_{j13}ASFBAD_t + f_{j14}ASLTD_t + f_{j15}ASOTNEG_t + f_{j16} ASSTD_t + f_{j17}ASOP_t + \zeta_{jt}$

The estimated regression coefficients for Model 13a are a_{jk}, for k = 0, 1, 2, ___,17 while α_{jt} is the stochastic error term. Similarly, the estimated regression coefficients in Model 13b are b_{jk} for k = 0, 1, 2, ___, 17 while β_{jt} is the stochastic error term. The coefficients and stochastic error terms associated with all other models are to be similarly interpreted.

Using Models 13a, 13b and 13c, I test for the influence of individual financial instrument asset and liability fair value classes on operating cash flows in the future years 1, 2 and 3, respectively. Model 14a, 14b and 14c was used to test the effects of individual financial instrument asset and liability fair value classes on operating earnings in the future years 1, 2 and 3 respectively.

Table 5.8 presents the definitions of the dependent variables (Panel A) and independent variables (Panel B) in relation to Models 13a and 13b.

Table 5.8
Definitions of Dependent and Independent Variables for the specific fair value data covering the period 1996 to 2005 (Panel A).

Panel A: Dependent Variables	
$ASCF_{t+1}$	Cash flow from operations in Year 1 (Future Cash flows in the next year)
$ASCF_{t+2}$	Cash flow from operations in Year 2 (Future Cash flows in 2 years' time)
$ASCF_{t+3}$	Cash flow from operations in Year 3 (Future Cash flows in 3 years' time)
$ASOP_{t+1}$	Operating Income in Year 1 (Net Income before Tax in the next year)
$ASOP_{t+2}$	Operating Income in Year 2 (Net Income before Tax in 2 years' time)
$ASOP_{t+3}$	Operating Income in Year 3 (Net Income before Tax in 3 years' time)

Table 5.8
Definitions of Dependent and Independent Variables for the specific fair value data covering the period 1996 to 2005 (Panel B).

Panel B: Independent Variables	
	On-balance sheet Financial Assets
$ASCASH_t$	Cash and cash equivalents include cash and amounts due from banks and interest-bearing deposits with banks. Generally, both cash and cash equivalents are considered to have maturities of three months or less. Accordingly, the carrying amount of such instruments is considered to be a reasonable estimate of their fair values.
$ASFEDE_t$	This consists of federal funds sold and securities purchased under resale agreements. Federal funds sold are unsecured advances of excess balances in reserve accounts held at Federal Reserve banks. The carrying amount of Federal funds sold is a reasonable estimate of its fair value. Securities purchased under agreements to resell are treated as collateralized financing transactions and since January 1, 2007, are primarily carried at fair value in accordance with SFAS 159. In prior periods, these agreements were carried at cost.

$ASFHLB_t$	This represents the common stock held by banks that are members of the Federal Reserve and Federal Home Loan Bank systems. The common stock is a required investment for these institutions and the required investment in the common stock is based on a predetermined formula. The carrying amount is usually the par value of the common stock or the price at which it may be resold to the Federal Home Loan Bank and Federal Reserve bank involved.
$ASINVA_t$	These are investment securities available for sale by banks. They usually include U.S. treasury obligations and obligations of U.S. government-sponsored agencies, mortgage-backed securities, corporate bonds and stocks. Securities available for sale are reported at estimated fair value, with unrealized gains and losses reported as accumulated other comprehensive income in the shareholders' equity section of the consolidated balance sheet.
$ASINVM_t$	These are debt or equity securities that are purchased with the intention of holding the investment to maturity. These types of securities are reported at amortized cost on the bank's financial statements and are usually in the form of a debt security with a specific maturity date. An estimate of the fair value of these securities is required for disclosure in the notes to the accounts based on SFAS 107. Where banks just disclose securities without splitting them into held-for-sale or held-to-maturity, I have taken the securities to be held-to-maturity.
$ASINVT_t$	These are investment securities that are traded in the ordinary course of business of the banks. Trading securities are reported at fair value. Market value adjustments, fees, and gains or losses from trading account activities are included in noninterest income. Interest income on trading account securities is included in interest and dividends on securities.
$ASLHS_t$	These are usually mortgage loans originated and intended for sale in the secondary market. They are carried at the lower of cost or estimated market value in the aggregate. It also includes other loans and leases held for sale. Net unrealized losses are recognized through a valuation allowance by charges to income.
$ASLOAN_t$	This represents bank loans which consist of commercial, consumer, real estate, individual loans and lease receivables made out to customers in the ordinary course of business. These loans are net of the allowance provision for loan losses.
$ASMSR_t$	This represents mortgage servicing rights, which is a separate asset that gives banks the right to service mortgage loans for others.
$ASOSTA_t$	This consists of other short-term assets not captured in of the earlier designations. Such assets could include: other interest receivables and customer acceptances due.
On-balance sheet Financial Liabilities	
$ASDEPO_t$	This represents bank deposits which include a broad selection of deposit instruments provided to individuals and businesses, including noninterest-bearing checking accounts, interest-bearing checking accounts, savings accounts, money rate savings, investor deposit accounts, certificates of deposit and individual retirement accounts.
$ASFFP_t$	This consists of federal funds purchased and securities sold under agreements to repurchase. Federal funds purchased include purchased excess reserves from a third party. Securities sold under agreements to repurchase are treated as collateralized financing transactions and since January 1, 2007, are primarily carried at fair value in accordance with SFAS 159. In prior periods, these agreements were carried at cost.
$ASFBAD_t$	This represents a Federal Home Loan Bank (FHLB) advance. This advance is a fully secured loan made by a Federal Home Loan Bank to one of its member institutions (i.e. the banks that own common stock in the Federal Home Loan

	Bank). Advances support members for local lending activities and make liquid otherwise illiquid assets. Rates available to banks for debt with similar terms and remaining maturities are used to estimate fair values of existing FHLB advances.
$ASLTD_t$	This is Long-term debt. This includes capital securities, subordinated notes issued, capitalised leases and other long-term debt.
$ASSTD_t$	This represents short-term debt that is raised by banks to fund their operations. It includes items such as commercial paper issued, master notes, short-term bank notes and U.S. Treasury tax and loan deposit notes payable.
$ASOTNEG_t$	This consists of other short-term liabilities such as other interest payables and acceptances outstanding and other financial instrument liabilities not captured in the earlier designations.
Other variables	
$ASCF_t$	Current year Cash flow from operations.
$ASOP_t$	Current year Operating Income (Net Income before Tax at time t).

5.6 Summary

This chapter describes the sample selection process, data collection methods and the hypothesis testing procedures employed in my study of the relationship between U.S. bank fair value disclosures and their future operating cash flows and operating earnings. For the first study period from 1996 to 2005, the final sample includes 1,229 firm-years for banks having future cash flows at time *t+1*, 1,162 firm-years for banks having future cash flows at time *t+2* and 942 firm-years for banks having future cash flows at time *t+3*. The sample also includes 1,150 firm-years for banks having future operating earnings at time *t+1*, 1,081 firm-years for banks having future operating earnings at time *t+2* and 875 firm-years for banks with future operating earnings at time *t+3*. In relation to the second study period which employs quarterly data from 2008 to 2010, the final sample covers a total of 5,730 firm-quarters for banks having future cash flows and operating earnings at time *t+1*, 5,105 firm-quarters for banks having future cash flows and operating earnings at time *t+2* and 4,503 firm-quarters for banks having future cash flows and operating earnings at time *t+3*.

For the first study period (1996-2005) bank fair values were measured as the fair values of financial instruments disclosed in the notes to the financial statements as mandated by SFAS 107. For the second study period (2008-2010), bank fair values were measured according to the levels classified fair values as mandated by SFAS 157.

A set of ordinary least squares regression models were then developed to estimate cross-sectional multivariate regression equations in order to test the hypothesised relationships between bank fair values, future operating cash flows and operating earnings. The data for the regressions is transformed using the inverse hyperbolic sine function and various robustness tests are applied.

Chapter six looks at the first part of the results of the hypothesis testing procedures with regard to the relationships between bank fair values and future operating cash flows. Chapter seven will report the results of the hypothesised relationships between bank fair values and future operating earnings.

CHAPTER SIX

RESULTS: FAIR VALUES AND FUTURE CASH FLOWS

In this chapter I summarise the first set of results obtained in the empirical work undertaken in this thesis to examine the relationship between bank fair values and future operating cash flows. Thus, section 6.1 starts with summary descriptive statistics relating to all the important variables on which my empirical analysis is based. Section 6.2 provides a summary of the empirical results relating to hypothesis 1a and 2a. These hypotheses examine whether there is a predictive relationship between bank fair values and future cash flows. The empirical results are summarised for the first study period using annual data from 1996 until 2005 and also for the second study period using quarterly data covering the period from 2008 until 2010. Section 6.3 summarises several robustness and sensitivity tests relating to the empirical procedures employed in this chapter - especially with respect to the impact of bank size, capital adequacy and growth prospects. A summary of the chapter is provided in section 6.4.

6.1 Descriptive Statistics

Table 6.1 presents descriptive statistics for the first study period from 1996 to 2005 of the raw (that is, untransformed) data associated with the regression variables used to examine the relationships between bank fair values and future cash flows. From panel A1 the average annual one year ahead future operating cash flow (CF_{t+1}) across the 1,299 firm-years comprising my sample amounts to \$209.7 million. Panel A2 shows that the average annual two year ahead operating cash flow (CF_{t+2}) increases to \$215 million across the 1,162 firm-years comprising my sample. Finally, panel A3 shows that the average annual three year ahead operating cash flow (CF_{t+3}) again increases to \$278.7 million across the 942 firm-years comprising my sample. Panel A1 also shows that the average net fair value assets ($NFVA_t$) associated with one year ahead operating cash flows amounts to \$548.6 million. Likewise, panels A2 and A3 show that the average net fair value assets ($NFVA_t$) associated with two and three year ahead operating cash flows amount to \$566.6 million and \$536.9 million, respectively. Panel A1 shows the average total fair value assets (FVA_t) associated with one year ahead operating cash flows (CF_{t+1}) were \$6,438.1 million, whilst the average total fair value liabilities (FVL_t) associated with one year ahead operating cash flows (CF_{t+1}) were \$6,128.2 million. Panel A1 also shows that the current year operating cash flows (CF_t) associated with one year ahead operating cash flows (CF_{t+1}) was \$130.7 million. The third column of panel A1 of Table 6.1 shows that the standard deviation of the one year ahead cash flows across the 1,299 firm years comprising my sample amounts to 1,802.6. The standardised skewness and kurtosis measures of the one year ahead cash flows are 10.662 and 203.677, respectively whilst the minimum and maximum one year ahead cash flows are -\$19,700 million and \$31,906 million, respectively. The other statistics appearing in Table 6.1 are to be similarly interpreted.

Table 6.1
Descriptive Statistics for the first study period (1996-2005) for the variables in $US millions[53]

Panel A1: Descriptive statistics for regression models 1a-1b

Variable[54]	Mean	Std. Dev.	Skewness	Kurtosis	Min.	Max.	N (Firm-Years)
CF_{t+1}	209.668	1802.583	10.662	203.677	-19700.000	31906.000	1299
$NFVA_t$	548.626	5170.350	15.361	271.541	-31200.000	104000.000	1299
FVA_t	6438.099	20900.795	6.697	53.998	92.112	235000.000	1299
FVL_t	6128.235	19892.653	6.926	60.910	0.000	271000.000	1299
CF_t	130.681	1337.836	3.853	195.483	-19700.000	26483.000	1299

Panel A2: Descriptive statistics for regression models 2a-2b

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Min.	Max.	N (Firm-Years)
CF_{t+2}	214.964	1998.548	11.951	231.031	-19700.000	40207.000	1162
$NFVA_t$	566.597	5283.315	15.245	263.121	-31200.000	104000.000	1162
FVA_t	6028.134	19707.383	6.980	59.322	92.112	235000.000	1162
FVL_t	5646.283	17805.595	6.472	50.166	0.000	182000.000	1162
CF_t	140.667	1291.892	6.000	219.295	-19700.000	26483.000	1162

Panel A3: Descriptive statistics for regression models 3a-3b

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Min.	Max.	N (Firm-Years)
CF_{t+3}	278.677	2272.519	10.353	172.073	-19700.000	40207.000	942
$NFVA_t$	536.879	5123.778	15.466	279.771	-31200.000	104000.000	942
FVA_t	5841.316	18873.405	6.824	56.046	92.112	213000.000	942
FVL_t	5485.308	17156.815	6.425	49.368	0.000	164000.000	942
CF_t	117.932	1121.120	-2.571	152.020	-19700.000	12504.000	942

On inspection it can be observed that the standard deviation, skewness and kurtosis statistics measures associated with the variables described in Table 6.1 are very large. The standardised skewness and kurtosis measures are also both significantly different from zero at any reasonable level of significance. This indicates that it is highly unlikely that my raw data are drawn from a normal distribution. In order to address this problem and also to address issues of heteroscedasticity, I apply the inverse hyperbolic sine transformation to my data, as discussed in section 5.5.1. As noted in section 5.5.1 this will moderate issues of heteroscedasticity thereby making the data employed in my

[53] The descriptive statistics presented in Table 6.1 are for the untransformed variables; hence, the descriptive statistics are shown on the basis of the actual variable numbers in millions of U.S. dollars and without the application of the inverse hyperbolic sine transformation. On the other hand, the descriptive statistics presented in Table 6.2 employ variables that have been transformed by the inverse hyperbolic sine function. Table 6.3 and Table 6.4 should be similarly interpreted.

[54] See Table 5.4 for definitions of the variables.

empirical analysis more compatible with the assumptions which underscore the general linear regression model. Table 6.2 presents the descriptive statistics for the transformed data (that is, after applying the inverse hyperbolic sine transformation). Thus, panel A1 of Table 6.2 shows that the average annual one year ahead transformed future operating cash flow ($ASCF_{t+1}$) across the 1,299 firm-years comprising my sample is 3.476 whilst the average transformed net fair value assets ($ASNFVA_t$) associated with one year ahead operating cash flows is 4.717. The other figures appearing in Table 6.2 are to be similarly interpreted.

Table 6.2
Descriptive Statistics for the first study period (1996-2005) for the transformed data

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Minimum	Maximum	N (Firm-Years)
Panel A1: Descriptive statistics for regression models 1a-1b							
$ASCF_{t+1}$	3.476	2.813	-1.625	7.388	-10.581	11.064	1299
$ASNFVA_t$	4.717	2.855	-2.384	10.575	-11.042	12.245	1299
$ASFVA_t$	8.159	1.334	1.005	4.071	5.216	13.062	1299
$ASFVL_t$	8.073	1.409	0.444	6.066	0.000	13.201	1299
$ASCF_t$	3.303	2.835	-1.628	7.170	-10.581	10.877	1299
Panel A2: Descriptive statistics for regression models 2a-2b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**	**N (Firm-Years)**
$ASCF_{t+2}$	3.504	2.816	-1.694	7.705	-10.581	11.295	1162
$ASNFVA_t$	4.725	2.764	-2.356	10.692	-11.042	12.245	1162
$ASFVA_t$	8.119	1.316	1.018	4.126	5.216	13.062	1162
$ASFVL_t$	8.030	1.392	0.407	6.285	0.000	12.803	1162
$ASCF_t$	3.267	2.813	-1.583	6.968	-10.581	10.877	1162
Panel A3: Descriptive statistics for regression models 3a-3b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**	**N (Firm-Years)**
$ASCF_{t+3}$	3.613	2.830	-1.579	7.434	-10.581	11.295	942
$ASNFVA_t$	4.700	2.735	-2.313	10.533	-11.042	12.245	942
$ASFVA_t$	8.076	1.333	0.987	4.002	5.216	12.960	942
$ASFVL_t$	7.984	1.421	0.302	6.409	0.000	12.703	942
$ASCF_t$	3.173	2.859	-1.504	6.513	-10.581	10.127	942

From Table 6.2, it can be observed that the inverse hyperbolic sine transformation substantially reduces the variability in the data (as measured by the standard deviation) and significantly reduces the standardised skewness and kurtosis measures associated with the untransformed data.

Table 6.3 presents descriptive statistics for the untransformed data for the regression variables used to examine the relationships between quarterly levels classified bank fair values and quarterly future cash flows, for the second study period from 2008 until 2010. From panel B1 the average one quarter ahead future operating cash flows (CF_{qt+1}) across the 5,730 firm-quarters comprising my sample amounts to \$470.1 million. Panel B2 shows that the average annual two quarter ahead operating cash flows (CF_{qt+2}) increases to \$523.3 million across the 5,105 firm-quarters comprising my sample. Finally, panel B3 shows that the average three quarter ahead operating cash flows (CF_{qt+3}) again increases to \$563 million across the 4,503 firm-quarters comprising my sample. Panel B1 also shows that the average net level 1 fair value assets ($NFVAL1_{qt}$) associated with one quarter ahead operating cash flows amounts to \$934.1 million. Likewise, panels B2 and B3 show that the average net level 1 fair value assets ($NFVAL1_{qt}$) associated with two and three quarter ahead operating cash flows amount to \$926.3 million and \$838 million, respectively. Panel B1 shows that the average total level 1 fair value assets ($ASSETSL1_{qt}$) associated with one quarter ahead operating cash flows (CF_{qt+1}) were \$1,275.2 million, whilst the average total level 1 fair value liabilities ($LIABL1_{qt}$) associated with one quarter ahead operating cash flows (CF_{qt+1}) were \$341.1 million. Finally, Panel B1 also shows that the current quarter operating cash flows (CF_{qt}) associated with one quarter ahead operating cash flows (CF_{qt+1}) was \$390.9 million. The third column of panel B1 of Table 6.3 also shows that the standard deviation of the one quarter ahead cash flows across the 5,730 firm quarters comprising my sample amounts to 6,377.8. The standardised skewness and kurtosis measures of the one quarter ahead cash flows are 11.296 and 245.036, respectively whilst the minimum and maximum one year ahead cash flows are -$110,000 million and $156,000 million, respectively. The other statistics appearing in Table 6.3 are to be similarly interpreted.

Table 6.3
Descriptive Statistics for the second study period (2008-2010) for the variables in $US millions

Panel B1: Descriptive statistics for regression models 7a-7b

Variable[55]	Mean	Std. Dev.	Skewness	Kurtosis	Min.	Max.	N (Firm-Quarters)
CF_{qt+1}	470.140	6377.675	11.296	245.036	-110000.000	156000.000	5730
$NFVAL1_{qt}$	934.086	13170.518	20.269	445.724	-265.000	369000.000	5730
$NFVAL2_{qt}$	2796.850	22173.533	13.769	209.933	-27900.000	403000.000	5730
$NFVAL3_{qt}$	438.926	4730.415	13.746	208.175	-19800.000	88693.000	5730
$ASSETSL1_{qt}$	1275.219	17002.960	19.317	424.959	0.000	532000.000	5730
$ASSETSL2_{qt}$	9949.293	128000.000	17.061	310.151	0.000	2930000.000	5730
$ASSETSL3_{qt}$	645.585	7258.027	15.295	253.750	0.000	145000.000	5730
$LIABL1_{qt}$	341.133	4648.798	19.013	445.549	-1.215	162000.000	5730
$LIABL2_{qt}$	7152.443	109000.000	17.770	336.915	0.000	2700000.000	5730
$LIABL3_{qt}$	206.659	2933.543	18.375	366.539	-0.563	73759.000	5730
CF_{qt}	390.845	6280.754	10.754	260.386	-110000.000	156000.000	5730

Panel B2: Descriptive statistics for regression models 8a-8b

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Min.	Max.	N (Firm-Quarters)
CF_{qt+2}	523.272	6395.837	13.360	251.864	-54500.000	156000.000	5105
$NFVAL1_{qt}$	926.279	13281.098	20.352	447.562	-99.000.000	369000.000	5105
$NFVAL2_{qt}$	2769.917	21931.348	13.817	211.232	-15000.000	402000.000	5105
$NFVAL3_{qt}$	445.270	4782.420	13.772	208.145	-19800.000	88693.000	5105
$ASSETSL1_{qt}$	1262.988	17104.540	19.526	433.338	0.000	532000.000	5105
$ASSETSL2_{qt}$	9883.025	126000.000	16.999	309.807	0.000	2930000.000	5105
$ASSETSL3_{qt}$	654.233	7370.184	15.238	251.306	0.000	145000.000	5105
$LIABL1_{qt}$	336.709	4628.205	19.309	465.245	-1.215	162000.000	5105
$LIABL2_{qt}$	7113.108	107000.000	17.780	340.120	0.000	2700000.000	5105
$LIABL3_{qt}$	208.963	2990.727	18.287	361.176	-0.563	73759.000	5105
CF_{qt}	387.807	6457.337	10.643	256.751	-110000.000	156000.000	5105

Panel B3: Descriptive statistics for regression models 9a-9b

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Min.	Max.	N (Firm-Quarters)
CF_{qt+3}	562.967	6685.529	13.160	238.111	-54500.000	156000.000	4503
$NFVAL1_{qt}$	837.970	12384.406	20.919	466.633	-99.000.000	310000.000	4503
$NFVAL2_{qt}$	2718.927	21882.188	14.042	217.278	-15000.000	402000.000	4503
$NFVAL3_{qt}$	452.890	4827.184	13.800	208.270	-19800.000	88693.000	4503
$ASSETSL1_{qt}$	1133.482	15464.732	19.067	394.246	0.000	366000.000	4503
$ASSETSL2_{qt}$	9671.155	126000.000	17.245	319.543	0.000	2930000.000	4503
$ASSETSL3_{qt}$	651.069	7439.173	15.383	254.869	0.000	145000.000	4503
$LIABL1_{qt}$	295.512	3919.800	16.155	280.389	-1.215	91027.000	4503
$LIABL2_{qt}$	6952.228	107000.000	18.110	353.898	0.000	2700000.000	4503
$LIABL3_{qt}$	198.178	2935.260	18.962	387.809	-0.563	73759.000	4503
CF_{qt}	388.150	6616.524	10.906	259.325	-110000.000	156000.000	4503

[55] See Table 5.6 for definitions of the variables.

I have previously noted (as with Table 6.1 and Table 6.2) that the inverse hyperbolic sine transformation renders the data on which my empirical analysis is based more compatible with the assumption of the general linear regression model. Thus, Table 6.4 presents descriptive statistics when the inverse hyperbolic sine transformation has been applied to the data on which my empirical analysis is based. Panel B1 of Table 6.4 shows that the average annual one quarter ahead transformed future operating cash flow ($ASCF_{qt+1}$) across the 5,730 firm- quarters comprising my sample is 2.504 whilst the average transformed average net level 1 fair value assets ($ASNFVAL1_{qt}$) associated with one quarter ahead operating cash flows amounts to is 1.547. The other figures appearing in Table 6.4 are to be similarly interpreted.

Table 6.4
Descriptive Statistics for the second study period (2008-2010) for the transformed data

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Min.	Max.	N (Firm-Quarters)
Panel B1: Descriptive statistics for regression models 7a-7b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Min.**	**Max.**	**N (Firm-Quarters)**
$ASCF_{qt+1}$	2.504	3.491	-1.016	5.461	-12.303	12.653	5730
$ASNFVAL1_{qt}$	1.547	2.356	1.721	6.254	-6.273	13.513	5730
$ASNFVAL2_{qt}$	5.343	2.824	-0.743	3.940	-10.930	13.600	5730
$ASNFVAL3_{qt}$	1.379	2.405	1.352	6.324	-10.587	12.086	5730
$ASASSETSL1_{qt}$	1.603	2.378	1.836	6.563	0.000	13.877	5730
$ASASSETSL2_{qt}$	5.413	2.794	-0.462	3.573	0.000	15.585	5730
$ASASSETSL3_{qt}$	1.510	2.327	1.827	6.326	0.000	12.576	5730
$ASLIABL1_{qt}$	0.284	1.393	5.866	39.665	-1.026	12.691	5730
$ASLIABL2_{qt}$	0.891	2.215	3.287	15.239	0.000	15.501	5730
$ASLIABL3_{qt}$	0.335	1.378	5.127	32.090	-0.537	11.902	5730
$ASCF_{qt}$	2.325	3.472	-0.992	5.447	-12.303	12.653	5730
Panel B2: Descriptive statistics for regression models 8a-8b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Min.**	**Max.**	**N (Firm-Quarters)**
$ASCF_{qt+2}$	2.553	3.487	-0.999	5.386	-11.600	12.653	5105
$ASNFVAL1_{qt}$	1.549	2.349	1.712	6.218	-5.288	13.513	5105
$ASNFVAL2_{qt}$	5.340	2.812	-0.688	3.588	-10.308	13.598	5105
$ASNFVAL3_{qt}$	1.385	2.402	1.361	6.268	-10.587	12.086	5105
$ASASSETSL1_{qt}$	1.605	2.369	1.828	6.547	0.000	13.877	5105
$ASASSETSL2_{qt}$	5.402	2.801	-0.464	3.549	0.000	15.585	5105
$ASASSETSL3_{qt}$	1.513	2.327	1.821	6.316	0.000	12.576	5105
$ASLIABL1_{qt}$	0.282	1.384	5.892	40.076	-1.026	12.691	5105
$ASLIABL2_{qt}$	0.884	2.205	3.302	15.390	0.000	15.501	5105
$ASLIABL3_{qt}$	0.329	1.371	5.171	32.583	-0.537	11.902	5105
$ASCF_{qt}$	2.296	3.452	-0.991	5.525	-12.303	12.653	5105
Panel B3: Descriptive statistics for regression models 9a-9b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Min.**	**Max.**	**N (Firm-Quarters)**
$ASCF_{qt+3}$	2.531	3.499	-0.948	5.201	-11.600	12.653	4503
$ASNFVAL1_{qt}$	1.549	2.334	1.669	6.075	-5.288	13.338	4503
$ASNFVAL2_{qt}$	5.315	2.824	-0.687	3.540	-10.308	13.598	4503
$ASNFVAL3_{qt}$	1.388	2.395	1.394	6.196	-10.587	12.086	4503
$ASASSETSL1_{qt}$	1.608	2.352	1.794	6.405	0.000	13.503	4503
$ASASSETSL2_{qt}$	5.377	2.813	-0.470	3.488	0.000	15.585	4503
$ASASSETSL3_{qt}$	1.509	2.322	1.817	6.307	0.000	12.576	4503
$ASLIABL1_{qt}$	0.277	1.361	5.920	40.545	-1.026	12.112	4503
$ASLIABL2_{qt}$	0.874	2.189	3.308	15.462	0.000	15.501	4503
$ASLIABL3_{qt}$	0.323	1.357	5.184	32.710	-0.537	11.902	4503
$ASCF_{qt}$	2.276	3.448	-0.995	5.537	-12.303	12.653	4503

The matrix of correlation coefficients between the independent variables employed in my empirical analysis for the first period from 1996 until 2005 are summarised in Table 6.5 and Table 6.6, respectively. Thus, the product moment correlation coefficient computed across the 1,229 firm-years comprising the sample for Model 1a, between the net fair value assets variable ($ASNFVA_t$) and the current year operating cash flows ($ASCF_t$) is r = 0.2650 as shown in panel C1 of Table 6.5. The other correlation coefficients summarised in this table are to be similarly interpreted.

Table 6.5
Correlation Matrices (Panels C1-C3) for the first study period (1996-2005)

Panel C1: Correlation Matrix for the Independent Variables for Model 1a (N=1,229 Firm-years)		
	$ASNFVA_t$	$ASCF_t$
$ASNFVA_t$	1	
$ASCF_t$	0.2650***	1
Panel C2: Correlation Matrix for the Independent Variables for Model 2a (N=1,162 Firm-years)		
	$ASNFVA_t$	$ASCF_t$
$ASNFVA_t$	1	
$ASCF_t$	0.2522***	1
Panel C3: Correlation Matrix for the Independent Variables for Model 3a (N=942 Firm-years)		
	$ASNFVA_t$	$ASCF_t$
$ASNFVA_t$	1	
$ASCF_t$	0.2315***	1

*, ** and *** denote significance level at the 0.1, 0.05 and 0.01 levels, respectively (two-tailed) for the Pearson correlation coefficients.

Panel C4 of Table 6.6 shows that the correlation coefficient computed across the 1,229 firm-years comprising the sample for Model 1b, between the total fair value assets variable ($ASFVA_t$) and the current year operating cash flows ($ASCF_t$) is r = 0.3586. Moreover, panel C4 also shows that the correlation between the total fair value assets variable ($ASFVA_t$) and the total fair value liabilities variable ($ASFVL_t$) for Model 1b amounts to r = 0.9571. The other correlation coefficients summarised in this table are to be similarly interpreted.

Table 6.6
Correlation Matrices (Panels C4-C6) for the first study period (1996-2005)

Panel C4: Correlation Matrix for the Independent Variables for Model 1b (N=1,229 Firm-years)			
	$ASFVA_t$	$ASFVL_t$	$ASCF_t$
$ASFVA_t$	1		
$ASFVL_t$	0.9571***	1	
$ASCF_t$	0.3586***	0.3208***	1
Panel C5: Correlation Matrix for the Independent Variables for Model 2b (N=1,162 Firm-years)			
	$ASFVA_t$	$ASFVL_t$	$ASCF_t$
$ASFVA_t$	1		
$ASFVL_t$	0.9545***	1	
$ASCF_t$	0.3647***	0.3251***	1
Panel C6: Correlation Matrix for the Independent Variables for Model 3b (N=942 Firm-years)			
	$ASFVA_t$	$ASFVL_t$	$ASCF_t$
$ASFVA_t$	1		
$ASFVL_t$	0.9497***	1	
$ASCF_t$	0.3644***	0.3222***	1

*, ** and *** denote significance level at the 0.1, 0.05 and 0.01 levels, respectively (two-tailed) for the Pearson correlation coefficients.

Note that none of the correlation coefficients recorded in Table 6.5 exceed the r = 0.80 threshold at which multicollinearity is considered to affect the integrity of the regression procedures I employ (Gujarati, 2003). In panels C4, C5 and C6 of Table 6.6 however, evidence of multicollinearity is present in the regression models 1b, 2b and 3b respectively, with very high and significant correlation coefficients computed between the total fair value assets variable ($ASFVA_t$) and the total fair value liabilities variable ($ASFVL_t$). Thus, the regression results from these particular models will need to be interpreted with caution. The other tests employed to check for multicollinearity and the further robustness tests that were applied to my regression procedures are discussed in later sections of this chapter.

The matrix of correlation coefficients between the independent variables employed in my data analysis during the second study period from 2008 until 2010 are summarised in Table 6.7 and Table 6.8. From Table 6.7, the product moment correlation coefficient computed across the 5,730 firm-quarters comprising the sample for Model 7a, between net level 1 fair value assets variable ($ASNFVAL1_{qt}$) and net level 2 fair value assets variable ($ASNFVAL2_{qt}$) is r = 0.4005 as shown in panel D1 of Table 6.7. Likewise, the correlation between the net level 3 fair value assets variable ($ASNFVAL3_{qt}$) and the current quarter operating cash flows variable ($ASCF_{qt}$) for Model 7a, amounts to r = 0.1347. The other correlation coefficients summarised in Table 6.7 are to be similarly interpreted.

In Table 6.8 the correlation coefficient computed across the 5,730 firm-quarters comprising the sample for Model 7b, between the total level 1 fair value assets variable ($ASASSETSL1_{qt}$) and the total level 2 fair value assets variable ($ASASSETSL2_{qt}$) is r = 0.4806 as presented in panel D4 of Table 6.8 while the correlation between total level 1 fair value liabilities ($ASLIABL1_{qt}$) and the current quarter operating cash flows variable ($ASCF_{qt}$) for Model 7b, amounts to r = 0.1538. The other correlation coefficients summarised in Table 6.8 are to be similarly interpreted. There appear to be no potential collinearity issues based on the correlation coefficients as presented in Table 6.7 and Table 6.8 for the second study period. Further tests employed to check for multicollinearity issues are discussed in later sections of the chapter.

Table 6.7
Correlation Matrices (Panels D1-D3) for the second study period (2008-2010)

Panel D1: Correlation Matrix for the Independent Variables for Models 7a (N=5,730 Firm-quarters)

	$ASNFVAL1_{qt}$	$ASNFVAL2_{qt}$	$ASNFVAL3_{qt}$	$ASCF_{qt}$
$ASNFVAL1_{qt}$	1			
$ASNFVAL2_{qt}$	0.4005***	1		
$ASNFVAL3_{qt}$	0.3879***	0.4587***	1	
$ASCF_{qt}$	0.1640***	0.2383***	0.1347***	1

Panel D2: Correlation Matrix for the Independent Variables for Models 8a (N=5,105 Firm-quarters)

	$ASNFVAL1_{qt}$	$ASNFVAL2_{qt}$	$ASNFVAL3_{qt}$	$ASCF_{qt}$
$ASNFVAL1_{qt}$	1			
$ASNFVAL2_{qt}$	0.4121***	1		
$ASNFVAL3_{qt}$	0.3882***	0.4633***	1	
$ASCF_{qt}$	0.1703***	0.2363***	0.1341***	1

Panel D3: Correlation Matrix for the Independent Variables for Models 9a (N=4,503 Firm-quarters)

	$ASNFVAL1_{qt}$	$ASNFVAL2_{qt}$	$ASNFVAL3_{qt}$	$ASCF_{qt}$
$ASNFVAL1_{qt}$	1			
$ASNFVAL2_{qt}$	0.4054***	1		
$ASNFVAL3_{qt}$	0.3860***	0.4693***	1	
$ASCF_{qt}$	0.1719***	0.2451***	0.1406***	1

*, ** and *** denote significance level at the 0.1, 0.05 and 0.01 levels, respectively (two-tailed) for the Pearson correlation coefficients.

Table 6.8
Correlation Matrices (Panels D4-D6) for the second study period (2008-2010)

Panel D4: Correlation Matrix for the Independent Variables for Models 7b (N=5,730 Firm-quarters)

	$ASASSETSL1_{qt}$	$ASASSETSL2_{qt}$	$ASASSETSL3_{qt}$	$ASLIABL1_{qt}$	$ASLIABL2_{qt}$	$ASLIABL3_{qt}$	$ASCF_{qt}$
$ASASSETSL1_{qt}$	1						
$ASASSETSL2_{qt}$	0.4806***	1					
$ASASSETSL3_{qt}$	0.5068***	0.5476***	1				
$ASLIABL1_{qt}$	0.6028***	0.4172***	0.5846***	1			
$ASLIABL2_{qt}$	0.6103***	0.5460***	0.6868***	0.7440***	1		
$ASLIABL3_{qt}$	0.5263***	0.4194***	0.5834***	0.7584***	0.7262***	1	
$ASCF_{qt}$	0.1747***	0.2351***	0.1614***	0.1538***	0.1974***	0.1371***	1

Panel D5: Correlation Matrix for the Independent Variables for Models 8b (N=5,105 Firm-quarters)

	$ASASSETSL1_{qt}$	$ASASSETSL2_{qt}$	$ASASSETSL3_{qt}$	$ASLIABL1_{qt}$	$ASLIABL2_{qt}$	$ASLIABL3_{qt}$	$ASCF_{qt}$
$ASASSETSL1_{qt}$	1						
$ASASSETSL2_{qt}$	0.4777***	1					
$ASASSETSL3_{qt}$	0.5023***	0.5463***	1				
$ASLIABL1_{qt}$	0.5988***	0.4154***	0.5832***	1			
$ASLIABL2_{qt}$	0.6037***	0.5442***	0.6858***	0.7426***	1		
$ASLIABL3_{qt}$	0.5250***	0.4183***	0.5796***	0.7551***	0.7272***	1	
$ASCF_{qt}$	0.1793***	0.2394***	0.1646***	0.1647***	0.2029***	0.1489***	1

Panel D6: Correlation Matrix for the Independent Variables for Models 9b (N=4,503 Firm-quarters)

	$ASASSETSL1_{qt}$	$ASASSETSL2_{qt}$	$ASASSETSL3_{qt}$	$ASLIABL1_{qt}$	$ASLIABL2_{qt}$	$ASLIABL3_{qt}$	$ASCF_{qt}$
$ASASSETSL1_{qt}$	1						
$ASASSETSL2_{qt}$	0.4708***	1					
$ASASSETSL3_{qt}$	0.4953***	0.5433***	1				
$ASLIABL1_{qt}$	0.5913***	0.4108***	0.5808***	1			
$ASLIABL2_{qt}$	0.5948***	0.5403***	0.6820***	0.7372***	1		
$ASLIABL3_{qt}$	0.5227***	0.4155***	0.5761***	0.7479***	0.7253***	1	
$ASCF_{qt}$	0.1819***	0.2461***	0.1658***	0.1702***	0.2006***	0.1530***	1

*, ** and *** denote significance level at the 0.1, 0.05 and 0.01 levels, respectively (two-tailed) for the Pearson correlation coefficients.

6.2 Multivariate Results

The results from estimating the multiple regression models used to test the hypothesised relationships are presented in Tables 6.9 to 6.12.

6.2.1 *Bank Fair Values and Future Operating Cash flows pre-SFAS 157 (Hypothesis 1a)*

My first set of regressions examined the relationship between bank fair values, current year operating cash flows and future operating cash flows at times: *t+1, t+2 and t+3* during the period from 1996 until 2005, which was before the introduction of SFAS 157. The results are summarised in Tables 6.9 and 6.10.[56] The first observation to make here is that Table 6.9 provides strong evidence that the current year net fair value assets ($ASNFVA_t$) are positively associated with the future operating cash flows across the three time horizons, defined as one-, two-, and three-year ahead operating cash flows. The coefficients on the current year net fair value assets, $ASNFVA_t$, is significantly positive as predicted (with t-statistics = 2.27, 3.62 and 2.83 for the one-, two-, and three-year horizons, respectively). These findings are consistent with the hypothesis that the magnitude of a bank's current year net fair value assets have a significant association with the level of the cash flows the bank will earn in subsequent periods of time. These findings are consistent with Aboody *et al.* (1999) who document a significant positive association between the revaluation of fixed assets of non-financial firms and their future cash flows from operations across a similar three year time horizon. Second, I find that the current year cash flow from operations ($ASCF_t$) has a positive and significant relationship with the one-, two-, and three-year ahead operating

[56] The models on which my empirical analysis is based are described in detail in section 5.5.

cash flows (with t-statistics = 6.76, 6.20 and 5.90 for the one-, two-, and three-year horizons, respectively). This result is consistent with the extant literature that shows current year cash flows do have a significant influence on future cash flows.

Table 6.9
Relationship between bank net fair values and operating cash flows in future years 1, 2 and 3.

		Model 1a: One year ahead		*Model 2a: Two years ahead*		*Model 3a: Three years ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVA_t$	+	0.10** (0.045)	2.27	0.18*** (0.049)	3.62	0.14*** (0.050)	2.83
$ASCF_t$	+	0.37*** (0.055)	6.76	0.35*** (0.056)	6.20	0.35*** (0.060)	5.90
Intercept	?	1.78*** (0.276)	6.44	1.53*** (0.245)	6.23	1.83*** (0.262)	6.99
Observations		1,229		1,162		942	
Adj. R-squared		0.17		0.18		0.17	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.4 for definitions of dependent and independent variables.

Table 6.10 shows that there is a positive and statistically significant relationship between the total fair value assets ($ASFVA_t$) and the one-, two-, and three-year ahead operating cash flows (with t-statistics = 4.59, 3.79 and 3.91 for the one-, two-, and three-year horizons, respectively). This result indicates that the current fair values of on-balance sheet financial assets as disclosed by the banks do reflect the future operating cash flows which banks are expected to earn. On the other hand the total fair value liabilities ($ASFVL_t$) has a negative and statistically significant (at the 10% level) relationship with the one-, two-, and three-year ahead operating cash flows (with t-statistics = -1.76, -2.01 and -1.67 for the one-, two-, and three-year horizons, respectively).[57] This result whilst not as compelling as one might have anticipated is still nonetheless as expected, since at some stage in the future all liabilities will have to be settled thereby reducing the operating cash flow which the bank will earn in future periods.

Table 6.10
Relationship between bank fair value assets, liabilities and operating cash flows in future years 1, 2 and 3.

		Model 1b: One year ahead		*Model 2b: Two years ahead*		*Model 3b: Three years ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASFVA_t$	+	0.86***	4.59	0.74***	3.79	0.84***	3.91
		(0.187)		(0.195)		(0.214)	
$ASFVL_t$	-	-0.25*	-1.76	-0.29**	-2.01	-0.27*	-1.67
		(0.141)		(0.144)		(0.159)	
$ASCF_t$	+	0.29***	4.98	0.31***	5.04	0.28***	4.18
		(0.058)		(0.062)		(0.068)	
Intercept	?	-2.48***	-3.54	-1.22	-1.51	-1.92**	-2.31
		(0.700)		(0.803)		(0.833)	
Observations		1,229		1,162		942	
Adj. R-squared		0.23		0.19		0.21	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.4 for definitions of dependent and independent variables.

6.2.2 *Bank Quarterly Fair Values and Future Operating Cash flows post-SFAS 157 (Hypothesis 2a)*

My second set of results examines the relationship between the levels classified bank fair values according to SFAS 157, current quarter operating cash flows and future quarter operating cash flows at times: *qt+1, qt+2* and *qt+3* during the period from 2008

[57] The correlation matrix presented in Table 6.6 (with Condition Indices for models 1b, 2b and 3b calculated as 56.1536, 54.9893 and 51.0794 respectively) shows that the regression model presented in Table 6.10 is severely afflicted by issues of collinearity in the independent variables. Given this, the regression results summarised here should be interpreted with caution. Also, further robustness tests on models 1b, 2b and 3b are not undertaken in this study because of the collinearity issue identified here.

until 2010. These results are summarised in Tables 6.11 and 6.12.[58] Table 6.11 shows that the net level 1 fair value assets ($ASNFVAL1_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 2.05, 2.58 and 2.65 for the one-, two-, and three-quarter horizons, respectively). I have previously shown (as in section 4.3) that as an asset's future cash flows grow in magnitude the market value of the underlying asset will also become larger. In other words, there will be a positive relationship between the current market value of an asset and the magnitude of the future cash flows that one can expect from the asset. Thus, as expected, my regression results show a positive relationship between the quarterly net level 1 asset fair values and the future quarters' operating cash flows. Similarly, net level 2 fair value assets ($ASNFVAL2_{qt}$) have a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 4.61, 4.68 and 4.40 for the one-, two-, and three-quarter horizons, respectively). Here, the t-scores show that the association between level 2 net asset fair values and future operating cash flows is much more compelling than the relationship between level 1 net asset fair values and future operating cash flows. One would not normally expect this to be the case since level 1 net asset fair values are more objectively determined being as they are, based on the actual market values of the affected net assets. However, during the period of the global financial crisis, asset markets were afflicted by serious issues of illiquidity and this meant that a relatively small proportion of bank net assets had an objectively determinable free market price (Bowen *et al.*, 2011; Cheng, 2012; Laux, 2012). This in turn means that level 2 net asset fair values were far more numerous than level 1 net asset fair values and so, the greater sample size associated with level 2 net asset fair values leads to more

[58] The models on which my empirical analysis is based are described in detail in section 5.5.

compelling t scores than is the case for the smaller sample size upon which the level 1 net asset fair values t-scores are based. Table 6.11 also shows level 3 net asset fair values are positively associated with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 1.62, 2.67 and 3.15 for the one-, two-, and three-quarter horizons, respectively). However, the relationships are only statistically significant at the second and third quarter horizon. The relationship is not significant at the first quarter horizon. Recall, that level 3 net asset fair values are derived through model based valuations with as much market-like inputs as possible employed in these models. Hence, the subjective nature of such models may have impacted on the relationship between the level 3 net asset fair values and the future operating cash flows of the banks. This is consistent with Song *et al.* (2010) who found that the value relevance of level 1 and level 2 net asset fair values were greater than the value relevance of level 3 net asset fair values suggesting that investors (the market in essence) place less weight on level 3 net asset fair values relative to level 1 and level 2 net asset fair values. Finally, from Table 6.11 I observe that the current quarter cash flow from operations ($ASCF_{qt}$) has a positive and significant relationship with the one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 20.96, 11.63 and 9.34 for the one-, two-, and three- quarter horizons, respectively).

Table 6.11
Relationship between Levels Net bank fair value assets and operating cash flows in future quarters 1, 2 & 3.

		Model 7a: One quarter ahead		*Model 8a: Two quarters ahead*		*Model 9a: Three quarters ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVAL1_{qt}$	+	0.05**	2.05	0.08***	2.58	0.08***	2.65
		(0.024)		(0.029)		(0.031)	
$ASNFVAL2_{qt}$	+	0.10***	4.61	0.12***	4.68	0.12***	4.40
		(0.023)		(0.026)		(0.027)	
$ASNFVAL3_{qt}$	+	0.04	1.62	0.08***	2.67	0.10***	3.15
		(0.026)		(0.031)		(0.032)	
$ASCF_{qt}$	+	0.51***	20.96	0.32***	11.63	0.27***	9.34
		(0.024)		(0.028)		(0.029)	
Intercept	?	0.63***	4.73	0.93***	6.20	1.01***	6.31
		(0.134)		(0.150)		(0.160)	
Observations		5,730		5,105		4,503	
Adj.R-squared		0.30		0.15		0.12	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

Table 6.12 shows that the level 1 fair value assets ($ASASSETSL1_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 2.18, 2.58 and 1.98 for the one-, two-, and three-quarter horizons, respectively). It also shows that the level 2 fair value assets ($ASASSETSL2_{qt}$) have a statistically significant and positive association with future operating cash flows across the three quarterly time horizons with t-statistics = 3.68, 3.90 and 3.51 for the one-, two-, and three-quarter horizons, respectively. In contrast, Table 6.12 reports that the relationship between level 3 fair value assets ($ASASSETSL3_{qt}$) and the future operating cash flows across the three quarterly time horizons is not significant. These results are consistent with the expectation that the more objectively determined asset fair values based on asset quoted prices would have a strong association with the bank's future cash flows, while the subjective nature of the level 3 fair value asset values which are based on model estimations would make such level 3 fair value assets have a weaker association with the future cash flows of banks. With regard to the levels classified fair value liabilities, Table 6.12 shows that the level 1 fair value liabilities ($ASLIABL1_{qt}$) and the level 3 fair value liabilities ($ASLIABL3_{qt}$) are not significantly related to the future operating cash flows across the three time horizons even though, both level 1 and level 3 fair value liabilities carry the expected negative signs, in terms of the relationship to the future operating cash flows.

Table 6.12
Relationship between Levels bank fair value assets, liabilities and operating cash flows in future quarters 1, 2 & 3.

Variable	Predicted Sign	*Model 7b: One quarter ahead* Coefficient	t-stat	*Model 8b: Two quarters ahead* Coefficient	t-stat	*Model 9b: Three quarters ahead* Coefficient	t-stat
$ASASSETSL1_{qt}$	+	0.04** (0.019)	2.18	0.06*** (0.024)	2.58	0.05** (0.026)	1.98
$ASASSETSL2_{qt}$	+	0.09*** (0.024)	3.68	0.11*** (0.027)	3.90	0.10*** (0.029)	3.51
$ASASSETSL3_{qt}$	+	0.01 (0.025)	0.43	0.02 (0.030)	0.55	0.04 (0.033)	1.22
$ASLIABL1_{qt}$	-	-0.03 (0.076)	-0.44	-0.05 (0.091)	-0.59	-0.06 (0.100)	-0.57
$ASLIABL2_{qt}$	-	0.10*** (0.035)	2.86	0.20*** (0.042)	4.63	0.21*** (0.045)	4.71
$ASLIABL3_{qt}$	-	-0.05 (0.063)	-0.73	-0.12 (0.075)	-1.59	-0.11 (0.084)	-1.27
$ASCF_{qt}$	+	0.51*** (0.024)	20.71	0.32*** (0.028)	11.38	0.27*** (0.029)	9.16
Intercept	?	0.70*** (0.147)	4.74	1.01*** (0.162)	6.25	1.10*** (0.173)	6.39
Observations		5,730		5,105		4,503	
Adj. R-squared		0.30		0.16		0.13	

Coefficient Comparisons	**F-stat**	**F-stat**	**F-stat**
Test of $ASASSETSL1_{qt}$ = $ASASSETSL2_{qt}$	2.38	1.56	1.69
Test of $ASASSETSL1_{qt}$ = $ASASSETSL3_{qt}$	0.95	1.29	0.06
Test of $ASASSETSL2_{qt}$ = $ASASSETSL3_{qt}$	4.54**	4.29**	1.74
Test of $ASLIABL1_{qt}$ = $ASLIABL2_{qt}$	2.15	4.88**	4.85**
Test of $ASLIABL1_{qt}$ = $ASLIABL3_{qt}$	0.01	0.25	0.11
Test of $ASLIABL2_{qt}$ = $ASLIABL3_{qt}$	3.49*	12.08***	10.45***

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

This latter result contrasts with the level 2 fair value liabilities ($ASLIABL2_{qt}$) which have a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 2.86, 4.63 and 4.71 for the one-, two-, and three-quarter horizons, respectively). This result is in a sense unexpected, as liabilities are generally expected to have a negative relationship with future cash flows. However, the positive and statistically significant coefficients associated with the level 2 fair value liabilities variable ($ASLIABL2_{qt}$) are consistent with the conceptual objection raised against the use of fair values to measure financial instruments where the deterioration in a bank's credit standing could result in a fall in the discounted value of its liabilities. This credit-rating downgrade could result in a bank recognising an accounting profit based on fair value accounting rules thus creating a situation where such a bank benefits from being unable to pay its debts in full (Barth *et al.,* 2008:634-635; Chisnall, 2001)[59]. In other words, the writing down of the fair value liabilities has a positive impact on the bank's future earnings. Likewise, the fact that the bank will now be required to pay out a lower sum in order to completely discharge its liabilities will mean that the bank's future operating cash flows will also be larger than they would otherwise have been. Hence, one should not be surprised that during the period of the global financial crisis there was a positive and significant coefficient associated with the level 2 fair value liabilities variable – especially in light of the fact that the liquidity problems which afflicted asset markets at this time meant that there were relatively few objective market prices on which banks could base level 1 fair value asset and liability measures.[60]

[59] A more detailed discussion on this issue is made in section 2.5.4.

[60] Further discussion to explain the implications of these empirical results is included in section 8.2.

There are also, additional explanations one could give for the positive and statistically significant coefficients associated with the level 2 fair value liabilities variable. For example, creditors were more likely to allow debtor banks greater latitude in the payment of their liabilities during the global financial crisis as they knew that under normal economic circumstances the debtor banks were perfectly viable businesses which would have no difficulty in discharging their liabilities as they became due. Hence, as the world economy emerged from the global financial crisis the creditors realised that the debtor banks would discharge all amounts due to them and so rather than put the debtor banks into liquidation – whence creditors would receive little if anything of the amounts owed to them – they allowed the debtor banks to continue trading by increasing the credit lines they were prepared to make available to them. This in turn meant that the future cash flows earned by the debtor banks would increase beyond what they would have been had creditors put the debtor banks into liquidation. My reasoning here is borne out by the Wald statistics summarised in Table 6.12 which show that the coefficients associated with the level two fair value assets and liabilities are generally larger and often, significantly different from the coefficients associated with the level one and three fair value assets and liabilities.

6.3 Sensitivity and Robustness Tests

6.3.1 Multicollinearity Issues

As well as showing the correlation matrices among the independent variables employed in my empirical analysis for both the first and second study periods, which were summarised in Tables 6.5 through to Table 6.8, I also use the variance inflation factor (*Vif*) and the Condition Index test to check for issues of multicollinearity that might arise with my regression models. As explained in section 5.5.1, values of *Vif* lower than

10 is a threshold where multicollinearity is not considered to be a problem (Coenders and Saez, 2000). Likewise, a condition number less than 30 is considered to provide no evidence of serious collinearity amongst the independent variables for the regression model (Coenders and Saez, 2000). Thus Tables 6.13 through to Table 6.16 provide the *Vif* and Condition Index test results for models 1a and 1b of the first study period, while Tables 6.17 through to Table 6.20 shows the *Vif* and Condition Index test results for models 7a and 7b of the second study period. Untabulated results recorded for the *Vif* for models 2a, 3a, 2b and 3b are 1.07, 1.06, 8.05 and 7.34, respectively for the first study period, while the condition Index numbers for the first study period for models 2a, 3a, 2b and 3b are 4.3537, 4.3566, 54.9893 and 51.0794, respectively. For the second study period the *Vif* for models 8a, 9a, 8b and 9b are 1.28, 1.29, 2.26 and 2.23 respectively, while the condition Index numbers for models 8a, 9a, 8b and 9b are 5.8682, 5.8329, 7.6520 and 7.5633, respectively.

Thus, for the first study period both *Vif* and Condition Index tests support the hypothesis that there is little evidence that the parameter estimates and their associated t-statistics obtained from Models 1a, 2a and 3a are affected by issues of co-linear independent variables. This is not the case for Models 1b, 2b and 3b all of which return Condition indices well in excess of 30 which is the value of the Condition Index that Coenders and Saez (2000) argue will lead to instability issues in the inversion of the information matrix on which the OLS parameter estimates are based. With regard to the second study period the hypothesis that there is little evidence of multicollinearity among the independent variables employed in the estimated regressions is supported based on both the *Vif* and Condition Index tests.

Table 6.13 Multicollinearity Test for Model 1a (Using Condition Index)		
No	**Eigenvalue**	**Condition Index**
1	2.5700	1.0000
2	0.2866	2.9945
3	0.1434	4.2339
Condition Number		**4.2339**

Table 6.14 Multicollinearity Test for Model 1a (Using VIF Factor)				
Variable	**VIF**	**SQRT VIF**	**Tolerance**	**R-Squared**
$ASNFVA_t$	1.08	1.04	0.9298	0.0702
$ASCF_t$	1.08	1.04	0.9298	0.0702
Mean VIF	**1.30**			

Table 6.15 Multicollinearity Test for Model 1b (Using Condition Index)		
No	**Eigenvalue**	**Condition Index**
1	3.6604	1.0000
2	0.3211	3.3766
3	0.0174	14.5142
4	0.0012	56.1536
Condition Number		**56.1536**

Table 6.16 Multicollinearity Test for Model 1b (Using VIF Factor)				
Variable	**VIF**	**SQRT VIF**	**Tolerance**	**R-Squared**
$ASFVA_t$	12.34	3.51	0.0810	0.9190
$ASFVL_t$	11.99	3.46	0.0834	0.9166
$ASCF_t$	1.16	1.07	0.8655	0.1345
Mean VIF	**8.49**			

Table 6.17 Multicollinearity Test for Model 7a (Using Condition Index)		
No	**Eigenvalue**	**Condition Index**
1	3.3053	1.0000
2	0.6772	2.2093
3	0.4790	2.6268
4	0.4409	2.7381
5	0.0976	5.8188
Condition Number		**5.8188**

Table 6.18 Multicollinearity Test for Model 7a (Using VIF Factor)				
Variable	**VIF**	**SQRT VIF**	**Tolerance**	**R-Squared**
$ASNFVAL1_{qt}$	1.28	1.13	0.7827	0.2173
$ASNFVAL2_{qt}$	1.41	1.19	0.7089	0.2911
$ASNFVAL3_{qt}$	1.35	1.16	0.7399	0.2601
$ASCF_{qt}$	1.07	1.03	0.9375	0.0625
Mean VIF	**1.28**			

Table 6.19 Multicollinearity Test for Model 7b (Using Condition Index)		
No	**Eigenvalue**	**Condition Index**
1	4.8094	1.0000
2	1.4762	1.8050
3	0.5532	2.9484
4	0.3580	3.6652
5	0.3068	3.9591
6	0.2148	4.7315
7	0.2003	4.9002
8	0.0812	7.6945
Condition Number		**7.6945**

Table 6.20 Multicollinearity Test for Model 7b (Using VIF Factor)				
Variable	**VIF**	**SQRT VIF**	**Tolerance**	**R-Squared**
$ASASSETSL1_{qt}$	1.83	1.35	0.5461	0.4539
$ASASSETSL2_{qt}$	1.65	1.28	0.6063	0.3937
$ASASSETSL3_{qt}$	2.14	1.46	0.4678	0.5322
$ASLIABL1_{qt}$	3.09	1.76	0.3234	0.6766
$ASLIABL2_{qt}$	3.40	1.84	0.2939	0.7061
$ASLIABL3_{qt}$	2.77	1.66	0.3613	0.6387
$ASCF_{qt}$	1.07	1.03	0.9361	0.0639
Mean VIF	**2.28**			

6.3.2 The Influence of Bank Characteristics

As a robustness test, I consider whether the effects of bank size and capital adequacy (which impacts on banks' financial risk) affect the underlying results summarised in Tables 6.9, 6.11 and 6.12.

6.3.2.1 The Effects of Size

In order to provide for the potential effects of firm size on the regression estimates, I employ the approach of Song *et al*. (2010) and Evans *et al*. (2014) in estimating the regressions with two subsamples of banks based on their relative size. Thus, banks are grouped into the 'large banks' classification when their total assets are above the median total assets of the entire sample of banks and into the 'small banks' classification when their total assets are below the median.[61] Table 6.21 presents the regression results based on this classification of banks for the first study period. For the large banks subsample (in Panel A1, Table 6.21) during the first study period there is a positive and statistically significant association between the net fair value assets ($ASNFVA_t$) and the two- and three-year ahead operating cash flows (with t-statistics = 2.67 and 1.87 for the two- and three-year horizons, respectively). For the one-year ahead operating cash flows, however, there is an insignificant relationship with net fair value assets ($ASNFVA_t$). On the other hand, for the small banks subsample (in Panel B1, Table 6.21) during the same period the one- and two-year operating cash flows (with t-statistics = 2.02 and 2.26 for the one- and two-year horizons, respectively) are positively and statistically significant in relation to net fair value assets ($ASNFVA_t$). However, the third-year ahead operating cash flows are not significantly related to net fair value assets ($ASNFVA_t$). These results suggest that there is a delayed effect for the market to factor in the expectations of the cash flows to be generated by large banks' net assets in the fair value valuations as compared to smaller banks. This could be

[61] In investigating the potential effects of bank size on the regression estimates, I considered other alternative estimation methods such as the use of an indicator variable for bank size above particular total assets thresholds and also the inclusion of the inverse sinh transformed total assets as a control variable in the previously estimated regression models. These procedures did not have a material effect on the estimation outcomes.

attributed to how quickly the cash flows generated by the banks' net assets are realised. Smaller banks may have incentives to realise cash flows more quickly in order to fund their continuing operations, while larger banks will have a more relaxed attitude towards the timing of their cash flows by virtue of the fact that their size will mean they are much less likely to experience liquidity problems than smaller banks.

Furthermore, the positive and statistically significant relationship between the current year cash flow from operations *($ASCF_t$)* and the one-, two-, and three-year ahead operating cash flows are unaffected by the differences in bank size.

Table 6.21
Relationship between bank net fair values and operating cash flows in future years 1, 2 and 3.

Panel A1: Large Banks Subsample

Variable	Predicted Sign	*One year ahead* Coefficient	t-stat	*Two years ahead* Coefficient	t-stat	*Three years ahead* Coefficient	t-stat
$ASNFVA_t$	+	0.06 (0.053)	1.17	0.16*** (0.061)	2.67	0.11* (0.061)	1.87
$ASCF_t$	+	0.36*** (0.072)	5.00	0.32*** (0.075)	4.34	0.34*** (0.080)	4.22
Intercept	?	2.46*** (0.433)	5.67	2.02*** (0.399)	5.07	2.47*** (0.441)	5.59
Observations		632		582		453	
Adj. R-squared		0.15		0.15		0.14	

Panel B1: Small Banks Subsample

Variable	Predicted Sign	*One year ahead* Coefficient	t-stat	*Two years ahead* Coefficient	t-stat	*Three years ahead* Coefficient	t-stat
$ASNFVA_t$	+	0.11** (0.055)	2.02	0.13** (0.056)	2.26	0.09 (0.059)	0.14
$ASCF_t$	+	0.24*** (0.087)	2.81	0.31*** (0.083)	3.78	0.26*** (0.096)	2.65
Intercept	?	1.60*** (0.328)	4.87	1.51*** (0.319)	4.73	1.88*** (0.330)	5.71
Observations		597		580		489	
Adj. R-squared		0.07		0.13		0.08	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.4 for definitions of dependent and independent variables.

During the second study period, where the levels classified bank fair values according to SFAS 157 where used, panel A2 of Table 6.22 shows for the large banks subsample, that the net level 2 fair value assets (*ASNFVAL2*$_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 3.58, 2.95 and 2.36 for the one-, two-, and three-quarter horizons, respectively). However, the relationships are not significant for net level 1 asset fair values (*ASNFVAL1*$_{qt}$) and future operating cash flows across all three time horizons, while net level 3 asset fair values (*ASNFVAL3*$_{qt}$) are statistically significant and positively associated with two-, and three-quarter ahead operating cash flows. For the small banks subsample (as in panel B2, Table 6.22), the net level 1 fair value assets (*ASNFVAL1*$_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 2.97, 3.46 and 2.94 for the one-, two-, and three-quarter horizons, respectively). Similarly, net level 2 fair value assets (*ASNFVAL2*$_{qt}$) have a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 3.75, 5.56 and 6.01 for the one-, two-, and three-quarter horizons, respectively). Panel B2 of Table 6.22 also shows that level 3 net fair value assets have an insignificant relationship with future operating cash flows across all three-quarter time horizons. Given that level 3 net asset fair values are the most subjective of the three fair value classifications and that smaller banks are more susceptible to financial distress during severe downturns than larger banks, this might mean that market participants completely discount the relevance of level 3 net asset fair values for smaller banks.

Table 6.22
Relationship between Levels Net bank fair value assets and operating cash flows in future quarters 1, 2 and 3.

Panel A2: Large Banks Subsample

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASNFVAL1_{qt}$	+	0.01	0.47	0.04	0.98	0.05	1.20
		(0.032)		(0.040)		(0.042)	
$ASNFVAL2_{qt}$	+	0.12***	3.58	0.12***	2.95	0.10**	2.36
		(0.034)		(0.039)		(0.042)	
$ASNFVAL3_{qt}$	+	0.03	0.78	0.08*	1.91	0.09**	2.25
		(0.033)		(0.040)		(0.041)	
$ASCF_{qt}$	+	0.48***	16.81	0.30***	9.11	0.25***	7.38
		(0.029)		(0.033)		(0.034)	
Intercept	?	0.96***	4.21	1.47***	5.71	1.66***	6.03
		(0.228)		(0.257)		(0.275)	
Observations		2,872		2,565		2,269	
Adj. R-squared		0.27		0.13		0.10	

Panel B2: Small Banks Subsample

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASNFVAL1_{qt}$	+	0.06***	2.97	0.08***	3.46	0.08***	2.94
		(0.020)		(0.023)		(0.026)	
$ASNFVAL2_{qt}$	+	0.06***	3.75	0.10***	5.56	0.12***	6.01
		(0.015)		(0.018)		(0.021)	
$ASNFVAL3_{qt}$	+	-0.02	-1.03	-0.04	-1.38	-0.02	-0.54
		(0.022)		(0.028)		(0.031)	
$ASCF_{qt}$	+	0.56***	21.57	0.36***	12.00	0.27***	8.36
		(0.026)		(0.030)		(0.033)	
Intercept	?	0.55***	6.33	0.70***	6.84	0.68***	5.89
		(0.087)		(0.102)		(0.115)	
Observations		2,858		2,540		2,234	
Adj. R-squared		0.32		0.14		0.09	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

Also, for the second study period, panel A3, Table 6.23 shows that for the large banks subsample, the level 2 fair value assets ($ASASSETSL2_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 2.87, 2.48 and 1.79 for the one-, two-, and three-quarter horizons, respectively). However, for the large subsample banks Table 6.23 also shows there are no significant relationships between both level 1 fair value assets ($ASASSETSL1_{qt}$) and level 3 fair value assets (*ASASSETSL3*$_{qt}$) in relation to the future operating cash flows across the three time horizons. Moreover, panel A3 of Table 6.23 shows for large subsample banks that level 1 fair value liabilities (*ASLIABL1*$_{qt}$) and level 3 fair value liabilities (*ASLIABL3*$_{qt}$) are not significantly related to future operating cash flows across all three time horizons. In contrast, there is a positive and statistically significant relationship between level 2 fair value liabilities (*ASLIABL2*$_{qt}$) and future operating cash flows across all three time horizons.

For the small banks subsample, I find from panel B3 of Table 6.23 that the level 1 fair value assets (*ASASSETSL1*$_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 2.81, 3.28 and 2.76 for the one-, two-, and three-quarter time horizons, respectively), while the level 2 fair value assets (*ASASSETSL2*$_{qt}$) also has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics of 4.32, 6.17 and 6.57 for the one-, two-, and three-quarter time horizons, respectively). However for the small banks subsample, level 3 fair value assets (*ASASSETSL3*$_{qt}$) is not significantly related to future operating cash flows across all three time horizons. Panel B3 of Table 6.23 also shows that for small subsample banks the level 1 fair value liabilities (*ASLIABL1*$_{qt}$) are statistically significant and positively related to future operating cash flows across all three time horizons (with t-statistics = 7.78, 6.14 and 6.24 for the one-, two-, and three-quarter time horizons, respectively). Also, there is a negative and statistically significant relationship between the level 2 fair value liabilities (*ASLIABL2*$_{qt}$) and future operating cash flows across the two-, and three-quarter time horizons, while level 3 fair value liabilities (*ASLIABL3*$_{qt}$) are not significantly related to future operating cash flows across all three time horizons. Hence, my results show that there is a strong association between level 1 fair value assets and liabilities and future operating cash flows for the small banks subsample. Here I would note that smaller banks are likely to have relatively fewer complex financial instruments when compared to their larger bank counterparts and so during the global financial crisis period the expected cash flows that these smaller banks can expect to earn from their level 1 financial assets and liabilities will be more easily and more reliably determined, when compared to the level 1 financial assets and liabilities of larger banks. This is because, for large banks with complex financial transactions conducted in multiple markets and with several counter-parties, the challenge of ascertaining the market value of their financial assets and liabilities in an objective manner would be greater, compared to the market prices of smaller banks' financial assets and liabilities. This argument is consistent with the "too big to fail" concept which is the term used to describe financial institutions that are very large with assets that are opaque, difficult for outsiders to value and traded in relatively illiquid and thin markets (White, 2014). Thus, during periods of severe illiquidity such as the global financial crisis, the task of obtaining reliable estimates of the market values for the level 1 assets and liabilities of large banks would become even more severe in comparison to that for smaller banks with less complex financial assets and liabilities.

Table 6.23
Relationship between Levels bank fair value assets, liabilities and operating cash flows in future quarters 1, 2 & 3.

Panel A3: Large Banks Subsample

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASASSETSL1_{qt}$	+	-0.00	-0.01	0.01	0.33	-0.00	-0.01
		(0.029)		(0.036)		(0.039)	
$ASASSETSL2_{qt}$	+	0.11***	2.87	0.10**	2.48	0.08*	1.79
		(0.037)		(0.041)		(0.044)	
$ASASSETSL3_{qt}$	+	-0.02	-0.47	-0.01	-0.31	0.01	0.23
		(0.035)		(0.043)		(0.046)	
$ASLIABL1_{qt}$	-	-0.01	-0.07	-0.03	-0.26	-0.04	-0.35
		(0.080)		(0.096)		(0.106)	
$ASLIABL2_{qt}$	-	0.10**	2.35	0.21***	4.22	0.23***	4.41
		(0.041)		(0.050)		(0.052)	
$ASLIABL3_{qt}$	-	-0.04	-0.59	-0.13	-1.48	-0.10	-1.04
		(0.073)		(0.086)		(0.096)	
$ASCF_{qt}$	+	0.48***	16.68	0.30***	8.93	0.25***	7.26
		(0.029)		(0.033)		(0.034)	
Intercept	?	1.03***	4.07	1.54***	5.57	1.76***	5.95
		(0.253)		(0.277)		(0.296)	
Observations		2,872		2,565		2,269	
Adj. R-squared		0.27		0.13		0.10	

Panel B3: Small Banks Subsample

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASASSETSL1_{qt}$	+	0.06***	2.81	0.08***	3.28	0.07***	2.76
		(0.020)		(0.023)		(0.026)	
$ASASSETSL2_{qt}$	+	0.07***	4.32	0.11***	6.17	0.14***	6.57
		(0.015)		(0.018)		(0.021)	
$ASASSETSL3_{qt}$	+	-0.03	-1.15	-0.04	-1.41	-0.02	-0.56
		(0.022)		(0.029)		(0.032)	
$ASLIABL1_{qt}$	-	0.52***	7.78	0.47***	6.14	0.45***	6.24
		(0.067)		(0.076)		(0.072)	
$ASLIABL2_{qt}$	-	-0.10	-1.30	-0.17*	-1.85	-0.20**	-2.06
		(0.076)		(0.093)		(0.099)	
$ASLIABL3_{qt}$	-	0.04	0.52	0.06	0.72	0.01	0.12
		(0.068)		(0.082)		(0.093)	
$ASCF_{qt}$	+	0.56***	21.60	0.36***	11.90	0.27***	8.26
		(0.026)		(0.030)		(0.033)	
Intercept	?	0.53***	6.08	0.67***	6.49	0.65***	5.49
		(0.088)		(0.104)		(0.119)	
Observations		2,858		2,540		2,234	
Adj. R-squared		0.32		0.14		0.09	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

6.3.2.2 The Effects of Capital Adequacy

In evaluating the potential impact of capital adequacy on the regression estimates, I follow Song *et al*. (2010) by differentiating the sample banks based on their relative Tier 1 capital ratios[62] and dividing the sample into two groups: 'Highly capitalised banks' with Tier 1 capital ratio above the median total Tier 1 capital ratio of the entire sample of banks and 'Low capitalised banks' with Tier 1 capital ratio below the median. Table 6.24 presents the results of the regression procedures for the first study period.

Table 6.24
Relationship between bank net fair values and operating cash flows in future years 1, 2 and 3.

Panel A4: Subsample of Banks with High Capital Ratio.

		One year ahead		*Two years ahead*		*Three years ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVA_t$	+	0.13*	1.89	0.27***	3.23	0.26***	2.67
		(0.070)		(0.082)		(0.099)	
$ASCF_t$	+	0.50***	6.60	0.33***	4.16	0.31***	3.67
		(0.076)		(0.079)		(0.084)	
Intercept	?	1.00**	2.56	1.00***	2.71	1.23**	2.53
		(0.390)		(0.369)		(0.488)	
Observations		577		544		443	
Adj. R-squared		0.27		0.20		0.20	

Panel B4: Subsample of Banks with Low Capital Ratio.

		One year ahead		*Two years ahead*		*Three years ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVA_t$	+	0.10*	1.82	0.16***	2.72	0.12**	2.08
		(0.053)		(0.058)		(0.057)	
$ASCF_t$	+	0.33***	5.05	0.35***	5.12	0.36***	4.84
		(0.066)		(0.068)		(0.074)	
Intercept	?	2.10***	6.16	1.74***	5.69	2.03***	6.28
		(0.340)		(0.306)		(0.323)	
Observations		652		618		499	
Adj. R-squared		0.14		0.18		0.16	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.4 for definitions of dependent and independent variables.

[62] Tier 1 capital ratio refers to banks' core capital (includes equity capital and disclosed reserves) divided by banks' risk weighted assets (i.e. all assets held by a bank weighted by credit risk).

During the first study period, the high capital ratio banks subsample (as in Panel A4, Table 6.24) there is a positive and statistically significant association between the net fair value assets ($ASNFVA_t$) and the one-, two- and three-year ahead operating cash flows (with t-statistics = 1.89, 3.23 and 2.67 for the one-, two- and three-year time horizons, respectively). On the other hand, for the low capital ratio banks subsample during the same period (as in Panel B4, Table 6.24) the one-, two- and three-year operating cash flows (with t-statistics = 1.82, 2.72 and 2.08 for the one-, two- and three-year time horizons, respectively) are positive and statistically significant in relation to net fair value assets ($ASNFVA_t$). These results suggest that the relationship between net fair value assets and future operating cash flows of banks was not affected by the level of financial risk. Here it will be recalled that during the first study period there were no problems with market illiquidity and uncertainty when compared to the period of the global financial crisis and so, capital adequacy issues had very little impact on the market's expectations about the future cash flows of the sampled banks.

For the second study period, panel A5 of Table 6.25 shows for the subsample of high capital ratio banks, that the net level 1 fair value assets ($ASNFVAL1_{qt}$) has a positive and statistically significant relationship at the 5% level, with two-, and three-quarter ahead operating cash flows (with t-statistics = 2.17 and 2.04 for the two-, and three-quarter time horizons, respectively). Also, the net level 2 fair value assets ($ASNFVAL2_{qt}$) has a positive and statistically significant relationship with two-, and three-quarter ahead operating cash flows (with t-statistics = 3.11 and 2.69 for the two-, and three-quarter time horizons, respectively). However, the relationships are not significant between net level 3 asset fair values ($ASNFVAL3_{qt}$) and future operating cash flows across all three time horizons.

Table 6.25
Relationship between Levels Net bank fair value assets and operating cash flows in future quarters 1, 2 and 3.

Panel A5: Subsample of Banks with High Capital Ratio.

		One quarter ahead		*Two quarters ahead*		*Three quarters ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVAL1_{qt}$	+	0.02	0.56	0.09**	2.17	0.09**	2.04
		(0.034)		(0.039)		(0.043)	
$ASNFVAL2_{qt}$	+	0.03	0.91	0.13***	3.11	0.11***	2.69
		(0.036)		(0.041)		(0.041)	
$ASNFVAL3_{qt}$	+	0.05	1.41	0.04	0.86	0.07	1.50
		(0.038)		(0.041)		(0.045)	
$ASCF_{qt}$	+	0.54***	14.23	0.35***	7.82	0.31***	6.65
		(0.038)		(0.044)		(0.047)	
Intercept	?	1.03***	4.50	0.98***	3.95	1.17***	4.62
		(0.229)		(0.247)		(0.253)	
Observations		2,551		2,221		1,910	
Adj. R-squared		0.30		0.16		0.15	

Panel B5: Subsample of Banks with Low Capital Ratio.

		One quarter ahead		*Two quarters ahead*		*Three quarters ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVAL1_{qt}$	+	0.08**	2.38	0.07*	1.66	0.07*	1.76
		(0.033)		(0.042)		(0.042)	
$ASNFVAL2_{qt}$	+	0.14***	4.79	0.11***	3.28	0.11***	3.08
		(0.029)		(0.033)		(0.035)	
$ASNFVAL3_{qt}$	+	0.04	1.16	0.12***	2.76	0.13***	3.08
		(0.034)		(0.043)		(0.043)	
$ASCF_{qt}$	+	0.49***	15.78	0.31***	8.79	0.25***	6.87
		(0.031)		(0.035)		(0.037)	
Intercept	?	0.45***	2.73	0.90***	4.89	0.95***	4.76
		(0.164)		(0.185)		(0.199)	
Observations		3,179		2,884		2,593	
Adj. R-squared		0.30		0.15		0.11	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

For the low capital ratio banks subsample (as in panel B5, Table 6.25), the net level 1 fair value assets ($ASNFVAL1_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 2.36, 1.66 and 1.76 for the one-, two-, and three-quarter time horizons, respectively). Furthermore, net level 2 fair value assets ($ASNFVAL2_{qt}$) have a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 4.79, 3.28 and 3.08 for the one-, two-, and three-quarter time horizons, respectively). Panel B5 of Table 6.25 also shows that level 3 net asset fair values (*ASNFVAL3*$_{qt}$) have a positive and statistically significant relationship with two-, and three-quarter ahead operating cash flows (with t-statistics = 2.76 and 3.08 for the two-, and three-quarter time horizons, respectively). These results suggest that during the global financial crisis the net level 2 fair value assets (*ASNFVAL2*$_{qt}$) continue to be significantly associated with future operating cash flows irrespective of the capital adequacy level of banks. There is, however, a delay in how the market factors its cash flow expectations into the net asset fair values appearing on a given bank's balance sheet according to whether the affected bank is a high or low capital ratio bank. Here, high capital ratio banks face lesser incentives to engage in hasty asset liquidations because of their comfortable capital position. However, the general uncertainty and market illiquidity during the global financial crisis make the task of obtaining objectively defined net fair values difficult - even for high capital ratio banks. The resulting measurement errors associated with the level 1 net asset fair values lead to an error in variables problem in regressions of future cash flows on net asset fair values. In such circumstances it is well known that regression coefficients will more than likely be biased towards zero (Greene, 2012) and so, it is not surprising that there is a weaker relationship between net level 1 fair value assets (*ASNFVAL1*$_{qt}$), net level 3 asset fair values (*ASNFVAL3*$_{qt}$) and the future operating cash flows when compared to the relationship between net level 2 fair value assets (*ASNFVAL2*$_{qt}$) and the future operating cash flows.

Also, for the second study period, panel A6 of Table 6.26 shows that for high capital ratio banks level 1 fair value assets (*ASASSETSL1*$_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 2.92, 3.49 and 2.90 for the one-, two-, and three-quarter time horizons, respectively). The level 2 fair value assets (*ASASSETSL2*$_{qt}$) has a positive and statistically significant relationship with two-, and three-quarter ahead operating cash flows (with t-statistics = 2.27 and 1.77 for the two-, and three-quarter time horizons, respectively). Moreover, level 3 fair value assets (*ASASSETSL3*$_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 2.84, 1.96 and 2.17 for the one-, two-, and three-quarter time horizons, respectively). Finally, for the high capital ratio banks panel A6 of Table 6.26 shows that the level 2 fair value liabilities (*ASLIABL2*$_{qt}$) is statistically significant and positively related to future operating cash flows across all three time horizons. Furthermore, level 3 fair value assets (*ASASSETSL3*$_{qt}$) has a negative and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = -3.15, -3.06, and -2.97 for the one-, two-, and three-quarter time horizons, respectively). In contrast level 1 fair value liabilities (*ASLIABL1*$_{qt}$) do not have a significant relationship with future operating cash flows across all three time horizons.

Panel B6 of Table 6.26 shows for low capital ratio banks that level 2 fair value assets (*ASASSETSL2*$_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 3.94, 2.75 and 2.45 for the one-, two-, and three-quarter time horizons, respectively), while level 2 fair value liabilities (*ASLIABL2*$_{qt}$) also has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating cash flows (with t-statistics = 2.20, 4.03 and 3.75 for the one-, two-, and three-quarter time horizons, respectively). However, panel B6 of Table 6.26 shows for low capital ratio banks that level 1 fair value assets

($ASASSETSL1_{qt}$), level 1 fair value liabilities ($ASLIABL1_{qt}$), level 3 fair value assets ($ASASSETSL3_{qt}$) and level 3 fair value liabilities ($ASLIABL3_{qt}$) all do not have a significant relationship with future operating cash flows across all three time horizons.

Table 6.26
Relationship between Levels bank fair value assets, liabilities and operating cash flows in future quarters 1, 2 & 3.

Panel A6: Subsample of Banks with High Capital Ratio.

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASASSETSL1_{qt}$	+	0.07***	2.92	0.11***	3.49	0.10***	2.90
		(0.025)		(0.031)		(0.035)	
$ASASSETSL2_{qt}$	+	0.02	0.39	0.10**	2.27	0.08*	1.77
		(0.039)		(0.044)		(0.043)	
$ASASSETSL3_{qt}$	+	0.10***	2.84	0.08*	1.96	0.10**	2.17
		(0.035)		(0.041)		(0.045)	
$ASLIABL1_{qt}$	-	-0.14	-1.17	-0.05	-0.36	-0.04	-0.23
		(0.118)		(0.146)		(0.167)	
$ASLIABL2_{qt}$	-	0.10**	2.04	0.14**	2.50	0.19***	3.12
		(0.047)		(0.058)		(0.061)	
$ASLIABL3_{qt}$	-	-0.28***	-3.15	-0.34***	-3.06	-0.37***	-2.97
		(0.088)		(0.110)		(0.124)	
$ASCF_{qt}$	+	0.53***	14.12	0.34***	7.68	0.30***	6.55
		(0.037)		(0.044)		(0.046)	
Intercept	?	1.02***	4.09	1.03***	3.87	1.27***	4.74
		(0.250)		(0.267)		(0.267)	
Observations		2,551		2,221		1,910	
Adj. R-squared		0.31		0.17		0.16	

Panel B6: Subsample of Banks with Low Capital Ratio.

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASASSETSL1_{qt}$	+	0.02	0.76	0.02	0.67	0.01	0.28
		(0.028)		(0.033)		(0.036)	
$ASASSETSL2_{qt}$	+	0.12***	3.94	0.10***	2.75	0.09**	2.45
		(0.031)		(0.034)		(0.037)	
$ASASSETSL3_{qt}$	+	-0.04	-1.13	-0.01	-0.24	0.03	0.59
		(0.034)		(0.041)		(0.045)	
$ASLIABL1_{qt}$	-	0.01	0.09	-0.10	-0.91	-0.12	-1.07
		(0.090)		(0.106)		(0.113)	
$ASLIABL2_{qt}$	-	0.11**	2.20	0.24***	4.03	0.23***	3.75
		(0.051)		(0.060)		(0.063)	
$ASLIABL3_{qt}$	-	0.12	1.42	0.05	0.51	0.11	0.99
		(0.087)		(0.097)		(0.107)	
$ASCF_{qt}$	+	0.48***	15.51	0.30***	8.56	0.24***	6.69
		(0.031)		(0.035)		(0.036)	
Intercept	?	0.59***	3.27	1.04***	5.17	1.09***	4.98
		(0.182)		(0.201)		(0.218)	
Observations		3,179		2,884		2,593	
Adj. R-squared		0.30		0.15		0.12	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables

Panel A6 of Table 6.26 shows that for banks with high capital ratios during the global financial crisis period, there is a strong relationship between level 1 fair value assets ($ASASSETSL1_{qt}$) and future operating cash flows across all three time horizons. This shows that the objectively determined fair value assets of banks with lower risk profiles as portrayed by high capital ratios during this period have a significant association with future operating cash flows. Also, for high capital ratio banks both level 3 fair value assets ($ASASSETSL3_{qt}$) and level 3 fair value liabilities ($ASLIABL3_{qt}$) are significantly associated with future operating cash flows. This shows for banks with high capital ratios that level 3 fair values (which are based on model estimates) also hold relevance to investors despite the fact that they may be of questionable objectivity. Thus, it may be concluded that when there is uncertainty in financial markets, the asset fair values of banks with less financial risk, because of high capital ratios, do have a better predictive relationship with regard to future cash flows when compared to banks with lower capital ratios. Panel B6 of Table 6.26 shows an insignificant statistical association between both the level 1 and level 3 fair value assets and liabilities of low capital ratio banks and their future operating cash flows during the global financial crisis period. This result further supports the hypothesis that the asset and liability fair values of banks with high financial risk as evidenced by low capital ratios during periods of financial markets uncertainty have a lesser predictive relationship with regard to future cash flows when compared with banks with high capital ratios.

6.3.2.3 The Effects of Growth Prospects

In order to control for the growth prospects of the sampled banks, I follow Song *et al*. (2010) and Eccher *et al.* (1996) by including a growth variable in my regression equations. The growth variable was represented by the growth in bank total assets and also, the growth in bank net loans. *ASGRW* (asset growth) is defined as the logarithm of bank total assets at time *t* divided by bank total assets at time (*t* - *1*) where time *t* represents the particular "year" during the first study period and time *t* represents the particular "quarter" during the second study period. Thus for the first study period these regressions are estimated as follows:

$$ASCF_{t+1} = a_0 + a_1 ASNFVA_t + a_2 ASCF_t + a_3 ASGRW + \alpha_t$$

$$ASCF_{t+2} = b_0 + b_1 ASNFVA_t + b_2 ASCF_t + b_3 ASGRW + \beta_t$$

$$ASCF_{t+3} = c_0 + c_1 ASNFVA_t + c_2 ASCF_t + c_3 ASGRW + \zeta_t$$

In the first of the above equations $ASCF_{t+1}$ is the one period ahead inverse sinh transformed value of the cash flow, $ASNFVA_t$ is the transformed value of the net fair value assets, $ASCF_t$ is the transformed value of the current period cash flow, a_1, a_2, and a_3 are parameters and α_t is a stochastic error term. The variables and parameters appearing in the second and third equations are to be similarly interpreted. The results of the above regression estimates are then compared with the original models which exclude the growth factor. The results are summarised in Table 6.27. From the results shown in Table 6.27, it can be seen that the *ASGRW (Asset growth)* variable does not change the coefficients associated with the other variables in the regressions in any fundamental way. Thus, there is no evidence that controlling for asset growth alters any of the conclusions I have previously reached.[63]

Table 6.28, shows the results when the *ASGRW* (asset growth) variable is incorporated into the regression models that relate net bank fair values to operating cash flows in future quarters 1, 2 and 3 during the second study period. The results show similar

[63] Similar results were obtained when growth in bank net loans was used instead of the asset growth variable in the regressions to test for the influence of the bank growth prospects on the underlying models.

outcomes to the results found during the first study period because when asset growth is controlled for in the regressions, it does not significantly change the findings obtained from the underlying models which do not incorporate the *ASGRW* (asset growth) variable.[64]

6.3.3 Specific fair value asset and Liability regressions for the first study period

For the first study period with annual data from 1996 until 2005, I further investigate whether the fair values of specific classes of financial assets and liabilities[65] have a significant influence on bank cash flows in the future years *t+1*, *t+2* and *t+3*, respectively. The results summarised in Table 6.29 suggest that only net loans ($ASLOAN_t$) and loans held for sale ($ASLHS_t$) have a significant association with future operating cash flows across the three time horizons. This finding is important as it indicates that at the specific financial asset or liability level, fair values may not possess a strong predictive relationship with future cash flows. However as already discussed earlier in the chapter, when these specific asset/liability fair values are aggregated, they do appear to possess a predictive relationship with future cash flows.

[64] Growth in bank net loans was used in place of the asset growth variable in the regressions with similar outcomes. Also similar control measures for growth prospects were employed with the regressions associated with the relationship between levels bank fair value assets, liabilities and operating cash flows in future quarters 1, 2 and 3, during the second study period with similar outcomes.

[65] There are ten classes of on-balance sheet fair value financial assets and six classes of on-balance sheet fair value of financial liabilities employed in the regression models as shown in Table 6.29. Each of these classes of financial assets and liabilities are described in detail in section 5.5.2 and specifically in Table 5.8 which is found on pages 125-127 of this thesis.

Table 6.27
Relationship between bank net fair values and operating cash flows in future years 1, 2 and 3 with and without an asset growth variable, during the first study period.

		One year ahead				*Two years ahead*				*Three years ahead*			
		Model 1a		*Model 1a with Growth Variable.*		*Model 2a*		*Model 2a with Growth Variable.*		*Model 3a*		*Model 3a with Growth Variable.*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVA_t$	+	0.10**	2.27	0.09**	2.10	0.18***	3.62	0.17***	3.48	0.14***	2.83	0.14***	2.69
		(0.045)		(0.045)		(0.049)		(0.050)		(0.050)		(0.050)	
$ASCF_t$	+	0.37***	6.76	0.37***	6.55	0.35***	6.20	0.35***	5.95	0.35***	5.90	0.35***	5.61
		(0.055)		(0.056)		(0.056)		(0.058)		(0.060)		(0.062)	
ASGRW	+			0.21	0.88			-0.05	-0.17			0.18	0.90
				(0.239)				(0.307)				(0.195)	
Intercept	?	1.78***	6.44	1.80***	6.41	1.53***	6.23	1.57***	6.15	1.83***	6.99	1.86***	6.85
		(0.276)		(0.282)		(0.245)		(0.255)		(0.262)		(0.271)	
Observations		1,229		1,198		1,162		1,131		942		912	
Adj. R-squared		0.17		0.16		0.18		0.17		0.17		0.16	

Robust standard errors in parentheses ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using
the White robust adjustment procedure. See Table 5.4 for definitions of dependent and independent variables.

Table 6.28
Relationship between Levels Net bank fair value assets and operating cash flows in future quarters 1, 2 and 3 with and without an asset growth variable, during the second study period.

		One quarter ahead				*Two quarters ahead*				*Three quarters ahead*			
		Model 7a		*Model 7a with Growth Variable*		*Model 8a*		*Model 8a with Growth Variable*		*Model 9a*		*Model 9a with Growth Variable*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVAL1_{qt}$	+	0.05**	2.05	0.03	1.34	0.08***	2.58	0.05*	1.67	0.08***	2.65	0.06*	1.77
		(0.024)		(0.026)		(0.029)		(0.032)		(0.031)		(0.034)	
$ASNFVAL2_{qt}$	+	0.10***	4.61	0.10***	3.73	0.12***	4.68	0.11***	3.79	0.12***	4.40	0.14***	4.45
		(0.023)		(0.026)		(0.026)		(0.030)		(0.027)		(0.031)	
$ASNFVAL3_{qt}$	+	0.04	1.62	0.03	1.23	0.08***	2.67	0.07**	2.20	0.10***	3.15	0.10***	2.90
		(0.026)		(0.027)		(0.031)		(0.034)		(0.032)		(0.034)	
ASGRW	+			-1.22	-1.20			0.21	0.16			0.17	0.15
				(1.022)				(1.264)				(1.190)	
$ASCF_{qt}$	+	0.51***	20.96	0.51***	19.89	0.32***	11.63	0.34***	11.49	0.27***	9.34	0.29***	9.39
		(0.024)		(0.026)		(0.028)		(0.030)		(0.029)		(0.031)	
Intercept	?	0.63***	4.73	0.70***	4.55	0.93***	6.20	0.90***	5.27	1.01***	6.31	0.76***	4.19
		(0.134)		(0.153)		(0.150)		(0.172)		(0.160)		(0.181)	
Observations		5,730		5,105		5,105		4,503		4,503		3,928	
Adj. R-squared		0.30		0.29		0.15		0.15		0.12		0.13	

Robust standard errors in parentheses ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using
the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

Table 6.29
Relationship between bank specific asset and liability fair values and operating cash flows in future years 1, 2 and 3, during the first study period.

		Model 13a: One year ahead		*Model 13b: Two years ahead*		*Model 13c: Three years ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASCASH_t$	+	-0.09	-1.04	-0.04	-0.43	-0.07	-0.69
		(0.085)		(0.094)		(0.100)	
$ASFEDE_t$	+	0.05	1.23	0.11***	3.08	0.10**	2.12
		(0.038)		(0.036)		(0.046)	
$ASFHLB_t$	+	0.02	0.25	0.06	0.79	-0.05	-0.57
		(0.076)		(0.078)		(0.093)	
$ASINVA_t$	+	0.00	0.14	-0.02	-0.72	0.01	0.20
		(0.030)		(0.033)		(0.035)	
$ASINVM_t$	+	0.03	0.78	-0.01	-0.33	0.05	1.10
		(0.037)		(0.038)		(0.042)	
$ASINVT_t$	+	0.04	0.41	0.16	1.56	0.25***	2.77
		(0.092)		(0.103)		(0.089)	
$ASLHS_t$	+	-0.17**	-2.42	-0.20**	-2.56	-0.13*	-1.79
		(0.071)		(0.077)		(0.070)	
$ASLOAN_t$	+	0.43**	1.98	0.46**	2.50	0.47**	2.34
		(0.217)		(0.184)		(0.201)	
$ASMSR_t$	+	-0.15	-0.81	-0.05	-0.27	-0.02	-0.10
		(0.182)		(0.185)		(0.216)	
$ASOSTA_t$	+	0.10**	2.08	0.01	0.22	0.09	1.27
		(0.049)		(0.064)		(0.069)	
$ASDEPO_t$	-	0.40**	2.24	0.18	1.55	0.18	1.41
		(0.180)		(0.117)		(0.127)	
$ASFFP_t$	-	-0.01	-0.31	-0.06	-1.23	-0.12*	-1.88
		(0.046)		(0.050)		(0.062)	
$ASFBAD_t$	-	-0.05	-1.17	-0.04	-0.89	-0.04	-0.98
		(0.039)		(0.040)		(0.042)	
$ASLTD_t$	-	0.02	0.55	-0.01	-0.24	-0.00	-0.04
		(0.038)		(0.037)		(0.040)	
$ASOTNEG_t$	-	-0.08*	-1.91	-0.06	-1.43	-0.08*	-1.76
		(0.042)		(0.041)		(0.047)	
$ASSTD_t$	-	-0.04	-0.93	-0.03	-0.70	-0.03	-0.56
		(0.045)		(0.043)		(0.047)	
$ASCF_t$	+	0.24***	3.83	0.26***	3.92	0.24***	3.44
		(0.063)		(0.066)		(0.070)	
Intercept	?	-3.18***	-3.53	-1.58*	-1.78	-1.77*	-1.82
		(0.901)		(0.885)		(0.970)	
Observations		1,229		1,162		942	
Adj. R-squared		0.24		0.21		0.22	

Robust standard errors in parentheses ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.8 for definitions of dependent and independent variables.

6.3.4 Further Robustness Tests

I now summarise the results of some other robustness tests which were undertaken in order to ensure the robustness of my primary results.

6.3.4.1 Heteroscedasticity Robust Option

As mentioned in section 5.5.1, utilising the inverse hyperbolic sine function to transform the variables employed in the regression models, reduces the impact heteroscedasticity might have on the veracity of the regression procedures. To further mitigate econometric issues associated with heteroscedastic error terms, the White (1980) adjustment procedure was applied to all regression models evaluated in my empirical analysis.

6.3.4.2 OLS Regression with Cluster Option

It is possible that the level of future year cash flows as shown in the first study period and the level of future quarter cash flows as shown in the second study period among different banks within a year or quarter as the case may be or different years or quarters within a bank may not be independent. This could lead to residuals that are not independent within years, quarters or banks. I therefore use OLS regression with the cluster option based on bank and year in the first study period and for the second study period, the cluster option based on bank and quarter.

Overall, untabulated results for both study periods show that the results regarding the relationship between the future operating cash flows the net fair values across the three time horizons remain unchanged when the cluster regression procedure is applied.

6.3.4.3 Outliers

Data employed in my regression analysis were also investigated for outliers. This was done by evaluating the studentized residuals associated with the variables. Following, Belsley *et al.* (1980) and Fox (1991) the studentized residuals computed from a regression equation with an absolute value of greater than 2 could raise concerns, while studentized residuals with an absolute value of greater than 3 are considered to be outliers. I therefore re-estimated the regression models after deleting observations with studentized residuals with an absolute value greater than 3. These procedures had no material effects on the results initially obtained from the underlying models.

6.3.4.4 Alternative Data Transformation techniques

I re-estimated all the regression models articulated in this chapter using two alternative data transformations. For the first transformation I deflated all variables by the balance sheet value of total assets. A second transformation involved deflating all variables by the balance sheet value of issued common shares. The regression results based on both of these deflation procedures were extremely poor and showed that there was at best a tenuous but more commonly, a non-existent relationship between future cash flows and the banks' current on-balance sheet net asset fair values. In some ways this is hardly surprising since Pearson (1897) showed over a century ago that when one implements a regression procedure where some or all of the independent variables and the dependent variable have been scaled by a common factor (as was the case with the regression procedures invoked in this section) that all parameter estimates will be biased and there will also be an element of spurious correlation in the regression relationship.

6.4 Summary

This chapter presents and discusses the descriptive statistics and multivariate regression results obtained from the hypothesis testing procedures with regard to the relationships between bank fair values, current year operating cash flows and future operating cash flows. Section 6.1 showed the summary descriptive statistics for the raw data and also the transformed data based on the inverse hyperbolic sine transformation. This transformation was applied in order to render the data employed in the empirical analysis more compatible with the assumptions of the general linear regression model. Furthermore, in comparison with other common transformations it can deal with negative values.

Section 6.2 provides a summary of the empirical results used to test for hypotheses 1a and 2a. These hypotheses examine whether there is a predictive relationship between bank fair values and their future cash flows, utilising annual data for the first study period from 1996 until 2005 and quarterly data for the second study period, from 2008 until 2010. The empirical results support hypothesis 1a, that the current net asset fair values of on-balance sheet financial instruments of banks during the first study period have a significant association with the future years' cash flows of such banks. With regard to hypothesis 2a for the second study period which encompassed the global financial crises period and also the levels classification of bank fair values according to SFAS 157, the findings from the empirical results were that the current quarter's level 1 and level 2 net asset fair values of banks have a significant association with the future quarters' cash flows of such banks. The level 3 net asset fair values of such banks in most cases had an insignificant association with the banks' future quarterly cash flows.

Section 6.3 summarises several robustness and sensitivity tests relating to the empirical procedures employed in this chapter - especially with respect to the impact of bank size, capital adequacy and growth prospects on the underlying empirical results. Overall, the robustness tests had very little impact on the results I obtained for first study period. However, for the second study period, there were cases where bank size and bank capital ratios did have a significant impact on the predictive relationship between bank fair values and future cash flows. Chapter seven will report the results of the hypothesised relationships between bank fair values and future operating earnings.

CHAPTER SEVEN

RESULTS: FAIR VALUES AND FUTURE EARNINGS

This chapter summarizes the second and final component of the empirical work conducted for this thesis and deals with the relationship between the fair values appearing in bank financial statements and bank future operating earnings. In section 7.1 I begin my summary of the empirical analysis with a summary descriptive statistics relating to all the important variables on which my empirical analysis is based. Section 7.2 provides a summary of the empirical results relating to hypotheses 1b and 2b. It will be recalled (as in section 4.4) that these hypotheses examine whether there is a predictive relationship between bank fair values and future earnings. The empirical results are summarised for the first study period using annual data from 1996 until 2005 and also for the second study period, using quarterly data covering the period from 2008 until 2010. Section 7.3 summarises several robustness and sensitivity tests relating to the empirical procedures employed in this chapter - especially with respect to the impact of bank size, bank capital adequacy and the growth prospects of banks. A summary of the chapter is provided in section 7.4.

7.1 Descriptive Statistics

Table 7.1 presents descriptive statistics for the raw (that is, untransformed data) associated with the regression variables that examine the relationships between bank fair values and future operating earnings, for the first study period from 1996-2005. From panel A1 the average annual one year ahead future operating earnings (OP_{t+1}) across the 1,150 firm-years comprising my sample is \$159.89 million. Panel A2 shows that the average annual two year ahead operating earnings (OP_{t+2}) increases to \$161.8 million across the 1,081 firm-years comprising that element of my sample. Finally, panel A3 shows that the average annual three year ahead operating earnings (OP_{t+3}) again increases to \$176.6 million across the 875 firm-years comprising my sample. Panel A1 also shows that the average net fair value assets ($NFVA_t$) associated with one year ahead operating earnings is \$505.5 million. Likewise, panels A2 and A3 show that the average net fair value assets ($NFVA_t$) associated with two and three year ahead operating earnings amount to \$402.3 million and \$326.6 million, respectively. Panel A1 of Table 7.1 also shows that the average total fair value assets (FVA_t) associated with one year ahead operating earnings (OP_{t+1}) were \$6749.4 million, whilst the average total fair value liabilities (FVL_t) associated with one year ahead operating earnings (OP_{t+1}) were \$6243.9 million as shown. Finally, panel A1 shows that the current year operating earnings (OP_t) associated with one year ahead operating earnings (OP_{t+1}) was \$139.4 million. The third column of panel A1 of Table 7.1 also shows that the standard deviation of the one year ahead operating earnings (OP_{t+1}) across the 1,150 firm years comprising my sample is 620.621. The standardised skewness and kurtosis measures of the one year ahead earnings (OP_{t+1}) are 7.36 and 64.313, respectively whilst the minimum and maximum one year ahead operating earnings are -\$204.5 million and \$6,863 million, respectively. The other statistics appearing in Table 7.1 are to be similarly interpreted.

Table 7.1 Descriptive Statistics for the first study period (1996-2005) for the variables in $US millions							
Panel A1: Descriptive statistics for regression models 4a-4b							
Variable[66]	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**	**N (Firm-Years)**
OP_{t+1}	159.890	620.621	7.360	64.313	-205.715	6863.000	1150
$NFVA_t$	505.509	4822.372	14.765	296.195	-38700.000	104000.000	1150
FVA_t	6749.426	21112.189	6.585	54.002	140.586	256000.000	1150
FVL_t	6243.917	18545.808	5.951	43.340	0.000	182000.000	1150
OP_t	139.399	549.015	7.979	76.878	-106.232	6571.000	1150
Panel A2: Descriptive statistics for regression models 5a-5b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**	**N (Firm-Years)**
OP_{t+2}	161.755	638.191	7.170	61.166	-1409.712	6863.000	1081
$NFVA_t$	402.257	3825.167	13.178	300.658	-38700.000	81701.000	1081
FVA_t	6229.327	19205.997	6.452	50.824	140.586	203000.000	1081
FVL_t	5827.070	17351.334	6.087	45.492	0.000	169000.000	1081
OP_t	129.056	511.094	8.259	83.073	-106.232	6176.400	1081
Panel A3: Descriptive statistics for regression models 6a-6b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**	**N (Firm-Years)**
OP_{t+3}	176.636	689.555	6.815	54.402	-1409.712	6863.000	875
$NFVA_t$	326.616	3205.416	9.034	280.377	-38700.000	68679.000	875
FVA_t	5938.709	18241.784	6.511	51.613	145.005	188000.000	875
FVL_t	5612.093	16847.697	6.269	48.291	0.000	164000.000	875
OP_t	119.726	464.806	8.329	86.237	-106.232	6154.000	875

As in chapter 6 the inverse hyperbolic sine transformation was applied to the raw data on which my empirical analysis is based in order to address issues of heteroscedasticity and also, to render my data more compatible with the assumptions of the general linear regression model. Given this, Table 7.2 presents the descriptive statistics associated with the transformed data. Panel A1 of Table 7.2 shows that the average annual one year ahead transformed future operating earnings ($ASOP_{t+1}$) across the 1,150 firm-years comprising my sample amounts to 4.029 whilst the average transformed net fair value assets ($ASNFVA_t$) associated with one year ahead transformed operating earnings

[66] See Table 5.4 for definitions of the variables.

amounts to 4.753. The other figures appearing in Table 7.2 are to be similarly interpreted.

Table 7.2 **Descriptive Statistics for the first study period (1996-2005) for the transformed data**							
Panel A1: Descriptive statistics for regression models 4a-4b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**	**N (Firm-Years)**
$ASOP_{t+1}$	4.029	1.750	-0.419	7.138	-6.020	9.527	1150
$ASNFVA_t$	4.753	2.840	-2.401	10.925	-11.257	12.245	1150
$ASFVA_t$	8.213	1.343	1.000	3.922	5.639	13.145	1150
$ASFVL_t$	8.114	1.423	0.399	5.985	0.000	12.804	1150
$ASOP_t$	3.895	1.780	-0.490	6.766	-5.359	9.484	1150
Panel A2: Descriptive statistics for regression models 5a-5b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**	**N (Firm-Years)**
$ASOP_{t+2}$	4.007	1.877	-0.983	9.078	-7.944	9.527	1081
$ASNFVA_t$	4.725	2.802	-2.463	11.297	-11.257	12.004	1081
$ASFVA_t$	8.172	1.320	1.009	3.974	5.639	12.914	1081
$ASFVL_t$	8.075	1.404	0.365	6.274	0.000	12.731	1081
$ASOP_t$	3.851	1.768	-0.539	6.952	-5.359	9.422	1081
Panel A3: Descriptive statistics for regression models 6a-6b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**	**N (Firm-Years)**
$ASOP_{t+3}$	4.097	1.859	-0.935	9.230	-7.944	9.527	875
$ASNFVA_t$	4.718	2.755	-2.477	11.528	-11.257	11.830	875
$ASFVA_t$	8.130	1.323	0.986	3.899	5.670	12.837	875
$ASFVL_t$	8.028	1.425	0.248	6.539	0.000	12.703	875
$ASOP_t$	3.796	1.779	-0.569	6.801	-5.359	9.418	875

Table 7.3 presents descriptive statistics for the untransformed data associated with the regression variables that examine the relationships between quarterly level classified bank fair values and quarterly future operating earnings, for the second study period from 2008 until 2010. From panel B1 the average one quarter ahead future operating earnings (E_{qt+1}) across the 5,730 firm-quarters comprising my sample amounts to $34.5 million. Panel B2 shows that the average annual two quarter ahead operating earnings (E_{qt+2}) increases to $43 million across the 5,105 firm-quarters comprising that element of my sample. Finally, panel B3 shows that the average three quarter ahead operating

earnings (E_{qt+3}) again increases to $45.5 million across the 4,503 firm-quarters comprising my sample. Panel B1 also shows that the average net level 1 fair value assets ($NFVAL1_{qt}$) associated with one quarter ahead operating earnings amounts to $934.1 million. Likewise, panels B2 and B3 show that the average net level 1 fair value assets ($NFVAL1_{qt}$) associated with two and three quarter ahead operating earnings amount to $926.3 million and $838 million, respectively. The average total level 1 fair value assets ($ASSETSL1_{t}$) associated with one quarter ahead operating earnings (E_{qt+1}) were $1,275.2 million, whilst the average total level 1 fair value liabilities ($LIABL1_{qt}$) associated with one quarter ahead operating earnings (E_{qt+1}) were $341.1 million as shown in panel B1. Finally, Panel B1 shows that the current quarter operating earnings (E_{qt}) associated with one quarter ahead operating earnings (E_{qt+1}) was $42.4 million. The third column of panel B1 of Table 7.3 also shows that the standard deviation of the one quarter ahead operating earnings across the 5,730 firm quarters comprising my sample amounts to 788.2. The standardised skewness and kurtosis measures of the one quarter ahead operating earnings are -26.224 and 1229.294, respectively whilst the minimum and maximum one year ahead operating earnings are -$39,100 million and $11,672.7 million, respectively. The other statistics appearing in Table 7.3 are to be similarly interpreted.

Table 7.3
Descriptive Statistics for the second study period (2008-2010) for the variables in $US millions

Panel B1: Descriptive statistics for regression models 10a-10b

Variable[67]	Mean	Std. Dev.	Skewness	Kurtosis	Min.	Max.	N (Firm-Quarters)
E_{qt+1}	34.491	788.235	-26.224	1229.294	-39100.000	11672.694	5730
$NFVAL1_{qt}$	934.086	13170.518	20.269	445.724	-265.000	369000.000	5730
$NFVAL2_{qt}$	2796.850	22173.533	13.769	209.933	-27900.000	403000.000	5730
$NFVAL3_{qt}$	438.926	4730.415	13.746	208.175	-19800.000	88693.000	5730
$ASSETSL1_{qt}$	1275.219	17002.960	19.317	424.959	0.000	532000.000	5730
$ASSETSL2_{qt}$	9949.293	128000.000	17.061	310.151	0.000	2930000.000	5730
$ASSETSL3_{qt}$	645.585	7258.027	15.295	253.750	0.000	145000.000	5730
$LIABL1_{qt}$	341.133	4648.798	19.013	445.549	-1.215	162000.000	5730
$LIABL2_{qt}$	7152.443	109000.000	17.770	336.915	0.000	2700000.000	5730
$LIABL3_{qt}$	206.659	2933.543	445.549	366.539	-0.563	73759.000	5730
E_{qt}	42.426	705.206	-29.199	1685.521	-39100.000	11672.694	5730

Panel B2: Descriptive statistics for regression models 11a-11b

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Min.	Max.	N (Firm-Quarters)
E_{qt+2}	42.967	604.704	-11.622	542.493	-23700.000	11672.694	5105
$NFVAL1_{qt}$	926.279	13281.098	20.352	447.562	-99.000	369000.000	5105
$NFVAL2_{qt}$	2769.917	21931.348	13.817	211.232	-15000.000	402000.000	5105
$NFVAL3_{qt}$	445.270	4782.420	13.772	208.145	-19800.000	88693.000	5105
$ASSETSL1_{qt}$	1262.988	17104.540	19.526	433.338	0.000	532000.000	5105
$ASSETSL2_{qt}$	9883.025	126000.000	16.999	309.807	0.000	2930000.000	5105
$ASSETSL3_{qt}$	654.233	7370.184	15.238	251.306	0.000	145000.000	5105
$LIABL1_{qt}$	336.709	4628.205	19.309	465.245	-1.215	162000.000	5105
$LIABL2_{qt}$	7113.108	107000.000	17.780	340.120	0.000	2700000.000	5105
$LIABL3_{qt}$	208.963	2990.727	18.287	361.176	-0.563	73759.000	5105
E_{qt}	40.725	710.666	-31.580	1826.112	-39100.000	11672.694	5105

Panel B3: Descriptive statistics for regression models 12a-12b

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Min.	Max.	N (Firm-Quarters)
E_{qt+3}	45.512	496.753	-2.534	123.860	-11200.000	6396.000	4503
$NFVAL1_{qt}$	837.970	12384.406	20.919	466.633	-99.000	310000.000	4503
$NFVAL2_{qt}$	2718.927	21882.188	14.042	217.278	-15000.000	402000.000	4503
$NFVAL3_{qt}$	452.890	4827.184	13.800	208.270	-19800.000	88693.000	4503
$ASSETSL1_{qt}$	1133.482	15464.732	19.067	394.246	0.000	366000.000	4503
$ASSETSL2_{qt}$	9671.155	126000.000	17.245	319.543	0.000	2930000.000	4503
$ASSETSL3_{qt}$	651.069	7439.173	15.383	254.869	0.000	145000.000	4503
$LIABL1_{qt}$	295.512	3919.800	16.155	280.389	-1.215	91027.000	4503
$LIABL2_{qt}$	6952.228	107000.000	18.110	353.898	0.000	2700000.000	4503
$LIABL3_{qt}$	198.178	2935.260	18.962	387.809	-0.563	73759.000	4503
E_{qt}	39.419	731.458	-32.729	1841.727	-39100.000	11672.694	4503

[67] See Table 5.6 for definitions of the variables.

Table 7.4 presents the descriptive statistics associated with the transformed data. Thus, Panel B1 of Table 7.4 shows that the average annual one quarter year ahead transformed future operating earnings (ASE_{qt+1}) across the 5,730 firm-quarters comprising my sample is 0.791. Similarly, the average transformed net level 1 fair value assets ($ASNFVAL1_{qt}$) associated with one quarter ahead transformed operating earnings amounts to 1.547. The other figures appearing in Table 7.4 are to be similarly interpreted.

Table 7.4 Descriptive Statistics for the second study period (2008-2010) for the transformed data							
Panel B1: Descriptive statistics for regression models 10a-10b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Min.**	**Max.**	**N (Firm-Quarters)**
ASE_{qt+1}	0.791	3.150	-0.158	3.403	-11.267	10.058	5730
$ASNFVAL1_{qt}$	1.547	2.356	1.721	6.254	-6.273	13.513	5730
$ASNFVAL2_{qt}$	5.343	2.824	-0.743	3.940	-10.930	13.600	5730
$ASNFVAL3_{qt}$	1.379	2.405	1.352	6.324	-10.587	12.086	5730
$ASASSETSL1_{qt}$	1.603	2.378	1.836	6.563	0.000	13.877	5730
$ASASSETSL2_{qt}$	5.413	2.794	-0.462	3.573	0.000	15.585	5730
$ASASSETSL3_{qt}$	1.510	2.327	1.827	6.326	0.000	12.576	5730
$ASLIABL1_{qt}$	0.284	1.393	5.866	39.665	-1.026	12.691	5730
$ASLIABL2_{qt}$	0.891	2.215	3.287	15.239	0.000	15.501	5730
$ASLIABL3_{qt}$	0.335	1.378	5.127	32.090	-0.537	11.902	5730
ASE_{qt}	0.901	3.084	-0.184	3.541	-11.267	10.058	5730
Panel B2: Descriptive statistics for regression models 11a-11b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Min.**	**Max.**	**N (Firm-Quarters)**
ASE_{qt+2}	0.737	3.173	-0.121	3.289	-10.766	10.058	5105
$ASNFVAL1_{qt}$	1.549	2.349	1.712	6.218	-5.288	13.513	5105
$ASNFVAL2_{qt}$	5.340	2.812	-0.688	3.588	-10.308	13.598	5105
$ASNFVAL3_{qt}$	1.385	2.402	1.361	6.268	-10.587	12.086	5105
$ASASSETSL1_{qt}$	1.605	2.369	1.828	6.547	0.000	13.877	5105
$ASASSETSL2_{qt}$	5.402	2.801	-0.464	3.549	0.000	15.585	5105
$ASASSETSL3_{qt}$	1.513	2.327	1.821	6.316	0.000	12.576	5105
$ASLIABL1_{qt}$	0.282	1.384	5.892	40.076	-1.026	12.691	5105
$ASLIABL2_{qt}$	0.884	2.205	3.302	15.390	0.000	15.501	5105
$ASLIABL3_{qt}$	0.329	1.371	5.171	32.583	-0.537	11.902	5105
ASE_{qt}	0.911	3.049	-0.198	3.597	-11.267	10.058	5105
Panel B3: Descriptive statistics for regression models 12a-12b							
Variable	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**	**Min.**	**Max.**	**N (Firm-Quarters)**
ASE_{qt+3}	0.729	3.189	-0.120	3.248	-10.021	9.457	4503
$ASNFVAL1_{qt}$	1.549	2.334	1.669	6.075	-5.288	13.338	4503
$ASNFVAL2_{qt}$	5.315	2.824	-0.687	3.540	-10.308	13.598	4503
$ASNFVAL3_{qt}$	1.388	2.395	1.394	6.196	-10.587	12.086	4503
$ASASSETSL1_{qt}$	1.608	2.352	1.794	6.405	0.000	13.503	4503
$ASASSETSL2_{qt}$	5.377	2.813	-0.470	3.488	0.000	15.585	4503
$ASASSETSL3_{qt}$	1.509	2.322	1.817	6.307	0.000	12.576	4503
$ASLIABL1_{qt}$	0.277	1.361	5.920	40.545	-1.026	12.112	4503
$ASLIABL2_{qt}$	0.874	2.189	3.308	15.462	0.000	15.501	4503
$ASLIABL3_{qt}$	0.323	1.357	5.184	32.710	-0.537	11.902	4503
ASE_{qt}	0.926	3.029	-0.215	3.626	-11.267	10.058	4503

The matrix of correlation coefficients between the independent variables employed in my empirical analysis during the first period (1996-2005) are summarised in Table 7.5

and Table 7.6, respectively. Thus, as shown in panel C1 of Table 7.5 the product moment correlation coefficient between the net fair value assets variable ($ASNFVA_t$) and the current year operating earnings variable ($ASOP_t$) across the 1,150 firm-years comprising the sample for Model 4a, is r = 0.3698. The other correlation coefficients summarised in this table are to be similarly interpreted.

Table 7.5
Correlation Matrices (Panels C1-C3) for the first study period (1996-2005)

Panel C1: Correlation Matrix for the Independent Variables for Models 4a (N=1,150 Firm-years)		
	$ASNFVA_t$	$ASOP_t$
$ASNFVA_t$	1	
$ASOP_t$	0.3698***	1
Panel C2: Correlation Matrix for the Independent Variables for Models 5a (N=1,081 Firm-years)		
	$ASNFVA_t$	$ASOP_t$
$ASNFVA_t$	1	
$ASOP_t$	0.3607***	1
Panel C3: Correlation Matrix for the Independent Variables for Models 6a (N= 875 Firm-years)		
	$ASNFVA_t$	$ASOP_t$
$ASNFVA_t$	1	
$ASOP_t$	0.3835***	1
*, ** and *** denote significance level at the 0.1, 0.05 and 0.01 levels, respectively (two-tailed) for the Pearson correlation coefficients.		

Panel C4 of Table 7.6 shows that the correlation coefficient between the total fair value assets variable ($ASFVA_t$) and the current year operating earnings variable ($ASOP_t$) across the 1,150 firm-years comprising the sample for Model 4b is r = 0.8161. Also, panel C4 of this Table shows that the correlation between the total fair value assets variable ($ASFVA_t$) and the total fair value liabilities variable ($ASFVL_t$) for Model 4b amounts to r = 0.9569. The other correlation coefficients summarised in this table are to be similarly interpreted.

Table 7.6
Correlation Matrices (Panels C4-C6) for the first study period (1996-2005)

Panel C4: Correlation Matrix for the Independent Variables for Models 4b (N=1,150 Firm-years)

	$ASFVA_t$	$ASFVL_t$	$ASOP_t$
$ASFVA_t$	1		
$ASFVL_t$	0.9569***	1	
$ASOP_t$	0.8161***	0.7697***	1

Panel C5: Correlation Matrix for the Independent Variables for Models 5b (N=1,081 Firm-years)

	$ASFVA_t$	$ASFVL_t$	$ASOP_t$
$ASFVA_t$	1		
$ASFVL_t$	0.9558***	1	
$ASOP_t$	0.8070***	0.7591***	1

Panel C6: Correlation Matrix for the Independent Variables for Models 6b (N= 875 Firm-years)

	$ASFVA_t$	$ASFVL_t$	$ASOP_t$
$ASFVA_t$	1		
$ASFVL_t$	0.9482***	1	
$ASOP_t$	0.7963***	0.7406***	1

*, ** and *** denote significance level at the 0.1, 0.05 and 0.01 levels, respectively (two-tailed) for the Pearson correlation coefficients.

Note that none of the correlation coefficients exhibited in Table 7.5 exceed the r = 0.80 threshold at which issues of multicollinearity are regarded as being significant (Gujarati 2003). However, panels C4, C5 and C6 of Table 7.6 show that there are very high and statistically significant correlation coefficients between the total fair value assets variable ($ASFVA_t$) and the total fair value liabilities variable ($ASFVL_t$) on which my regression models 4b, 5b and 6b are based. Thus, the regression results from these particular models will need to be interpreted with considerable caution. The other tests employed to assess potential issues of multicollinearity and other robustness issues are discussed in later sections of this chapter.

The matrix of correlation coefficients between the independent variables for the second study period (2008-2010) are summarised in Table 7.7 and Table 7.8, respectively. Panel D1 of Table 7.7 shows that the product moment correlation coefficient between the net level 1 fair value assets variable ($ASNFVAL1_{qt}$) and the net level 2 fair value assets variable ($ASNFVAL2_{qt}$) across the 5,730 firm-quarters comprising the sample for Model 10a is r = 0.4005. Likewise, the correlation between the net level 2 fair value assets variable ($ASNFVAL2_{qt}$) and the current quarter operating cash flows variable (ASE_{qt}) for Model 10a, amounts to r = -0.0896. The other correlation coefficients summarised in Table 7.7 are to be similarly interpreted.

Panel D4 of Table 7.8 shows that the correlation coefficient between the total level 1 fair value assets variable ($ASASSETSL1_{qt}$) and the total level 2 fair value assets variable ($ASASSETSL2_{qt}$) across the 5,730 firm-quarters comprising the sample for Model 10b is r = 0.4806. Similarly, the correlation coefficient between the total level 1 fair value liabilities variable ($ASLIABL1_{qt}$) and the current quarter operating cash flows variable (ASE_{qt}) for Model 10b, amounts to r = 0.1175. The other correlation coefficients summarised in Table 7.8 are to be similarly interpreted. The correlation matrices summarised in Table 7.7 and Table 7.8 show that there do not appear to be any issues of multicollinearity for the second study period on which my empirical analysis is based. Further tests employed to assess potential issues of multicollinearity are discussed in later sections of the chapter.

Table 7.7
Correlation Matrices (Panels D1-D3) for the second study period (2008-2010)

Panel D1: Correlation Matrix for the Independent Variables for Models 10a (N=5,730 Firm-quarters)				
	$ASNFVAL1_{qt}$	$ASNFVAL2_{qt}$	$ASNFVAL3_{qt}$	ASE_{qt}
$ASNFVAL1_{qt}$	1			
$ASNFVAL2_{qt}$	0.4005***	1		
$ASNFVAL3_{qt}$	0.3879***	0.4587***	1	
ASE_{qt}	0.0799***	-0.0896***	0.0074	1
Panel D2: Correlation Matrix for the Independent Variables for Models 11a (N=5,105 Firm-quarters)				
	$ASNFVAL1_{qt}$	$ASNFVAL2_{qt}$	$ASNFVAL3_{qt}$	ASE_{qt}
$ASNFVAL1_{qt}$	1			
$ASNFVAL2_{qt}$	0.4121***	1		
$ASNFVAL3_{qt}$	0.3882***	0.4633***	1	
ASE_{qt}	0.0762***	-0.0891***	0.0066	1
Panel D3: Correlation Matrix for the Independent Variables for Models 12a (N=4,503 Firm-quarters)				
	$ASNFVAL1_{qt}$	$ASNFVAL2_{qt}$	$ASNFVAL3_{qt}$	ASE_{qt}
$ASNFVAL1_{qt}$	1			
$ASNFVAL2_{qt}$	0.4054***	1		
$ASNFVAL3_{qt}$	0.3860***	0.4693***	1	
ASE_{qt}	0.0664***	-0.1015***	0.0005	1

*, ** and *** denote significance level at the 0.1, 0.05 and 0.01 levels, respectively (two-tailed) for the Pearson correlation coefficients.

Table 7.8
Correlation Matrices (Panels D4-D6) for the second study period (2008-2010)

Panel D4: Correlation Matrix for the Independent Variables for Models 10b (N=5,730 Firm-quarters)

	$ASASSETSL1_{qt}$	$ASASSETSL2_{qt}$	$ASASSETSL3_{qt}$	$ASLIABL1_{qt}$	$ASLIABL2_{qt}$	$ASLIABL3_{qt}$	ASE_{qt}
$ASASSETSL1_{qt}$	1						
$ASASSETSL2_{qt}$	0.4806***	1					
$ASASSETSL3_{qt}$	0.5068***	0.5476***	1				
$ASLIABL1_{qt}$	0.6028***	0.4172***	0.5846***	1			
$ASLIABL2_{qt}$	0.6103***	0.5460***	0.6868***	0.7440***	1		
$ASLIABL3_{qt}$	0.5263***	0.4194***	0.5834***	0.7584***	0.7262***	1	
ASE_{qt}	0.0710***	-0.0820***	0.0117	0.1175***	0.0983***	0.0951***	1

Panel D5: Correlation Matrix for the Independent Variables for Models 11b (N=5,105 Firm-quarters)

	$ASASSETSL1_{qt}$	$ASASSETSL2_{qt}$	$ASASSETSL3_{qt}$	$ASLIABL1_{qt}$	$ASLIABL2_{qt}$	$ASLIABL3_{qt}$	ASE_{qt}
$ASASSETSL1_{qt}$	1						
$ASASSETSL2_{qt}$	0.4777***	1					
$ASASSETSL3_{qt}$	0.5023***	0.5463***	1				
$ASLIABL1_{qt}$	0.5988***	0.4154***	0.5832***	1			
$ASLIABL2_{qt}$	0.6037***	0.5442***	0.6858***	0.7426***	1		
$ASLIABL3_{qt}$	0.5250***	0.4183***	0.5796***	0.7551***	0.7272***	1	
ASE_{qt}	0.0704***	-0.0854***	0.0082	0.1132***	0.0903***	0.0947***	1

Panel D6: Correlation Matrix for the Independent Variables for Models 12b (N=4,503 Firm-quarters)

	$ASASSETSL1_{qt}$	$ASASSETSL2_{qt}$	$ASASSETSL3_{qt}$	$ASLIABL1_{qt}$	$ASLIABL2_{qt}$	$ASLIABL3_{qt}$	ASE_{qt}
$ASASSETSL1_{qt}$	1						
$ASASSETSL2_{qt}$	0.4708***	1					
$ASASSETSL3_{qt}$	0.4953***	0.5433***	1				
$ASLIABL1_{qt}$	0.5913***	0.4108***	0.5808***	1			
$ASLIABL2_{qt}$	0.5948***	0.5403***	0.6820***	0.7372***	1		
$ASLIABL3_{qt}$	0.5227***	0.4155***	0.5761***	0.7479***	0.7253***	1	
ASE_{qt}	0.0600***	-0.0991***	-0.0034	0.0912***	0.0693***	0.0803***	1

*, ** and *** denote significance level at the 0.1, 0.05 and 0.01 levels, respectively (two-tailed) for the Pearson correlation coefficients.

7.2 Multivariate Results

The results from estimating the multiple regression models used to test the relationships expressed in hypotheses 1b and 2b are presented in Tables 7.9 to 7.12.

7.2.1 *Bank Fair Values and Future Operating Earnings pre-SFAS 157 (Hypothesis 1b)*

Table 7.9 and 7.10[68] summarise my regression results relating to the relationship between bank fair values, current year operating earnings and one, two and three year ahead operating earnings (that is, operating earnings at times: *t+1, t+2 and t+3*) during the period from 1996 until 2005. This period pre-dated the introduction of SFAS 157. Here, Table 7.9 provides evidence that current year net fair value assets ($ASNFVA_t$) is positively associated with future operating earnings across all three time horizons. The coefficients on the current year net fair value assets, $ASNFVA_t$, is significantly positive as predicted (with t-statistics = 2.66, 2.15 and 1.76 for the one-, two-, and three-year time horizons, respectively). These findings are consistent with the hypothesis that the current net asset fair values of on-balance sheet financial instruments of banks are significantly associated with the future years' earnings of such banks. This finding is consistent with Aboody *et al.* (1999) who record a significant positive association between the revaluation of fixed assets of non-financial firms and their future operating income across a similar three year time horizon. Secondly, I find that the current year earnings ($ASOP_t$) has a positive and significant relationship with the one-, two-, and three-year ahead operating earnings (with t-statistics of 14.24, 13.66 and 9.11 for the one-, two-, and three-year horizons, respectively).

[68] The models on which my empirical analysis is based are described in detail in section 5.5.

Table 7.10 shows that there is a positive and statistically significant relationship between total fair value assets ($ASFVA_t$) and the one-, two-, and three-year ahead operating cash flows (with t-statistics of 8.80, 7.41 and 6.04 for the one-, two-, and three-year horizons, respectively). This result indicates that the current fair values of on-balance sheet financial assets as disclosed by the banks are significantly associated with the banks' future operating earnings.

Table 7.9
Relationship between bank net fair values and operating earnings in future years 1, 2 and 3.

		Model 4a: One year ahead		*Model 5a: Two years ahead*		*Model 6a: Three years ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVA_t$	+	0.07***	2.66	0.05**	2.15	0.09*	1.76
		(0.025)		(0.022)		(0.049)	
$ASOP_t$	+	0.73***	14.24	0.69***	13.66	0.64***	9.11
		(0.051)		(0.051)		(0.070)	
Intercept	?	0.87***	4.74	1.11***	6.31	1.26***	6.41
		(0.184)		(0.176)		(0.197)	
Observations		1,150		1,081		875	
Adj. R-squared		0.62		0.46		0.45	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.4 for definitions of dependent and independent variables.

Table 7.10
Relationship between bank fair value assets, liabilities and operating earnings in future years 1, 2 and 3

		Model 4b: One year ahead		*Model 5b: Two years ahead*		*Model 6b: Three years ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASFVA_t$	+	0.76***	8.80	0.72***	7.41	0.85***	6.04
		(0.086)		(0.097)		(0.140)	
$ASFVL_t$	-	-0.06**	-2.12	-0.05	-1.21	-0.11	-1.00
		(0.028)		(0.041)		(0.109)	
$ASOP_t$	+	0.34***	5.03	0.32***	5.36	0.26***	3.51
		(0.067)		(0.060)		(0.073)	
Intercept	?	-3.04***	-8.28	-2.66***	-6.00	-2.88***	-6.86
		(0.367)		(0.444)		(0.419)	
Observations		1,150		1,081		875	
Adj. R-squared		0.71		0.53		0.54	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.4 for definitions of dependent and independent variables.

The above results are in contrast with the total fair value liabilities (*$ASFVL_t$*) which have a negative and statistically significant relationship with the one-year ahead operating earnings (with a t-statistic of -2.12). However, the total fair value liabilities (*$ASFVL_t$*) coefficients even though negatively related to the second- and third-year ahead operating earnings are statistically not significant.[69] This result shows that there is a stronger relationship between current year asset fair values and future earnings as compared to the relationship between current year liability fair values and future earnings, suggesting that asset fair values provide a better predictive relationship with regard to future earnings when compared to liability fair values.

7.2.2 *Bank Quarterly Fair Values and Future Operating Earnings post-SFAS 157 (Hypothesis 2b)*

Tables 7.11 and 7.13 examine the relationship between the levels classified bank fair values according to SFAS 157, current quarter operating earnings and future quarter operating earnings at times: *qt+1, qt+2 and qt+3* during the period from 2008 until 2010.[70] Table 7.11 shows that the net level 1 fair value assets (*$ASNFVAL1_{qt}$*) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of 2.34, 3.19 and 2.87 for the one-, two-, and three-quarter horizons, respectively). In contrast, net level 2 fair value assets (*$ASNFVAL2_{qt}$*) has a negative and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of -2.34, -3.23 and -2.98 for the one-, two-, and three-quarter horizons, respectively). Net level 3 fair value

[69] The correlation matrix presented in Table 7.6 (with Condition Indices for models 4b, 5b and 6b calculated as 59.7578, 59.6596 and 54.6980 respectively) shows that the regression model presented in Table 7.10 is severely afflicted by issues of collinearity in the independent variables. Given this, the regression results summarised here should be interpreted with considerable caution. Further robustness tests on models 4b, 5b and 6b are not undertaken in this study because of the collinearity issue identified here.

[70] The models on which my empirical analysis is based are described in detail in section 5.5.

assets ($ASNFVAL3_{qt}$) is not significantly related to future quarterly earnings across all three time horizons. Thus the results summarised in Table 7.11 and Table 7.13 regarding the relationship between the net level 1 fair value assets ($ASNFVAL1_{qt}$) and future operating earnings follow a similar pattern to those summarised in section 6.2.2 for the relationship between the net level 1 fair value assets ($ASNFVAL1_{qt}$) and future operating cash flows. Also, net level 3 fair value assets ($ASNFVAL3_{qt}$) is not significantly related to future quarterly earnings across all three time horizons, suggesting that the subjective nature of the model-based derived fair values may have impacted on the relationship between level 3 net asset fair values and the future operating earnings of banks. However, the net level 2 fair value assets ($ASNFVAL2_{qt}$) have a negative and statistically significant relationship with future operating earnings. This contrasts with the results summarised in section 6.2.2, which evidence a positive and statistically significant relationship between the net level 2 fair value assets ($ASNFVAL2_{qt}$) and future operating cash flows across all three time horizons. One would of course expect there to be a positive relationship between earnings, cash flows and the net level 2 fair value assets ($ASNFVAL2_{qt}$) and so, the results summarised in Table 7.11 call into question the veracity of the regression results summarised for the relationship between earnings and net level 2 fair value assets ($ASNFVAL2_{qt}$). Here it will be recalled that in section 4.3 I have argued that a given firm's earnings will tend to track its cash flows into the future (Modigliani and Miller, 1961; Kim and Kross, 2005; Dechow, Kothari and Watts, 1998). Beaver (1998) also considered a firm's earnings to be a proxy for its permanent (or normalised) cash flows over time.

Table 7.11
Relationship between Levels Net bank fair value assets and operating earnings in future quarters 1, 2 and 3.

		Model 10a: One quarter ahead		*Model 11a: Two quarters ahead*		*Model 12a: Three quarters ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVAL1_{qt}$	+	0.05**	2.34	0.07***	3.19	0.08***	2.87
		(0.022)		(0.023)		(0.027)	
$ASNFVAL2_{qt}$	+	-0.04**	-2.34	-0.06***	-3.23	-0.06***	-2.98
		(0.018)		(0.018)		(0.022)	
$ASNFVAL3_{qt}$	+	0.01	0.48	-0.01	-0.26	0.01	0.47
		(0.022)		(0.026)		(0.028)	
ASE_{qt}	+	0.67***	36.87	0.63***	31.38	0.55***	23.60
		(0.018)		(0.020)		(0.023)	
Intercept	?	0.33***	3.13	0.37***	3.50	0.43***	3.44
		(0.104)		(0.106)		(0.124)	
Observations		5,730		5,105		4,503	
Adj. R-squared		0.43		0.37		0.28	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

Given this, I estimate two regression equations in order to evaluate the relationship between operating cash flows and operating earnings across the two study periods as follows:

$$CF_t = a_0 + a_1 OP_t + \alpha_t$$

$$CF_{qt} = b_0 + b_1 E_{qt} + \beta_t$$

where CF_t is the banks' annual operating cash flows and OP_t is the banks' annual operating earnings in the first study period and α_t is a stochastic error term. CF_{qt} is the banks' quarterly operating cash flows and E_{qt} is the banks' quarterly operating earnings in the second study period and β_t is a stochastic error term. Table 7.12 shows the results of the estimated regression equations.

Table 7.12
Relationship between Operating Cash flows and Operating Earnings across the two study periods.

		First Study period: 1996-2005		Second study period: 2008-2010	
		Dependent Variable = Annual Operating Cash flows (CF_t)		*Dependent Variable = Quarterly Operating Cash flows (CF_{qt})*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
OP_t	+	0.58*** (0.045)	13.04		
E_{qt}	+			1.87*** (0.100)	18.76
Intercept	?	19.57 (23.686)	0.83	328.83*** (76.167)	4.32
Observations		1,334		6,355	
Adj. R-squared		0.11		0.05	

Standard errors in parentheses. ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively.

From Table 7.12, it can be seen that there is a structural change in the relationship between the banks' operating cash flows and banks' operating earnings over the course of the two periods. In the first study period a $1 increase in operating earnings will lead on average to an increase of about 60 cents in operating cash flows. This contrasts with the results for the second study period where a $1 increase in operating earnings will lead on average to an increase of about $1.90 in operating cash flows. Note that the increase in the cash flows during the first period is much smaller than a dollar whilst in the second period, it is much greater than a dollar. Figures 7.1 and 7.2 provide further information about the nature of the structural change which occurred in the relationship between cash flows and earnings over the two periods. Figure 7.1 represents the average annual operating earnings and average operating cash flows across all the sampled banks for the first study period, while Figure 7.2 represents the average operating earnings and average operating cash flows in each quarter across all the sampled banks for the second study period.

Figure 7.1:
Relationship between Operating Cash flows and Earnings during the first study period

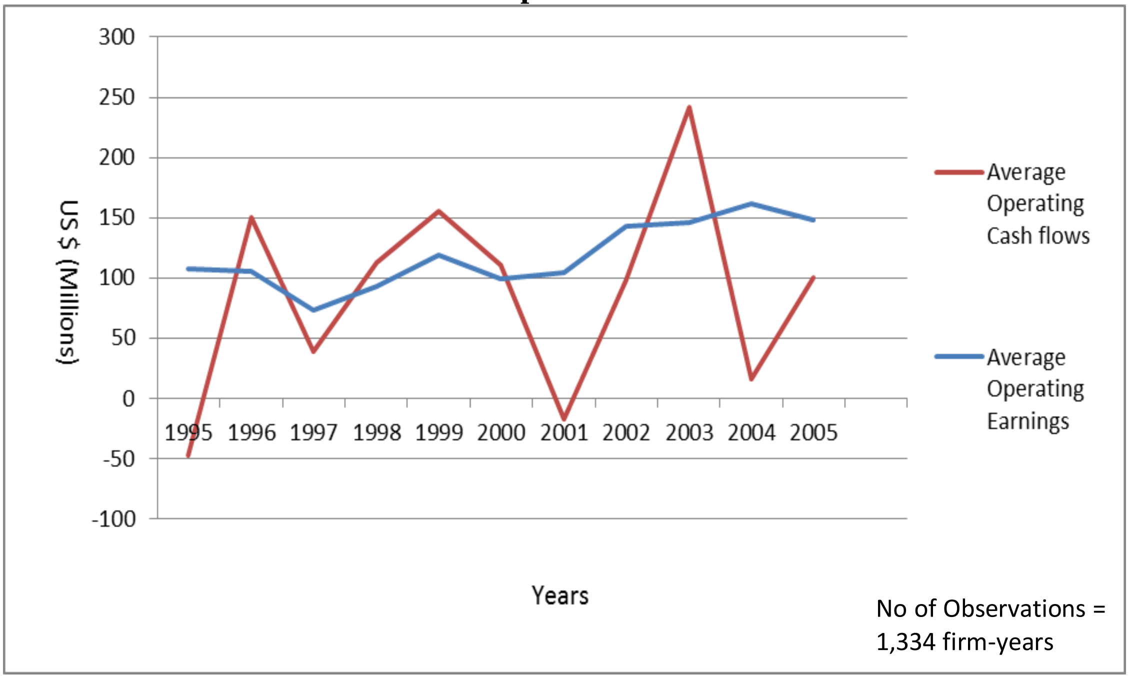


Figure 7.2:
Relationship between Operating Cash flows and Earnings during the second study period

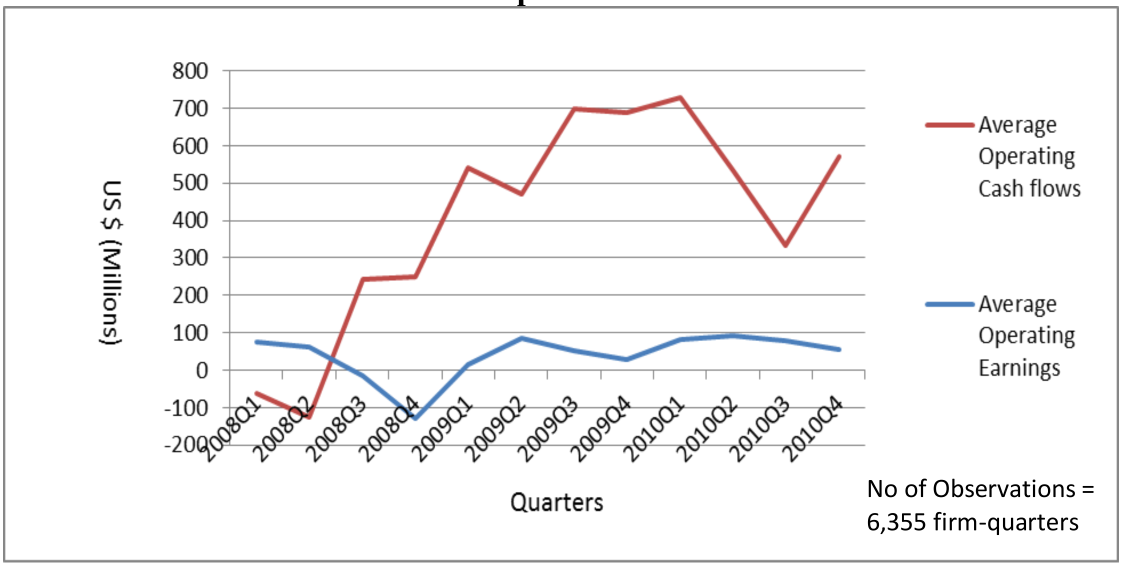


Figure 7.1 shows that during the pre-global financial crisis period average bank operating earnings tends to track average bank operating cash flows but that average operating earnings are not as volatile as average operating cash flows. This supports the

previously stated hypothesis that earnings represent the normalised (or permanent) cash flows which banks will earn (Beaver, 1998). However, Figure 7.2 shows that during global financial crises period there is a systematic downward bias in average bank operating earnings relative to bank operating cash flows although again bank average operating earnings are much less volatile than bank average operating cash flows. This in turn implies that current bank operating earnings will be a very poor proxy for bank future operating cash flows. This may explain why the regression results summarised in Table 7.11 show an inverse relationship between net level 2 fair value assets ($ASNFVAL2_{qt}$) (which were far more numerous than level 1 net asset fair values during this period of market illiquidity) and bank future operating earnings when one might normally expect there to be a positive relationship between these two variables.

The effects of the structural change in the relationship between the banks' operating cash flows and banks' operating earnings over the course of the two periods as illustrated by Figure 7.1, Figure 7.2 and Table 7.12 can also be observed in the regression results summarised in Table 7.13. Table 7.13 shows that the level 2 fair value assets ($ASASSETSL2_{qt}$) have a statistically significant and negative association with future operating earnings across the three quarterly time horizons with t-statistics of 3.68, -3.94 and -4.02 for the one-, two-, and three-quarter horizons, respectively. It also shows that level 3 fair value asset values ($ASASSETSL3_{qt}$) have a negative and statistically significant relationship (at the 10% level) with the one-, two-, and three-quarter ahead operating earnings with t-statistics of -1.89, -2.50 and -1.65 for the one-, two-, and three-quarter horizons, respectively. In contrast, Table 7.13 reports an insignificant relationship between level 1 fair value asset values ($ASASSETSL1_{qt}$) and future operating earnings across the three quarterly time horizons. These results are consistent with the explanation that the banks' operating earnings during the global financial crises period were a poor proxy for bank future operating cash flows. With regard to the levels classified liabilities, Table 7.13 shows that the level 1 fair value liabilities (*ASLIABL1*$_{qt}$) and the level 3 fair value liabilities (*ASLIABL3*$_{qt}$) are not significantly related to the future operating earnings across most of the three quarterly time horizons. However, level 2 fair value liabilities (*ASLIABL2*$_{qt}$) have a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of 2.67, 3.14 and 2.10 for the one-, two-, and three-quarter horizons, respectively). This latter result is similar to the result reported in section 6.2.2, regarding the relationship between level 2 fair value liabilities (*ASLIABL2*$_{qt}$) and future operating cash flows. I there noted that this result could be attributed to banks recognising an accounting profit based on fair value accounting rules because of the deterioration in their credit standing. In particular, fair value accounting rules would allow banks to write down their fair value liabilities because of their deteriorating financial position and this in turn will have a positive impact on bank future operating earnings. (Barth *et al.,* 2008:634-635; Chisnall, 2001).[71]

[71] Further discussion to explain the implications of these empirical results is included in section 8.2.

Table 7.13
Relationship between Levels bank fair value assets, liabilities and operating earnings in future quarters 1, 2 & 3.

Variable	Predicted Sign	*Model 10b: One quarter ahead* Coefficient	t-stat	*Model 11b: Two quarters ahead* Coefficient	t-stat	*Model 12b: Three quarters ahead* Coefficient	t-stat
$ASASSETSL1_{qt}$	+	0.02 (0.017)	0.97	0.02 (0.018)	0.93	0.01 (0.022)	0.63
$ASASSETSL2_{qt}$	+	-0.07*** (0.018)	-3.69	-0.08*** (0.019)	-3.94	-0.09*** (0.022)	-4.02
$ASASSETSL3_{qt}$	+	-0.04* (0.023)	-1.89	-0.07** (0.026)	-2.50	-0.05* (0.029)	-1.65
$ASLIABL1_{qt}$	-	0.05 (0.065)	0.78	0.02 (0.077)	0.21	-0.05 (0.086)	-0.53
$ASLIABL2_{qt}$	-	0.09*** (0.032)	2.67	0.11*** (0.036)	3.14	0.09** (0.042)	2.10
$ASLIABL3_{qt}$	-	-0.004 (0.057)	-0.07	0.05 (0.067)	0.82	0.19** (0.077)	2.42
ASE_{qt}	+	0.66*** (0.018)	35.71	0.62*** (0.020)	30.62	0.54*** (0.023)	23.20
Intercept	?	0.50*** (0.106)	4.72	0.53*** (0.112)	4.71	0.63*** (0.128)	4.90
Observations		5,730		5,105		4,503	
Adj. R-Squared		0.44		0.38		0.29	

Coefficient Comparisons	**F-stat**	**F-stat**	**F-stat**
Test of $ASASSETSL1_{qt} = ASASSETSL2_{qt}$	10.15***	10.83***	9.81***
Test of $ASASSETSL1_{qt} = ASASSETSL3_{qt}$	4.23**	6.40**	2.70
Test of $ASASSETSL2_{qt} = ASASSETSL3_{qt}$	0.49	0.08	1.05
Test of $ASLIABL1_{qt} = ASLIABL2_{qt}$	0.22	1.17	1.78
Test of $ASLIABL1_{qt} = ASLIABL3_{qt}$	0.31	0.12	3.11*
Test of $ASLIABL2_{qt} = ASLIABL3_{qt}$	1.54	0.47	0.95

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

7.3 Sensitivity and Robustness Tests

7.3.1 Multicollinearity Issues

In addition to showing the correlation matrices among the independent variables employed in this chapter's empirical analysis for both the first and second study periods, as summarised in Tables 7.5 through to Table 7.8, I also use the variance inflation factor (*Vif*) and the Condition Index test to check for issues of multicollinearity that might arise with the regression models. I have previously noted (as in section 5.5.1), that *Vif* values in excess of 10 are generally considered to provide evidence of multicollinearity amongst the independent variables for the regression model (Coenders and Saez, 2000). Likewise, a condition number in excess of 30 is considered as providing evidence of collinearity amongst the independent variables for the regression model (Coenders and Saez, 2000). Thus Tables 7.14 through to Table 7.17 provide the *Vif* and Condition Index test scores for models 4a and 4b over the first study period, while Tables 7.18 through to Table 7.21 shows the *Vif* and Condition Index test results for models 10a and 10b over the second study period. Untabulated results recorded for the *Vif* for models 5a, 6a, 5b and 6b are 1.15, 1.17, 9.55 and 8.34 respectively for the first study period, while the Condition Index numbers for the first study period for models 5a, 6a, 5b and 6b are 5.4969, 5.4028, 59.6596 and 54.6980 respectively. For the second study period the *Vif* for models 11a, 12a, 11b and 12b are 1.27, 1.27, 2.26 and 2.23 respectively, while the Condition Index numbers for models 11a, 12a, 11b and 12b are 5.6728, 5.6472, 7.6307 and 7.5419 respectively.

Thus, for the first study period both the *Vif* and Condition Index scores support the hypothesis that there is little evidence the parameter estimates and their associated t-statistics for Models 4a, 5a and 6a are affected by issues of co-linear independent variables. However, this is not the case for Models 4b, 5b and 6b all of which return condition indices well in excess of 30. This contrasts with the *Vif* and Condition Index scores for the second (global financial crisis) study period which show little evidence of any collinearity issues.

Table 7.14 Multicollinearity Test for Model 4a (Using Condition Index)		
No	**Eigenvalue**	**Condition Index**
1	2.7521	1.0000
2	0.1575	4.1800
3	0.0904	5.5168
Condition Number		**5.5168**

Table 7.15 Multicollinearity Test for Model 4a (Using VIF Factor)				
Variable	**VIF**	**SQRT VIF**	**Tolerance**	**R-Squared**
$ASNFVA_t$	1.16	1.08	0.8632	0.1368
$ASOP_t$	1.16	1.08	0.8632	0.1368
Mean VIF	**1.16**			

Table 7.16 Multicollinearity Test for Model 4b (Using Condition Index)		
No	**Eigenvalue**	**Condition Index**
1	3.8925	1.0000
2	0.0973	6.3252
3	0.0091	20.6749
4	0.0011	59.7578
Condition Number		**59.7578**

Table 7.17 Multicollinearity Test for Model 4b (Using VIF Factor)				
Variable	**VIF**	**SQRT VIF**	**Tolerance**	**R-Squared**
$ASFVA_t$	14.54	3.81	0.0688	0.9312
$ASFVL_t$	11.91	3.45	0.0840	0.9160
$ASOP_t$	3.01	1.73	0.3325	0.6675
Mean VIF	**9.82**			

Table 7.18 Multicollinearity Test for Model 10a (Using Condition Index)		
No	**Eigenvalue**	**Condition Index**
1	2.9827	1.0000
2	0.9213	1.7993
3	0.5639	2.3000
4	0.4376	2.6108
5	0.0945	5.6177
Condition Number		**5.6177**

Table 7.19 **Multicollinearity Test for Model 10a (Using VIF Factor)**				
Variable	**VIF**	**SQRT VIF**	**Tolerance**	**R-Squared**
$ASNFVAL1_{qt}$	1.29	1.14	0.7760	0.2240
$ASNFVAL2_{qt}$	1.39	1.18	0.7184	0.2816
$ASNFVAL3_{qt}$	1.35	1.16	0.7395	0.2605
ASE_{qt}	1.03	1.01	0.9754	0.0246
Mean VIF	**1.26**			

Table 7.20 **Multicollinearity Test for Model 10b (Using Condition Index)**		
No	**Eigenvalue**	**Condition Index**
1	4.5861	1.0000
2	1.3483	1.8443
3	0.9108	2.2439
4	0.3565	3.5869
5	0.3048	3.8792
6	0.2148	4.6212
7	0.2010	4.7768
8	0.0778	7.6759
Condition Number		**7.6759**

Table 7.21 **Multicollinearity Test for Model 10b (Using VIF Factor)**				
Variable	**VIF**	**SQRT VIF**	**Tolerance**	**R-Squared**
$ASASSETSL1_{qt}$	1.83	1.35	0.5461	0.4539
$ASASSETSL2_{qt}$	1.65	1.29	0.6047	0.3953
$ASASSETSL3_{qt}$	2.14	1.46	0.4668	0.5332
$ASLIABL1_{qt}$	3.10	1.76	0.3225	0.6775
$ASLIABL2_{qt}$	3.41	1.85	0.2930	0.7070
$ASLIABL3_{qt}$	2.77	1.66	0.3614	0.6386
ASE_{qt}	1.05	1.02	0.9560	0.0440
Mean VIF	**2.28**			

7.3.2 The Influence of Bank Characteristics

As a robustness test, I consider whether bank size and capital adequacy (which impact on banks' financial risk) affect the underlying results obtained in Tables 7.9, 7.11 and 7.13.

7.3.2.1 The Effects of Size

To provide for the potential effects of firm size on the regression estimates, I follow the approach of Song *et al.* (2010) and Evans *et al.* (2014) in estimating my regression equations with two subsamples of banks based on their relative size. Thus, banks are grouped into the 'large banks' classification when their total assets are above the median total assets of the entire sample of banks and into the 'small banks' classification when their total assets are below the median.[72] Table 7.22 presents the regression results based on this classification of banks for the first study period. For the large banks subsample during the first study period (as in Panel A1, Table 7.22) there is a positive and statistically significant association between the net fair value assets ($ASNFVA_t$) and the one- and three-year ahead operating earnings (with t-statistics of 2.22 and 1.71 for the one- and three-year time horizons, respectively). For the two-year ahead operating earnings, however, there is not a significant relationship with net fair value assets ($ASNFVA_t$). On the other hand, for the small banks subsample during the same period (as in Panel B1, Table 7.22), the one- and two-year operating earnings (with t-statistics of 2.22 and 1.94 for the one- and two-year time horizons, respectively) are positively and statistically significant in relation to net fair value assets ($ASNFVA_t$). However, the third-year ahead operating cash flows are not significantly related to net fair value assets ($ASNFVA_t$). These results suggest that during the first study period there is very little difference in the way bank size impacts on the relationship between net asset bank fair values and the future operating earnings of banks - considering that

[72] In investigating the potential effects of bank size on the regression estimates, I considered other alternative estimation methods such as the use of an indicator variable for bank size above particular total assets thresholds and also the inclusion of the inverse sinh transformed total assets as a control variable in the previously estimated regression models. These procedures did not materially affect the regression outcomes.

for both the small and large bank subsamples there is a strong relationship between the net fair value assets variable and the operating earnings variable one-year ahead and marginal or insignificant relationships are observed between the two variables in the second and third-years ahead. Furthermore, the positive and statistically significant relationship between the current year cash flow from operations *($ASCF_t$)* and the one-, two-, and three-year ahead operating cash flows are unaffected by the differences in bank size.

Table 7.22
Relationship between bank net fair values and operating earnings in future years 1, 2 and 3.

Panel A1: Large Banks Subsample.

Variable	Predicted Sign	*One year ahead* Coefficient	t-stat	*Two years ahead* Coefficient	t-stat	*Three years ahead* Coefficient	t-stat
$ASNFVA_t$	+	0.07** (0.032)	2.22	0.03 (0.024)	1.37	0.11* (0.064)	1.71
$ASOP_t$	+	0.62*** (0.091)	6.84	0.63*** (0.089)	7.02	0.55*** (0.120)	4.58
Intercept	?	1.59*** (0.436)	3.64	1.76*** (0.402)	4.38	1.88*** (0.450)	4.18
Observations		591		543		424	
Adj. R-squared		0.44		0.31		0.32	

Panel B1: Small Banks Subsample.

Variable	Predicted Sign	*One year ahead* Coefficient	t-stat	*Two years ahead* Coefficient	t-stat	*Three years ahead* Coefficient	t-stat
$ASNFVA_t$	+	0.05** (0.021)	2.22	0.08* (0.039)	1.94	0.01 (0.024)	0.35
$ASOP_t$	+	0.56*** (0.080)	7.00	0.40*** (0.066)	6.12	0.35*** (0.065)	5.32
Intercept	?	1.19*** (0.234)	5.11	1.55*** (0.211)	7.34	2.10*** (0.200)	10.52
Observations		559		538		451	
Adj. R-squared		0.43		0.20		0.13	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.4 for definitions of dependent and independent variables.

For the duration of the second study period, where the levels classified bank fair values according to SFAS 157 where used, panel A2 of Table 7.23 shows for the large banks subsample, that the net level 1 asset fair values ($ASNFVAL1_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of 2.04, 3.22 and 2.98 for the one-, two-, and three-quarter time horizons, respectively). In contrast the net level 2 fair value assets ($ASNFVAL2_{qt}$) has a negative and statistically significant relationship with future operating earnings across all three time horizons (with t-statistics of -3.29, -4.92 and -4.68 for the one-, two-, and three-quarter time horizons, respectively). However, the relationships are not significant between net level 3 asset fair values ($ASNFVAL3_{qt}$) and future operating earnings across all three time horizons. For the small banks subsample (as in panel B2, Table 7.23), the net level 2 fair value assets ($ASNFVAL2_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of 3.27, 3.87 and 4.11 for the one-, two- and three-quarter time horizons, respectively). This is not the case for net level 3 fair value assets ($ASNFVAL3_{qt}$) which has a negative and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of -2.16, -2.87 and -1.87 for the one-, two-, and three-quarter time horizons, respectively). Panel B2 of Table 7.23 also shows that level 1 net fair value assets have an insignificant relationship with future operating earnings across all three-quarter time horizons.

Note again that Table 7.23 shows that for large banks there is a negative and statistically significant relationship between the net level 2 fair value assets ($ASNFVAL2_{qt}$) and future operating earnings. I have previously noted how this contrasts with the results summarised in section 6.2.2, which evidences a positive relationship between the net level 2 fair value assets ($ASNFVAL2_{qt}$) and future operating cash flows. The expectation is that there should be a positive relationship between earnings, cash flows and the net level 2 fair value assets ($ASNFVAL2_{qt}$) and so, the results summarised in Table 7.23 again call into question the veracity of the regression results obtained for the relationship between earnings and net level 2 fair value assets ($ASNFVAL2_{qt}$) as summarised in this table. These results are again consistent with a structural change in the relationship between bank operating cash flows and their operating earnings over the course of the two periods. I have already noted in section 7.2.2 in particular how for the second study period (which includes the period of the global financial crisis) there is a systematic downward bias in operating earnings relative to the operating cash flows of the sampled banks. This in turn makes operating earnings a poor proxy for future operating cash flows during this second study period.

Table 7.23
Relationship between Levels Net bank fair value assets and operating earnings in future quarters 1, 2 and 3.

Panel A2: Large Banks Subsample.

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASNFVAL1_{qt}$	+	0.07** (0.032)	2.04	0.10*** (0.031)	3.22	0.12*** (0.040)	2.98
$ASNFVAL2_{qt}$	+	-0.10*** (0.030)	-3.29	-0.14*** (0.028)	-4.92	-0.17*** (0.036)	-4.68
$ASNFVAL3_{qt}$	+	0.02 (0.028)	0.58	0.00 (0.033)	0.07	0.03 (0.036)	0.70
ASE_{qt}	+	0.66*** (0.022)	29.65	0.61*** (0.024)	25.19	0.51*** (0.028)	18.61
Intercept	?	0.80*** (0.188)	4.28	1.03*** (0.188)	5.49	1.24*** (0.224)	5.52
Observations		2,872		2,565		2,269	
Adj. R-squared		0.44		0.38		0.28	

Panel B2: Small Banks Subsample.

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASNFVAL1_{qt}$	+	0.01 (0.016)	0.84	0.01 (0.018)	0.79	0.00 (0.020)	0.22
$ASNFVAL2_{qt}$	+	0.04*** (0.012)	3.27	0.05*** (0.014)	3.87	0.06*** (0.015)	4.11
$ASNFVAL3_{qt}$	+	-0.05** (0.022)	-2.16	-0.07*** (0.025)	-2.87	-0.05* (0.027)	-1.87
ASE_{qt}	+	0.57*** (0.021)	26.46	0.54*** (0.024)	22.45	0.51*** (0.025)	20.42
Intercept	?	-0.14** (0.064)	-2.19	-0.25*** (0.072)	-3.43	-0.29*** (0.078)	-3.75
Observations		2,858		2,540		2,234	
Adj. R-squared		0.30		0.25		0.22	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

Panel A3 of Table 7.24 shows that for the large banks subsample, the level 2 fair value assets ($ASASSETSL2_{qt}$) has a negative and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of -4.58, -5.25 and -5.63 for the one-, two-, and three-quarter time horizons, respectively). However, for the large subsample banks Table 7.24 also shows there are mostly insignificant relationships between both level 1 fair value assets ($ASASSETSL1_{qt}$) and level 3 fair value assets ($ASASSETSL3_{qt}$) in relation to the future operating earnings across all three time horizons. Moreover, panel A3 of Table 7.24 shows for large subsample banks that level 1 fair value liabilities ($ASLIABL1_{qt}$) and level 3 fair value liabilities ($ASLIABL3_{qt}$) are mostly not significant in relation to future operating earnings across all three time horizons. In contrast, there is a positive and statistically significant relationship between level 2 fair value liabilities ($ASLIABL2_{qt}$) and future operating earnings across all three time horizons.

For the small banks subsample, I find from panel B3 of Table 7.24 that the level 2 fair value assets ($ASASSETSL2_{qt}$) has a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of 3.25, 3.90 and 4.12 for the one-, two-, and three-quarter time horizons, respectively), while the level 3 fair value assets ($ASASSETSL3_{qt}$) has a negative and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of -2.57, -3.25 and -2.24 for the one-, two-, and three-quarter time horizons, respectively). However for the small banks subsample, level 1 fair value assets ($ASASSETSL1_{qt}$) is not significantly related to future operating earnings across all three time horizons. Panel B3 of Table 7.24 also shows that for small subsample banks the level 1 fair value liabilities ($ASLIABL1_{qt}$) are statistically significant and positively related to future operating earnings across all three time horizons (with t-statistics of 3.03, 3.30 and 3.09 for the one-, two-, and three-quarter time horizons, respectively), while both the level 2 fair value liabilities ($ASLIABL2_{qt}$) and level 3 fair value liabilities ($ASLIABL3_{qt}$) are not significantly related to future operating earnings across all three time horizons.

The results summarised in Table 7.24 are consistent with structural a change in the relationship between bank operating cash flows and operating earnings as previously observed in the second study period and which I have argued will have a perverse effect on my regression results – in this instance especially with regard to the large banks subsample.

Table 7.24
Relationship between Levels bank fair value assets, liabilities and operating earnings in future quarters 1, 2 & 3.

Panel A3: Large Banks Subsample.

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASASSETSL1_{qt}$	+	0.02	0.77	0.02	0.77	0.02	0.71
		(0.027)		(0.029)		(0.034)	
$ASASSETSL2_{qt}$	+	-0.13***	-4.58	-0.16***	-5.25	-0.20***	-5.63
		(0.028)		(0.030)		(0.035)	
$ASASSETSL3_{qt}$	+	-0.05	-1.60	-0.07**	-2.01	-0.06	-1.40
		(0.033)		(0.037)		(0.041)	
$ASLIABL1_{qt}$	-	0.06	0.88	0.02	0.22	-0.06	-0.61
		(0.068)		(0.080)		(0.091)	
$ASLIABL2_{qt}$	-	0.09**	2.19	0.12***	2.76	0.09*	1.84
		(0.040)		(0.044)		(0.051)	
$ASLIABL3_{qt}$	-	0.02	0.29	0.09	1.20	0.25***	2.82
		(0.067)		(0.077)		(0.090)	
ASE_{qt}	+	0.65***	28.45	0.60***	24.39	0.50***	18.14
		(0.023)		(0.024)		(0.028)	
Intercept	?	1.09***	5.65	1.26***		1.55***	6.82
					6.28		
		(0.192)		(0.201)		(0.228)	
Observations		2,872		2,565		2,269	
Adj. R-squared		0.44		0.38		0.29	

Panel B3: Small Banks Subsample.

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASASSETSL1_{qt}$	+	0.01	0.87	0.01	0.79	0.00	0.18
		(0.016)		(0.018)		(0.021)	
$ASASSETSL2_{qt}$	+	0.04***	3.25	0.06***	3.90	0.06***	4.12
		(0.012)		(0.014)		(0.016)	
$ASASSETSL3_{qt}$	+	-0.06**	-2.57	-0.08***	-3.25	-0.06**	-2.24
		(0.023)		(0.026)		(0.028)	
$ASLIABL1_{qt}$	-	0.26***	3.03	0.30***	3.30	0.38***	3.09
		(0.087)		(0.092)		(0.122)	
$ASLIABL2_{qt}$	-	0.01	0.32	-0.02	-0.34	-0.05	-0.84
		(0.044)		(0.049)		(0.055)	
$ASLIABL3_{qt}$	-	-0.04	-0.61	-0.06	-0.72	-0.04	-0.56
		(0.070)		(0.078)		(0.076)	
ASE_{qt}	+	0.57***	26.29	0.54***	22.17	0.51***	20.21
		(0.022)		(0.024)		(0.025)	
Intercept	?	-0.14**	-2.05	-0.24***	-3.22	-0.28***	-3.51
		(0.066)		(0.075)		(0.081)	
Observations		2,858		2,540		2,234	
Adj. R-squared		0.30		0.25		0.22	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

7.3.2.2 The Effects of Capital Adequacy

Following Song *et al*. (2010) I differentiate the sample banks based on their relative Tier 1 capital ratio by dividing the sample into two groups: 'Highly capitalised banks' with Tier 1 capital ratio above the median total Tier 1 capital ratio of the entire sample of banks and 'Low capitalised banks' with Tier 1 capital ratio below the median. This was done in order to assess if the capital adequacy level of the banks impacted on the underlying regression relationships previously obtained. Table 7.25 presents the results of the regression procedures for the first study period.

Table 7.25
Relationship between bank net fair values and operating earnings in future years 1, 2 and 3.

Panel A4: Subsample of Banks with High Capital Ratio.

Variable	Predicted Sign	*One year ahead* Coefficient	t-stat	*Two years ahead* Coefficient	t-stat	*Three years ahead* Coefficient	t-stat
$ASNFVA_t$	+	0.01	0.40	0.03	1.00	0.04	0.73
		(0.017)		(0.025)		(0.052)	
$ASOP_t$	+	0.89***	17.76	0.84***	20.75	0.79***	12.47
		(0.050)		(0.041)		(0.064)	
Intercept	?	0.45***	2.74	0.59***	4.15	0.79***	3.26
		(0.164)		(0.143)		(0.243)	
Observations		538		508		420	
Adj. R-squared		0.69		0.63		0.52	

Panel B4: Subsample of Banks with Low Capital Ratio.

Variable	Predicted Sign	*One year ahead* Coefficient	t-stat	*Two years ahead* Coefficient	t-stat	*Three years ahead* Coefficient	t-stat
$ASNFVA_t$	+	0.09***	2.82	0.06**	2.04	0.10*	1.78
		(0.032)		(0.028)		(0.059)	
$ASOP_t$	+	0.67***	10.68	0.64***	10.38	0.58***	6.99
		(0.062)		(0.062)		(0.084)	
Intercept	?	1.15***	4.67	1.37***	5.88	1.54***	6.09
		(0.247)		(0.233)		(0.253)	
Observations		612		573		455	
Adj. R-squared		0.60		0.41		0.42	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.4 for definitions of dependent and independent variables.

For the high capital ratio banks subsample during the first study period (as in Panel A4, Table 7.25), there is an insignificant relationship between the net fair value assets (*$ASNFVA_t$*) and the operating earnings across all three time horizons (with t-statistics of 0.40, 1.00 and 0.73 for the one-, two- and three-year time horizons, respectively). On the other hand, for the low capital ratio banks subsample during the same period (as in Panel B4, Table 7.25) the one-, two- and three-year operating earnings (with t-statistics of 2.82, 2.04 and 1.78 for the one-, two- and three-year time horizons, respectively) are positively and statistically significant in relation to net fair value assets ($ASNFVA_t$). These results suggest that the relationship between net fair value assets and future operating earnings of the low capital banks was affected by the level of financial risk.

For the second study period, panel A5 of Table 7.26 shows for the subsample of high capital ratio banks, that the net level 1 fair value assets ($ASNFVAL1_{qt}$) has a positive and statistically significant relationship with two-, and three-quarter ahead operating earnings (with t-statistics of 3.30 and 2.17 for the two-, and three-quarter time horizons, respectively). However, the relationships are mostly not significant for both the net level 2 fair value assets ($ASNFVAL2_{qt}$) and net level 3 asset fair values ($ASNFVAL3_{qt}$) in relation to future operating earnings across all three time horizons.

Table 7.26
Relationship between Levels Net bank fair value assets and operating earnings in future quarters 1, 2 and 3.

Panel A5: Subsample of Banks with High Capital Ratio.

		One quarter ahead		*Two quarters ahead*		*Three quarters ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVAL1_{qt}$	+	0.03	1.18	0.08***	3.30	0.07**	2.17
		(0.026)		(0.025)		(0.033)	
$ASNFVAL2_{qt}$	+	-0.01	-0.29	-0.00	-0.14	0.04	1.24
		(0.028)		(0.024)		(0.033)	
$ASNFVAL3_{qt}$	+	0.04	1.34	0.04	1.36	0.10***	3.15
		(0.027)		(0.031)		(0.033)	
ASE_{qt}	+	0.67***	23.80	0.61***	19.70	0.52***	14.92
		(0.028)		(0.031)		(0.035)	
Intercept	?	0.30*	1.79	0.26*	1.76	0.12	0.66
		(0.168)		(0.150)		(0.187)	
Observations		2,551		2,221		1,910	
Adj. R-squared		0.44		0.37		0.30	

Panel B5: Subsample of Banks with Low Capital Ratio.

		One quarter ahead		*Two quarters ahead*		*Three quarters ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVAL1_{qt}$	+	0.07*	1.95	0.06*	1.78	0.08**	2.15
		(0.035)		(0.036)		(0.039)	
$ASNFVAL2_{qt}$	+	-0.09***	-3.46	-0.11***	-4.56	-0.15***	-5.41
		(0.025)		(0.025)		(0.029)	
$ASNFVAL3_{qt}$	+	0.00	0.15	-0.02	-0.63	-0.03	-0.65
		(0.032)		(0.037)		(0.040)	
ASE_{qt}	+	0.65***	27.82	0.62***	24.09	0.54***	18.29
		(0.023)		(0.026)		(0.030)	
Intercept	?	0.38***	2.90	0.48***	3.42	0.63***	4.00
		(0.132)		(0.140)		(0.157)	
Observations		3,179		2,884		2,593	
Adj. R-squared		0.43		0.38		0.30	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

For the low capital ratio banks subsample (as in panel B5, Table 7.26), the net level 1 fair value assets ($ASNFVAL1_{qt}$) has a positive and statistically significant relationship (mostly at the 10% level) with one-, two-, and three-quarter ahead operating earnings (with t-statistics of 1.95, 1.78 and 2.15 for the one-, two-, and three-quarter time horizons, respectively). Furthermore, net level 2 fair value assets ($ASNFVAL2_{qt}$) have a negative and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of -3.46, -4.58 and -5.41 for the one-, two-, and three-quarter time horizons, respectively). Panel B5 of Table 7.26 also shows that level 3 net asset fair values ($ASNFVAL3_{qt}$) are not significantly related to future operating earnings.

Also, for the second study period, panel A6 of Table 7.27 shows that for high capital ratio banks level 1 fair value assets ($ASASSETSL1_{qt}$), level 2 fair value assets ($ASASSETSL2_{qt}$) and level 3 fair value assets ($ASASSETSL3_{qt}$) are not significantly related to future operating earnings across the three quarterly time horizons. Similarly, for the high capital ratio banks panel A6 of Table 7.27 shows that the relationships between level 1, level 2, level 3 fair value liabilities and future operating earnings are generally weak considering that the relationships are mainly not statistically significant across all three time horizons.

For low capital ratio banks, panel B6 of Table 7.27 shows that level 2 fair value assets ($ASASSETSL2_{qt}$) has a negative and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of -4.86, -5.33 and -5.79 for the one-, two-, and three-quarter time horizons, respectively). This contrasts with the level 2 fair value liabilities ($ASLIABL2_{qt}$) which have a positive and statistically significant relationship with one-, two-, and three-quarter ahead operating earnings (with t-statistics of 2.23, 2.97 and 1.90 for the one-, two-, and three-quarter time horizons, respectively). However, panel B6 of Table 7.27 shows for low capital ratio banks that level 1 fair value assets ($ASASSETSL1_{qt}$), level 1 fair value liabilities ($ASLIABL1_{qt}$), level 3 fair value assets ($ASASSETSL3_{qt}$) and level 3 fair value liabilities ($ASLIABL3_{qt}$) are mostly not significantly related to future operating earnings across all three time horizons. The results summarised in Tables 7.26 and Table 7.27 are again consistent with a structural change in the relationship between bank operating cash flows and operating earnings as previously observed in the second study period and which I have previously argued will have a perverse effect on my regression results.

Table 7.27
Relationship between Levels bank fair value assets, liabilities and operating earnings in future quarters 1, 2 & 3.

Panel A6: Subsample of Banks with High Capital Ratio.

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASASSETSL1_{qt}$	+	0.02	0.77	0.03	1.05	0.01	0.42
		(0.020)		(0.024)		(0.028)	
$ASASSETSL2_{qt}$	+	-0.03	-0.99	-0.01	-0.46	0.00	0.13
		(0.026)		(0.027)		(0.030)	
$ASASSETSL3_{qt}$	+	-0.01	-0.36	-0.02	-0.54	0.03	0.87
		(0.030)		(0.034)		(0.039)	
$ASLIABL1_{qt}$	-	0.10	1.19	0.19*	1.95	0.25**	2.29
		(0.081)		(0.098)		(0.108)	
$ASLIABL2_{qt}$	-	0.07*	1.68	0.06	1.32	0.06	0.95
		(0.041)		(0.049)		(0.058)	
$ASLIABL3_{qt}$	-	-0.10	-1.40	-0.02	-0.29	0.00	0.03
		(0.073)		(0.081)		(0.088)	
ASE_{qt}	+	0.67***	23.74	0.60***	19.73	0.51***	15.15
		(0.028)		(0.031)		(0.034)	
Intercept	?	0.45***	2.71	0.40**	2.48	0.42**	2.33
		(0.166)		(0.162)		(0.182)	
Observations		2,551		2,221		1,910	
Adj. R-squared		0.44		0.38		0.30	

Panel B6: Subsample of Banks with Low Capital Ratio.

Variable	Predicted Sign	*One quarter ahead* Coefficient	t-stat	*Two quarters ahead* Coefficient	t-stat	*Three quarters ahead* Coefficient	t-stat
$ASASSETSL1_{qt}$	+	0.01	0.50	0.00	0.01	0.00	0.10
		(0.028)		(0.027)		(0.032)	
$ASASSETSL2_{qt}$	+	-0.12***	-4.86	-0.14***	-5.33	-0.17***	-5.79
		(0.025)		(0.027)		(0.030)	
$ASASSETSL3_{qt}$	+	-0.05	-1.56	-0.08**	-2.16	-0.08*	-1.91
		(0.033)		(0.036)		(0.039)	
$ASLIABL1_{qt}$	-	0.02	0.19	-0.08	-0.72	-0.19*	-1.65
		(0.097)		(0.108)		(0.116)	
$ASLIABL2_{qt}$	-	0.11**	2.23	0.15***	2.97	0.11*	1.90
		(0.048)		(0.051)		(0.059)	
$ASLIABL3_{qt}$	-	0.07	0.87	0.12	1.27	0.33***	2.83
		(0.085)		(0.098)		(0.116)	
ASE_{qt}	+	0.64***	26.30	0.61***	22.98	0.53***	17.82
		(0.024)		(0.026)		(0.030)	
Intercept	?	0.60***	4.37	0.67***	4.50	0.80***	4.76
		(0.138)		(0.148)		(0.167)	
Observations		3,179		2,884		2,593	
Adj. R-squared		0.44		0.39		0.30	

Robust standard errors in parentheses
***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

7.3.2.3 The Effects of Growth Prospects

To control for the growth prospects of the sampled banks, I follow Song *et al*. (2010) and Eccher *et al.* (1996) by including a growth variable in my regression equations. The growth variable was represented by the growth in bank total assets and also, the growth in bank net loans. *ASGRW* (asset growth) is defined as the logarithm of bank total assets at time *t* divided by bank total assets at time (*t* - *1*) where time *t* represents the particular "year" during the first study period and time *t* represents the particular "quarter" during the second study period. Thus for the first study period these regressions are estimated as follows:

$$ASOP_{t+1} = a_0 + a_1 ASNFVA_t + a_2\, ASOP_t + a_3 ASGRW + \alpha_t$$

$$ASOP_{t+2} = b_0 + b_1 ASNFVA_t + b_2\, ASOP_t + b_3 ASGRW + \beta_t$$

$$ASOP_{t+3} = c_0 + c_1 ASNFVA_t + c_2\, ASOP_t + c_3 ASGRW + \zeta_t$$

In the first of the above equations $ASOP_{t+1}$ is the one period ahead inverse sinh transformed value of the operating earnings, $ASNFVA_t$ is the transformed value of the net fair value assets, $ASOP_t$ is the transformed value of the current period operating earnings, a_1, a_2, and a_3 are parameters and α_t is a stochastic error term. The variables and parameters appearing in the second and third equations are similarly defined. The results of the above regression estimates are then compared with the original models which exclude the growth factor. The results are summarised in Table 7.28. From the results shown in Table 7.28, it can be seen that the *ASGRW (Asset growth)* variable does not change the coefficients associated with the other variables in the regression equations in any fundamental way. Thus, there is no evidence that controlling for asset growth alters any of the conclusions I have previously reached.[73]

Table 7.29, shows the results when the *ASGRW* (asset growth) variable is incorporated into the regression models that relate net bank fair values to operating earnings in future quarters 1, 2 and 3 during the second study period. The results show similar outcomes to the results for the first study period because when asset growth is controlled for in the regressions, it does not significantly change the findings obtained from the underlying models which do not incorporate the *ASGRW* (asset growth) variable.[74]

7.3.3 Specific fair value asset and Liability regressions for the first study period

For the first study period with annual data from 1996 until 2005, I further investigate whether the fair values of specific classes of financial assets and liabilities[75] have a significant influence on bank earnings in future years *t+1*, *t+2* and *t+3*, respectively. The results summarised in Table 7.30 suggest that only net loans ($ASLOAN_t$) have a significant association with future operating earnings across the three time horizons. Similar to the findings in section 6.3.3, there is evidence that at the specific financial asset or liability level, bank fair values may not possess a strong predictive relationship

[73] Similar results were obtained when growth in bank net loans was used instead of the asset growth variable in the regressions to test for the influence of the bank growth prospects on the underlying models.

[74] Growth in bank net loans was used in place of the asset growth variable in the regressions with similar outcomes. Also similar control measures for growth prospects were employed with the regressions associated with the relationship between levels bank fair value assets, liabilities and operating earnings in future quarters 1, 2 and 3, during the second study period with similar result outcomes.

[75] There are ten classes of on-balance sheet fair value financial assets and six classes of on-balance sheet fair value of financial liabilities employed in the regression models as shown in Table 7.30. Each of these classes of financial assets and liabilities are described in detail in section 5.5.2 and specifically in Table 5.8 which is found on pages 125-127 of this thesis.

with future earnings. Nevertheless as already mentioned when these specific asset/liability fair values are aggregated, they do appear to possess a predictive relationship with future earnings.

Table 7.28
Relationship between bank net fair values and operating earnings in future years 1, 2 and 3 with and without an asset growth variable, during the first study period.

		One year ahead				*Two years ahead*				*Three years ahead*			
		Model 4a		*Model 4a with Growth Variable.*		*Model 5a*		*Model 5a with Growth Variable.*		*Model 6a*		*Model 6a with Growth Variable.*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVA_t$	+	0.07*** (0.025)	2.66	0.07** (0.028)	2.58	0.05** (0.022)	2.15	0.05** (0.024)	2.02	0.09* (0.049)	1.76	0.08* (0.051)	1.66
$ASOP_t$	+	0.73*** (0.051)	14.24	0.73*** (0.054)	13.48	0.69*** (0.051)	13.66	0.70*** (0.053)	13.15	0.64*** (0.070)	9.11	0.65*** (0.074)	8.76
ASGRW	+			0.30* (0.178)	1.71			0.55*** (0.199)	2.74			0.50*** (0.167)	2.99
Intercept	?	0.87*** (0.184)	4.74	0.79*** (0.196)	4.01	1.11*** (0.176)	6.31	0.98*** (0.192)	5.10	1.26*** (0.197)	6.41	1.17*** (0.209)	5.58
Observations		1,150		1,112		1,081		1,044		875		841	
Adj. R-squared		0.62		0.62		0.46		0.47		0.45		0.46	

Robust standard errors in parentheses ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.4 for definitions of dependent and independent variables.

Table 7.29

Relationship between Levels Net bank fair value assets and operating earnings in future quarters 1, 2 and 3 with and without an asset growth variable, during the second study period.

		One quarter ahead				*Two quarters ahead*				*Three quarters ahead*			
		Model 10a		*Model 10a with Growth Variable*		*Model 11a*		*Model 11a with Growth Variable*		*Model 12a*		*Model 12a with Growth Variable*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASNFVAL1_{qt}$	+	0.05**	2.34	0.06**	2.53	0.07***	3.19	0.10***	4.03	0.08***	2.87	0.11***	4.04
		(0.022)		(0.025)		(0.023)		(0.024)		(0.027)		(0.028)	
$ASNFVAL2_{qt}$	+	-0.04**	-2.34	-0.05**	-2.43	-0.06***	-3.23	-0.07***	-3.64	-0.06***	-2.98	-0.08***	-3.26
		(0.018)		(0.021)		(0.018)		(0.020)		(0.022)		(0.025)	
$ASNFVAL3_{qt}$	+	0.01	0.48	0.01	0.50	-0.01	-0.26	-0.00	-0.02	0.01	0.47	0.05*	1.69
		(0.022)		(0.023)		(0.026)		(0.027)		(0.028)		(0.029)	
ASGRW	+			1.18	0.98			1.31	1.25			0.64	0.45
				(1.207)				(1.051)				(1.413)	
ASE_{qt}	+	0.67***	36.87	0.66***	34.25	0.63***	31.38	0.62***	28.50	0.55***	23.60	0.57***	23.88
		(0.018)		(0.019)		(0.020)		(0.022)		(0.023)		(0.024)	
Intercept	?	0.33***	3.13	0.36***	3.06	0.37***	3.50	0.47***	3.92	0.43***	3.44	0.57***	4.11
		(0.104)		(0.119)		(0.106)		(0.121)		(0.124)		(0.139)	
Observations		5,730		5,105		5,105		4,503		4,503		3,928	
Adj. R-squared		0.43		0.44		0.37		0.38		0.28		0.33	

Robust standard errors in parentheses ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.6 for definitions of dependent and independent variables.

Table 7.30
Relationship between bank specific asset and liability fair values and operating earnings in future years 1, 2 and 3, during the first study period.

		Model 14a: One year ahead		*Model 14b: Two years ahead*		*Model 14c: Three years ahead*	
Variable	**Predicted Sign**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**	**Coefficient**	**t-stat**
$ASCASH_t$	+	-0.01	-0.22	-0.03	-1.06	-0.04	-1.08
		(0.025)		(0.031)		(0.034)	
$ASFEDE_t$	+	0.02	0.80	0.04	1.45	0.02	0.82
		(0.019)		(0.025)		(0.029)	
$ASFHLB_t$	+	-0.03	-0.86	-0.07	-1.34	-0.05	-0.78
		(0.032)		(0.050)		(0.060)	
$ASINVA_t$	+	0.01	1.17	0.01	0.64	0.02	0.89
		(0.012)		(0.018)		(0.018)	
$ASINVM_t$	+	0.03**	2.23	0.02	0.85	0.02	1.22
		(0.014)		(0.019)		(0.020)	
$ASINVT_t$	+	-0.01	-0.39	0.05*	1.83	0.05*	1.87
		(0.033)		(0.027)		(0.027)	
$ASLHS_t$	+	0.02	0.96	-0.00	-0.00	0.01	0.42
		(0.021)		(0.034)		(0.028)	
$ASLOAN_t$	+	0.29**	2.41	0.32**	2.17	0.61***	3.23
		(0.121)		(0.148)		(0.190)	
$ASMSR_t$	+	-0.03	-0.54	-0.02	-0.19	-0.09	-0.61
		(0.059)		(0.115)		(0.154)	
$ASOSTA_t$	+	-0.02	-1.04	-0.03	-1.11	-0.03	-0.81
		(0.017)		(0.031)		(0.035)	
$ASDEPO_t$	-	-0.34***	-2.74	-0.41***	-2.78	-0.22	-1.46
		(0.125)		(0.148)		(0.148)	
$ASFFP_t$	-	-0.00	-0.02	0.03	0.93	-0.01	-0.60
		(0.013)		(0.030)		(0.017)	
$ASFBAD_t$	-	0.02	1.18	0.03*	1.65	0.04**	2.14
		(0.014)		(0.018)		(0.018)	
$ASLTD_t$	-	-0.00	-0.04	0.01	0.43	0.01	0.63
		(0.015)		(0.020)		(0.020)	
$ASOTNEG_t$	-	0.02	1.28	0.07***	2.69	0.07**	2.31
		(0.016)		(0.026)		(0.030)	
$ASSTD_t$	-	0.02	1.27	0.06*	1.84	0.05	1.42
		(0.017)		(0.031)		(0.033)	
$ASOP_t$	+	0.39***	5.56	0.35***	5.59	0.26***	3.34
		(0.071)		(0.062)		(0.077)	
Intercept	?	-2.49***	-5.33	-2.52***	-4.51	-2.84***	-5.01
		(0.468)		(0.559)		(0.567)	
Observations		1,150		1,081		875	
Adj. R-squared		0.70		0.54		0.54	

Robust standard errors in parentheses ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.10 levels (two-tailed), respectively. Standard errors are corrected using the White robust adjustment procedure. See Table 5.8 for definitions of dependent and independent variables.

7.3.4 Further Robustness Tests

I now summarise some other sensitivity tests that were applied to my regression procedures in order to assess the robustness of the results presented in this chapter.

7.3.4.1 Heteroscedasticity Robust Option

As mentioned in section 5.5.1, I utilise the inverse hyperbolic sine function to transform the variables employed in the regression models, thereby reducing the impact heteroscedasticity might have on the veracity of my regression procedures. To further mitigate econometric issues associated with heteroscedastic error terms, the White (1980) adjustment procedure was applied to all regression models evaluated in my empirical analysis.

7.3.4.2 OLS Regression with Cluster Option

It is possible that the level of future year earnings as shown in the first study period and the level of future quarter earnings as shown in the second study period among different banks within a year or quarter as the case may be, or different years or quarters within a bank may not be independent. This could lead to residuals that are not independent within years, quarters or banks. I therefore use OLS regression with the cluster option based on bank and year in the first study period and for the second study period, the cluster option based on bank and quarter.

Overall, untabulated results for both study periods show that the results regarding the relationship between the future operating earnings and the net fair values across the three time horizons remain unchanged when the cluster regression procedure is applied.

7.3.4.3 Outliers

Following procedures similar to those summarised in section 6.3.4.3, the data utilised in this chapter's regression analysis were also assessed for outliers. The studentized residuals associated with the variables were examined in order to find computed studentized residuals with an absolute value greater than 3 which are considered to be outliers (Belsley *et al.*, 1980 and Fox, 1991). A re-estimation of the regression models after deleting observations with studentized residuals with an absolute value greater than 3 showed no significant difference from the results originally for the models.

7.3.4.4 Alternative Data Transformation techniques

I also re-estimated all the regression models articulated in this chapter using two alternative data transformations. For the first transformation I deflated all variables by the balance sheet value of total assets. A second transformation involved deflating all variables by the balance sheet value of issued common shares. The regression results based on both of these deflation procedures were extremely poor and showed that there was at best a tenuous but more commonly, a non-existent relationship between future earnings and the banks' current on-balance sheet net asset fair values. I have previously noted (as in section 6.3.4.4) that in some ways this is hardly surprising since Pearson (1897) showed that when one implements a regression procedure where some or all of the independent variables and the dependent variable itself have been scaled by a common factor (as was the case with the regression procedures invoked in this section) that all parameter estimates will be biased and there will also be an element of spurious correlation in the regression relationship.

7.4 Summary

This chapter presents and discusses the descriptive statistics and multivariate regression results obtained from the hypothesis testing procedures with regard to the relationships between bank fair values, current year operating earnings and future operating earnings. Section 7.1 showed the summary descriptive statistics for the raw data and also the transformed data based on the inverse hyperbolic sine transformation. This transformation was applied in order to render the data employed in the empirical analysis more compatible with the assumptions of the general linear regression model.

Section 7.2 provides a summary of the empirical results on which the testing of hypothesis 1b and 2b is based. These hypotheses examine whether there is a predictive relationship between bank fair values and their future earnings, utilising annual data for the first study period from 1996 until 2005 and quarterly data for the second study period, from 2008 until 2010. The empirical results obtained support hypothesis 1b, that the current net asset fair values of on-balance sheet financial instruments of banks during the first study period are significantly associated with the future years' earnings of such banks. With regard to hypothesis 2b for the second study period which encompassed the global financial crises period and also the levels classification of bank fair values according to SFAS 157, the findings from the empirical results were that the current quarter's level 1 net asset fair values of banks were positively associated with the future quarters' earnings of such banks. However, the level 2 net asset fair values of banks were negatively associated with the future quarters' earnings of such banks. This result was in contrast to the results obtained in chapter six, where it was found that both level 1 and level 2 net asset bank fair values were positively related to future quarters' bank cash flows. It was discovered that a possible reason behind this disparity was that there was a structural change in the relationship between bank operating cash flows and operating earnings over the course of the first and second study period, where in particular for the second study period (which includes the period of the global financial crisis) there was a systematic downward bias in operating earnings relative to the operating cash flows of the sampled banks. This in turn made operating earnings a poor proxy for operating cash flows during the second study period.

Section 7.3 summarises several robustness and sensitivity tests relating to the empirical procedures employed in this chapter - especially with respect to the impact of bank size, capital adequacy and growth prospects. Overall, the robustness tests had little impact on the results I obtained for the first study period. However, for the second study period, where the structural change in the relationship between bank operating cash flows and operating earnings had a perverse effect on my regression results, there were cases where bank size and bank capital ratios did have an impact on the predictive relationship between bank fair values and earnings. Chapter eight will summarise and discuss the main findings that come out of my thesis and then go on to conclude the thesis.

CHAPTER EIGHT

SUMMARY AND CONCLUSION

This final chapter of the thesis provides an overall summary of the conclusions obtained from the empirical work contained in the thesis and discusses the implications for researchers, regulators and users of published financial statements. Moreover, the chapter also outlines the major limitations associated with the empirical work reported in the thesis. Finally, the chapter provides some suggestions for future research.

8.1 Summary and Main Findings

The thesis is motivated by the limited research on the direct relationship between bank fair values and banks' future performance. The study is also motivated by the limited research into U.S. bank fair value disclosures based on the SFAS 157 levels classification of fair values, especially in regard to how such disclosures are related to banks' future performance during the 2007/2008 global financial crisis. Two key research questions were examined in this study. Firstly, do bank fair values predict future cash flows and earnings (that is, the future financial performance) of banks? Secondly, did bank fair values have predictive value in relation to banks' future financial performance during the 2007/2008 global financial crisis? These research questions were asked in the context of the arguments for and against the wider use of fair value accounting for banks' financial instruments and the claim by some that fair values during economic recessions (where markets may be highly illiquid) are irrelevant and largely unreliable. A number of studies have found that bank fair values when compared to traditional historical costs are more value-relevant based on capital market reactions and thus have higher explanatory power. However, there is a very limited literature on how bank fair values are related to the future performance (e.g.

earnings and cash flows) of banks. This study fills this gap by providing empirical evidence on the relationship between U.S. bank fair value disclosures and banks' future performance as measured by operating cash flows and earnings over a three-period future horizon. Furthermore, the thesis provides evidence about the relationship between bank fair values, in terms of the levels classification introduced during the period of the 2008 global financial crisis, and the future performance of banks, thus showing whether market illiquidity affected the underlying relationships.

I commenced my analysis in chapter two with a discussion of the history of standard setting by the FASB. This history showed a continuous shift towards more fair value accounting as a measurement basis, particularly for financial instruments. This move towards fair value accounting was founded on the decision-usefulness paradigm on which the FASB's Conceptual Framework is built. Specific events such as the Savings and Loans Crisis in the U.S. during the 1980s and the massive growth in recent times in use of more complex financial instruments have helped to lead professional accounting standard setting bodies towards fair value measurement. Fair value focused accounting standards have had broader application in the measurement of financial instruments and there are arguments for and against this. At the conceptual level, fair value is seen as superior to amortised cost accounting because it reflects the market's assessment of current economic conditions and thus makes fair value a more relevant measurement metric than historical cost accounting. The case against fair valuation of financial instruments includes: (i) the subjective nature of the exit values upon which fair values are based, (ii) unnecessary income volatility which fair value accounting may yield for financial instruments held to maturity, and (iii) other practical implementation issues such as the difficulty associated with auditing fair values and the challenges of obtaining fair values when active markets do not exist for an asset or liability. On the procyclical nature of fair value accounting, there seems to be some theoretical backing to support the exacerbating effects of fair values on cycles whether in boom times or in recessionary times. However, on whether fair value accounting exacerbated the recent global financial crisis, the discussion suggests that largely it did not spark a fire sale in banks' assets. Indeed, even if there were some exacerbating effects associated with fair value accounting it would have been minor, considering the leverage practices of financial institutions and that, at that time, fair value accounting for financial instruments had yet to be fully implemented in terms of both measurement and recognition.

Chapter three compared the theoretical case for the implementation of fair value accounting to the other measurement bases which have been suggested in the literature. It also reviewed the empirical literature, particularly in relation to the value relevance of fair values. Moreover, this chapter considered the principal features of the 2001 and 2007 economic recessions and the impact that fair value accounting procedures might have had in prolonging the adverse effects of these two recessions. The theoretical developments surrounding fair value accounting suggest that fair values - especially when derived from active markets - are more relevant to the users of financial statements when compared to historical costs. Prior research based on the period before the introduction of SFAS 157 in November, 2007 found that the explanatory power of bank fair values when compared to traditional historical costs are more value-relevant based on capital market reactions. There is however a very limited literature that deals with the relationship between fair values and the future performance of firms in terms of future cash flows and earnings. The few existing studies have focused on non-financial firms[76], for example, Aboody *et al.* 1999. The literature subsequent to SFAS 157 which coincided with the 2008 global financial crisis focused on whether the levels classification of fair values was value-relevant. The reported results generally support the hypothesis that there is a more significant association between level 1 and level 2 classified fair values than level 3 fair values. However, this literature had not examined whether these levels classified fair values have a direct relationship with the future cash flows and earnings of firms. In particular, the research studies did not consider the relationship between banks' reported fair values and their future performance over the period coinciding with the global financial crisis and also, how market illiquidity could impact on such a relationship.

In chapter four, the hypotheses relating to bank net asset fair values and their future cash flows and earnings were developed. These hypotheses were all based on the decision-usefulness doctrine supported in the FASB and IASB Conceptual Frameworks, the efficient market hypothesis and the market valuation model. Agency theory was also employed to explain why firm management may act opportunistically in determining the fair values to be reported in a firm's published financial statements.

Chapter five described the sample selection process, data collection methods and the hypothesis testing procedures employed in the study of the relationship between U.S. bank fair value disclosures and their future operating cash flows and operating earnings. For the first study period from 1996 to 2005, the final sample includes 1,229 firm-years

[76] A recently published paper by Evans, Hodder and Hopkins (2014) employed financial firms in their study and they find that the accumulated fair value adjustments (i.e. the difference between the fair value and amortized cost) for investment securities of a sample of U.S. commercial banks had a positive association with the realized income from investment securities in the following period. This suggests that bank investment securities' fair values have predictive ability in relation to the affected banks' future realized incomes. This is the first published paper I am aware of that employs financial firms when the predictive ability of bank fair values are considered. However, the study focuses on a specific class of bank assets - namely investment securities - while my study encompasses the entire on-balance sheet fair values of financial instruments of banks.

for banks having one year ahead *(t+1)* future cash flows, 1,162 firm-years for banks having two year ahead *(t+2)* future cash flows and 942 firm-years for banks having three year ahead *(t+3)* future cash flows. The sample also includes 1,150 firm-years for banks having one year ahead *(t+1)* future operating earnings, 1,081 firm-years for banks having two year ahead *(t+2)* future operating earnings and 875 firm-years for banks with three year ahead *(t+3)* future operating earnings. In relation to the second study period which employs quarterly data from 2008-2010, the final sample covers a total of 5,730 firm-quarters for banks having one quarter ahead *(t+1)* future cash flows and operating earnings, 5,105 firm-quarters for banks having two quarter ahead *(t+2)* future cash flows and operating earnings and 4,503 firm-quarters for banks having three quarter ahead *(t+3)* future cash flows and operating earnings. For the first study period (1996-2005) my empirical analysis is based on the fair values of financial instruments disclosed in the notes to the financial statements as mandated by SFAS 107. For the second study period (2008-2010), bank fair values were measured according to the levels classified fair values as mandated by SFAS 157. A set of ordinary least squares regression models were developed to estimate cross-sectional multivariate regression equations in order to test the hypothesised relationships between bank fair values, future operating cash flows and operating earnings.

Chapter six presented the descriptive statistics and multivariate regression results obtained from the hypothesis testing procedures with regard to the relationships between bank fair values, current year operating cash flows and future operating cash flows. The summary descriptive statistics of the raw data and also the transformed data based on the inverse hyperbolic sine transformation were summarised in this chapter. This latter transformation was applied in order to render the data employed in the empirical analysis more compatible with the assumptions of the general linear regression model. The empirical results obtained support hypothesis 1a, which examined whether there is a predictive relationship between bank fair values and their future cash flows based on annual data for the first study period from 1996 until 2005. This is because the current net asset fair values of on-balance sheet financial instruments of banks during the first study period were significantly associated with the future years' cash flows of such banks. With regard to hypothesis 2a, which examined whether there is a predictive relationship between bank fair values and their future cash flows based on quarterly data for the second study period, from 2008 until 2010,[77] the findings from the empirical results were that the current quarter's level 1 and level 2 net asset fair values of banks were significantly associated with the future quarters' cash flows of such banks. However, the level 3 net asset fair values of such banks ***in most cases*** did not have a significant association with the banks' future quarterly cash flows.

Chapter seven presented and discussed the descriptive statistics and multivariate regression results obtained from the hypothesis testing procedures with regard to the relationships between bank fair values, current year operating earnings and future operating earnings. The chapter provided summary descriptive statistics for both the raw and transformed data based on the inverse hyperbolic sine transformation. The empirical results were compatible with hypothesis 1b, which posits the existence of a predictive relationship between bank fair values and their future earnings utilising annual data for the first study period from 1996 until 2005. This is because the current net asset fair values of on-balance sheet financial instruments of banks during the first study period were significantly associated with the future years' earnings of such banks. With regard to hypothesis 2b which examined whether there is a predictive relationship between bank fair values and their future earnings, utilising quarterly data for the

[77] This period encompassed the global financial crises period and also the levels classification of bank fair values according to SFAS 157.

second study period from 2008 until 2010[78], the findings from the empirical results were that the current quarter's level 1 net asset fair values of banks were positively associated with the future quarters' earnings of such banks. However, the level 2 net asset fair values of banks were negatively associated with the future quarters' earnings of such banks. This result was in contrast to the results obtained earlier, where it was found that both level 1 and level 2 net asset bank fair values were positively related to future quarters' bank cash flows. Further empirical analysis showed that a possible reason behind this disparity was that there was a structural change in the relationship between bank operating cash flows and operating earnings over the course of the first and second study periods, where in particular for the second study period there was a systematic downward bias in operating earnings relative to the operating cash flows of the sampled banks. This in turn made operating earnings a poor proxy for operating cash flows during the second study period.

A range of robustness and sensitivity tests were conducted relating to the empirical procedures employed - especially with respect to the impact of bank size, capital adequacy and growth prospects. Overall, the robustness tests had little impact on the empirical results relating to the first study period. However, for the second study period, there were cases where bank size and bank capital ratios did have a significant impact on the predictive relationship between bank fair values and future cash flows. Also during the second study period the structural change in the relationship between bank operating cash flows and operating earnings had a perverse effect on the regression results relating to the predictive relationship between bank fair values and earnings. This structural change in the relationship between bank operating cash flows and operating earnings during the second study period may have accentuated the impact

[78] It will be recalled that this period encompassed the global financial crises period and also the levels classification of bank fair values according to SFAS 157.

that bank size and bank capital ratios had on the predictive relationship between bank fair values and earnings.

8.2 Discussion and Contribution

The research methodology employed and the findings reported in this thesis provide several contributions to the academic literature on fair value accounting and accounting standard-setting. I would begin by noting that this is the first study to conduct a direct test of the differences in valuation relevance between the three levels of classified fair values based on SFAS 157 and banks' future operating performance during the 2007 global financial crisis period. Furthermore, this is the first study in the fair value accounting literature to apply the inverse hyperbolic sine transformation to all data employed in the empirical analysis in order to render it more compatible with the assumptions on which the general linear regression model is based. The following sections discuss in specific ways how this study contributes to the academic literature on fair value accounting and accounting standard-setting.

8.2.1 The Performance Prediction Value of Bank Fair Values

First as noted in the previous section, the empirical results summarised in the thesis show that bank fair values are significantly associated with future bank performance as measured by their future operating cash flows and earnings. The study shows that during the first study period from 1996 until 2005, the net asset fair values of on-balance sheet financial instruments were significantly associated with the future years' operating cash flows and operating earnings of such banks. These results provide confirmation that net asset fair values possess the attribute of performance prediction as argued by Ball (2008); Barth (2006b) and Tweedie (2008). Another implication of this finding is that net asset fair values possess the predictive value attribute that fits into the FASB's view that the asset values shown in firm financial statements should communicate information about the potential future financial performance of the affected firms (FASB 2010:17).

8.2.2 The Performance Prediction Value of Bank Fair Values during Financial Crisis

Secondly, in examining the predictive relationship between bank fair values and future cash flows during the second study period from 2008 until 2010,[79] this thesis shows that the current quarter's level 1 and level 2 net asset fair values of banks were significantly associated with the future quarters' cash flows of such banks. However, the level 3 net asset fair values of such banks in most cases were not significantly associated with the banks' future quarterly cash flows. These findings show that objectively determined bank fair values based on market prices rather than model based determined bank fair values provide greater predictive value in relation to future performance as measured by operating cash flows. This is consistent with results summarised in the value relevance of fair values-post SFAS 157 literature where Goh, *et al.* (2009), Kolev (2008), Song *et al.* (2010) show that the value relevance of level 1 and level 2 fair values were greater than the value relevance of level 3 fair values. From this I conclude that investors priced mark-to-model assets (level 3 fair values) lower than level 1 and level 2 fair values which were directly based on observed market prices.

[79] It will be recalled that this period encompassed the global financial crises period and also the levels classification of bank fair values according to SFAS 157.

8.2.3 Fair Value Cash flow Prediction versus Fair Value Earnings Prediction

Thirdly, the empirical results summarised in chapters six and seven demonstrate that the relationships between bank fair values and future operating cash flows are stronger compared to the relationships between bank fair values and future operating earnings. During the first study period the predictive relationship between bank fair values and future cash flows are statistically more significant when compared to the corresponding relationships for future operating earnings and current year bank fair values. This is possibly because, in theoretical terms, fair values represent the expected present value of the future cash flows of the affected asset and/or liability rather than the expected present value of its earnings. Hence, fair values are likely to be more closely aligned to future cash flows in comparison to future earnings. Moreover, the weaker relationships between future operating earnings and bank fair values was more evident during the global financial crisis period, where I found that there was a systematic downward bias in operating earnings relative to the operating cash flows of the sampled banks. This in turn made operating earnings a poor proxy for operating cash flows during the second study period.

8.2.4 Bank Operating Cash flows versus Bank Operating Earnings during the Global Financial Crisis

Fourthly, this study found that during the global financial crisis period from 2008 until 2010, operating cash flows and operating earnings of the banks did not track each other. Rather operating cash flows continued to rise, while earnings fell or flat-lined, thus showing that whilst banks implemented significant asset write-downs during the global financial crisis period which adversely affected their bottom line earnings, they were at the same time building up their operating cash flows. This finding shows that the operating cash flows and operating earnings of the sampled banks did not track each other and contrasts with the theory that earnings represent a firm's normalised (or permanent) cash flows (as developed by Beaver (1998) and summarised in section 4.3 of this thesis). This finding also contradicts the empirical findings of Kim and Kross (2005) who study non-financial firms from 1973 until 2000 and find that the ability of earnings to predict future cash flows has generally been strengthening over time.

8.2.5 Bank Size and the Predictive Value of Bank Fair Values

Fifthly, this study indicates that bank size could affect the relationship between bank fair values and future operating cash flows and earnings, depending on whether the affected banks were operating in a financial crisis environment or not. During the first study period (where there was no significant financial crisis) my empirical results show that there is a delayed effect for the market to factor in the expectations of the cash flows to be generated by large banks' net assets in the fair value valuations when compared to smaller banks. This was attributed to how quickly the cash flows generated by the banks' net assets are realised. Smaller banks may have incentives to realise cash flows more quickly in order to fund their continuing operations, while larger banks are likely to have a more relaxed attitude towards how they realise their cash flows by virtue of the fact that their size will mean they are much less likely to experience liquidity problems than smaller banks. However, during this same period, the study found very little difference in the way bank size impacts on the relationship between bank net asset fair values and the future operating earnings of the affected banks.

During the second study period, where there was a global financial crisis, the study found that the net level 3 bank fair values for large banks were significantly related to banks' future operating cash flows in the second and third quarters ahead, while the net level 3 bank fair values for small banks were not significantly related to banks' future operating cash flows across all three time horizons considered. Given that level 3 net asset fair values are the most subjective of the three fair value classifications and that smaller banks are more susceptible to financial distress during severe downturns than larger banks, this might mean that market participants completely discount the relevance of level 3 net asset fair values for smaller banks. This is consistent with Song *et al.* (2010) who found that investors perceived fair value estimates by managers of small banks as being less reliable than the fair value estimates by managers of large banks. The empirical results also show that there is a strong association between the level 1 fair value assets and liabilities of small banks and future operating cash flows - in contrast to the empirical results obtained for large banks. This is because for large banks, with complex financial transactions conducted in multiple markets and with several counter-parties involved, the challenge of ascertaining the market value of their financial assets and liabilities in an objective manner would be greater during the global financial crisis, compared to the market prices of smaller banks' financial assets and liabilities. This argument is consistent with the "too big to fail" concept which is the term used to describe financial institutions that are very large with assets that are opaque, difficult for outsiders to value and traded in relatively illiquid and thin markets (White, 2014). Thus, during periods of severe illiquidity such as the global financial crisis, the task of obtaining reliable estimates of the market values for the level 1 assets and liabilities of large banks would become even more severe in comparison to that for smaller banks with less complex financial assets and liabilities.

My results show that there was a structural change in the relationship between bank operating cash flows and their operating earnings over the course of the two study periods, where, in particular, for the second study period (which includes the period of the global financial crisis) there is a systematic downward bias in operating earnings relative to the operating cash flows of the sampled banks. This made the operating earnings of the sampled banks a poor proxy for their future operating cash flows during this second study period and had a perverse effect on the regression results I report for this period.

8.2.6 Bank Capital Adequacy, Bank Fair Values and Bank Future Cash Flows

Sixthly, this study is that during the first study period the banks' level of capital adequacy did not affect the relationship between net fair value assets and future bank operating cash flows. It will be recalled that during the first study period there were no problems with market illiquidity and uncertainty when compared to the period of the global financial crisis and so, the level of financial risk as measured by capital adequacy had very little impact on the market's expectations about the future cash flows of the sampled banks.

The study further found that in the second study period the net level 2 fair value assets ($ASNFVAL2_{qt}$) continue to be significantly associated with future operating cash flows irrespective of the capital adequacy level of the banks. There is, however, a delay in how the market factors its cash flow expectations into the fair values appearing on a given bank's balance sheet according to whether the affected bank is a high or low capital ratio bank. Here, high capital ratio banks face lesser incentives to engage in hasty asset liquidations because of their relatively comfortable capital position. However, the general uncertainty and market illiquidity during the global financial crisis period make the task of obtaining objectively defined net fair values difficult - even for high capital ratio banks. Thus, it is hardly surprising that there is an insignificant relationship between net level 1 fair value assets (*ASNFVAL1*$_{qt}$), net level 3 asset fair values (*ASNFVAL3*$_{qt}$) and bank future operating cash flows during the period of the financial crisis.

Also, for banks with high capital ratios during the global financial crisis period, there is a strong relationship between level 1 fair value assets (*ASASSETSL1*$_{qt}$) and future operating cash flows. This shows that the objectively determined fair value assets of banks with lower risk profiles as portrayed by high capital ratios have a significant association with future operating cash flows. Also, for high capital ratio banks both level 3 fair value assets (*ASASSETSL3*$_{qt}$) and level 3 fair value liabilities (*ASLIABL3*$_{qt}$) have a significant association with future operating cash flows. This shows for banks with high capital ratios that level 3 fair values (which are based on model estimates) also hold relevance to investors despite the fact that they may be of questionable objectivity. Thus, it may be concluded that when there is uncertainty in financial markets, the fair values of banks with less financial risk, because of high capital ratios, do have a better predictive relationship with regard to future cash flows when compared to banks with lower capital ratios as evidenced by the lack of a significant statistical association between both the level 1 and level 3 fair value assets and liabilities of low capital ratio banks and their future operating cash flows, during the global financial crisis period.

8.2.7 Growth Prospects and the Predictive Value of Bank Fair Values

Seventh, this study relates to the questioned whether bank growth prospects, as measured by the asset and net loan growth rates of the sampled banks, has any impact on the relationship between bank fair values and their future operating cash flows and earnings. Consistent with the findings of Song *et al.* (2010), my empirical results show that there is little evidence that controlling for bank growth prospects in my regression models alters the conclusions reached earlier in both the first and second study periods.

8.2.8 Liability Fair Values, Credit-rating downgrade and Profit Benefits

Eighth, this study found a positive relationship between level 2 fair value liabilities and the future operating cash flows and earnings during the global financial crisis period. This provides evidence that during the global financial crisis period banks benefit from fair value disclosure rules because the rules lead banks to write down their fair value liabilities when they experience a deteriorating financial position and diminished credit standing. This in turn had a positive impact on the banks' future operating cash flows and earnings. This finding is consistent with the conceptual case against the fair valuation of banks' liabilities because fair value accounting rules allow banks who suffer a credit-rating downgrade that results in a fall in the fair value of their liabilities to recognise an accounting profit based on the difference between the fair value and the face value of these liabilities, thus creating a situation where banks benefit from being unable to pay their debts at face value (Barth *et al.*, 2008:634-635; Chisnall, 2001).

8.2.9 The Inverse Hyperbolic Sine Transformation

Ninth, the study contributes to the literature methodologically, as the inverse hyperbolic sine transformation applied to all data employed in my empirical analysis, facilitated regression procedures that made the relationship between bank fair values and operating cash flows and earnings much more compliant with the assumptions of the general linear model. In particular, the inverse hyperbolic sine transformation addresses the issue of heteroscedasticity and the transformation of negative values without biasing the parameter estimates and inducing spurious correlation as would be the case if I followed the procedure that is usually applied in most papers appearing in the literature of standardising or normalising both my independent and dependent variables by the book value of assets (Pearson, 1897; Laubscher, 1961; Davidson and Tippett, 2012).

8.2.10 Specific Asset and Liability Fair Values Predictive Value

Finally, the evaluation of the predictive relationship between the fair values of specific classes of financial assets and liabilities and future operating cash flows and operating earnings during the first study period showed that many of the specific asset and liability fair values do not have a significant association with future operating cash flows and/or operating earnings. The implication of these findings is that at the specific financial asset or liability level, fair values may not possess a strong predictive relationship with future cash flows and/or earnings. However, when these specific asset/liability fair values are aggregated, they do turn out to possess a predictive relationship with future bank performance as measured by its operating cash flows and/or its operating earnings.

8.3 Limitations and Directions for Future Research

The major limitation of this thesis is that it employs a basic and somewhat rudimentary valuation theory in order to determine the relationship between fair values and a firm's future operating cash flows and earnings as explained in chapter four. However, more advanced theory shows that the relationships in this area are notoriously complex (Davidson and Tippett, 2012). This is borne out by the fact that if I had implemented the regression models developed in chapters six and seven by standardising all variables by total assets instead of applying the inverse hyperbolic sine transformation to all my data, my results would have shown there to be a tenuous relationship at best between operating cash flows, earnings and fair values. There is, therefore, an urgent need to develop a more sophisticated theory of the relationship between earnings, operating cash flows and fair values, if one is to have greater confidence in the apparent empirical relationships which have been found in this area of the literature. My diagnostic testing of the models evaluated in chapters six and seven show that in the large majority of cases my empirical results appear not to have been affected by issues of heteroscedasticity, omitted variables bias and co-linear independent variables. Nonetheless the theory on which my regression models are based is a simplistic abstraction of the complex non-linear relationships which are likely to exist in this area of economic activity.

Moreover, whilst my study evaluates the predictive value of bank fair values with respect to their future operating cash flows, it did not explore how current bank fair values are related to the comprehensive income of my sampled banks. Considering the volatile nature of comprehensive income (Hodder, Hopkins and Wahlen, 2006) and also that the increase or decrease in particular bank asset fair values are recognised in comprehensive income, future research could examine the relationship between current year bank net asset fair values and future year comprehensive income. Also, this thesis finds that during the global financial crisis period from 2008 until 2010, the operating earnings of banks were systematically biased downwards in comparison to operating cash flows as during this period bank operating cash flows continued to rise, while banks earnings fell or flat-lined. The thesis however did not explore why this was the case and hence, the study leaves this as an open question for future research to examine the possible reasons why operating cash flows and operating earnings of banks during the global financial crisis period did not track each other as theory suggests they ought to (Beaver, 1998).

Finally whilst this research also assesses the predictive relationship during the first study period between the fair values of specific classes of financial assets and liabilities and future operating cash flows and operating earnings, I did not evaluate a similar relationship for the second study period because of the problem of collecting the data related to such specific asset and liability classified fair values based on the SFAS 157 levels classification during the second study period. Thus, future research could examine whether there is a predictive relationship between the levels classified fair values according to SFAS 157 of specific classes of financial assets and liabilities and future bank performance from the year 2008 onwards.

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APPENDIX ONE:
Extract of fair value estimates reported by Associated Banc-Corp for the year 1996

ASSOCIATED BANC-CORP
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

FORM 10-K

(Mark One)

[X] ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 for the fiscal year ended December 31, 1996.

COMMISSION FILE NUMBER: 0-5519

ASSOCIATED BANC-CORP WISCONSIN
(Exact name of registrant as specified in its charter)

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 16: FAIR VALUE OF FINANCIAL INSTRUMENTS:

SFAS No. 107, "Disclosures about Fair Value of Financial Instruments," requires that the Corporation disclose estimated fair values for its financial instruments. Fair value estimates, methods, and assumptions are set forth below for the Corporation's financial instruments.

CASH AND DUE FROM BANKS, INTEREST-BEARING DEPOSITS IN OTHER FINANCIAL INSTITUTIONS, AND FEDERAL FUNDS SOLD AND SECURITIES PURCHASED UNDER AGREEMENTS TO RESELL:

For these short-term instruments, the carrying amount is a reasonable estimate of fair value.

INVESTMENT SECURITIES HELD TO MATURITY, INVESTMENT SECURITIES AVAILABLE FOR SALE, AND TRADING ACCOUNT SECURITIES:

The fair value of investment securities held to maturity, investment securities available for sale, and trading account securities, except certain state and municipal securities, is estimated based on bid prices published in financial newspapers or bid quotations received from securities dealers. The fair value of certain state and municipal securities is not readily available through market sources other than dealer quotations, so fair value estimates are based on quoted market prices of similar instruments, adjusted for differences between the quoted instruments and the instruments being valued.

LOANS:

Fair values are estimated for portfolios of loans with similar financial characteristics. Loans are segregated by type such as commercial, commercial real estate, residential mortgage, credit card and other consumer. For residential mortgage loans for resale, fair value is estimated using the prices of the Corporation's existing commitments to sell such loans and/or the quoted market prices for commitments to sell similar loans.

The fair value of other types of loans is estimated by discounting the future cash flows using the current rates at which similar loans would be made to borrowers with similar credit ratings and for similar maturities. Future cash flows are also adjusted for estimated reductions or delays due to delinquencies, non-accruals or potential charge-offs.

EXCESS SERVICING RIGHTS:

The fair value of excess servicing rights is estimated based upon a pricing model that considers factors such as normal servicing fees, loan prepayment speeds and an appropriate discount rate.

MORTGAGE SERVICING RIGHTS:

The fair value is estimated by discounting the expected future cash flows considering estimated service fees, ancillary income, interest on tax and insurance, and principal and interest float, servicing costs, other costs, and future prepayment speeds.

DEPOSITS:

Under SFAS No. 107, the fair value of deposits with no stated maturity such as noninterest-bearing demand deposits, savings, NOW accounts and money market accounts, is equal to the amount payable on demand as of December 31. The fair value of certificates of deposit is based on the discounted value of contractual cash flows. The discount rate is estimated using the rates currently offered for deposits of similar remaining maturities.

SHORT-TERM BORROWINGS:

For these short-term instruments, the carrying amount is a reasonable estimate of fair value.

LONG-TERM BORROWINGS:

Rates currently available to the Corporation for debt with similar terms and remaining maturities are used to estimate fair value of existing borrowings.

ASSOCIATED BANC-CORP

The estimated fair values of the Corporation's financial instruments at December 31 are as follows:

	1996		**1995**	
	Carrying Amount	**Fair Value**	**Carrying Amount**	**Fair Value**
		(IN THOUSANDS)		
	$	$	$	$
Financial assets:				
Cash and due from banks	236,314	236,314	214,411	214,411
Interest-bearing deposits in other financial institutions	670	670	652	652
Federal funds sold and securities purchased under agreements to resell	27,977	27,977	45,100	45,100
Investment securities:				
Held to maturity	417,195	417,541	398,233	399,697
Available for sale	437,440	437,440	397,476	397,476
Loans	3,159,853	3,145,627	2,747,936	2,728,480
Mortgage servicing rights	10,995	14,177	7,239	9,348
Financial liabilities:				
Deposits	3,508,041	3,509,091	3,145,676	3,152,893
Short-term borrowings	444,066	444,066	363,726	363,726
Long-term borrowings	21,130	20,833	22,064	22,291

APPENDIX TWO:

Extract of the Levels classified fair values according to SFAS 157 reported by Associated Banc-Corp for the first quarter of 2008

ASSOCIATED BANC-CORP
UNITED STATES SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549
FORM 10-Q

(Mark One)

[X] QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 for the quarterly period ended March 31, 2008.

COMMISSION FILE NUMBER: 0-5519

ASSOCIATED BANC-CORP WISCONSIN
(Exact name of registrant as specified in its charter)

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 13: Fair Value Measurements
As discussed in Note 3, "New Accounting Pronouncements Adopted," the Corporation adopted SFAS 157 effective January 1, 2008, with the exception of the application to nonfinancial assets and liabilities measured at fair value on a nonrecurring basis (such as other real estate owned and goodwill and other intangible assets for impairment testing) in accordance with FSP 157-2. SFAS 157 defines fair value, establishes a framework for measuring fair value, and expands disclosures about fair value measurements. SFAS 157 applies to reported balances that are required or permitted to be measured at fair value under existing accounting pronouncements; accordingly, the standard amends numerous accounting pronouncements but does not require any new fair value measurements of reported balances. SFAS 157 emphasizes that fair value, among other things, is based on exit price versus entry price, should include assumptions about risk such as non-performance risk in liability fair values, and is a market-based measurement, not an entity-specific measurement. When considering the assumptions that market participants would use in pricing the asset or liability, SFAS 157 establishes a fair value hierarchy that distinguishes between market participant assumptions based on market data obtained from sources independent of the reporting entity (observable inputs that are classified within Levels 1 and 2 of the hierarchy) and the reporting entity's own assumptions about market participant assumptions (unobservable inputs classified within Level 3 of the hierarchy). The fair value hierarchy prioritizes inputs used to measure fair value into three broad levels.

Level 1 inputs: Level 1 inputs utilize quoted prices (unadjusted) in active markets for identical assets or liabilities that the Corporation has the ability to access.

Level 2 inputs: Level 2 inputs are inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly or indirectly. Level 2 inputs may include quoted prices for similar assets and liabilities in active markets, as well as inputs that are observable for the asset or liability (other than quoted prices), such as interest rates, foreign exchange rates, and yield curves that are observable at commonly quoted intervals.

Level 3 inputs: Level 3 inputs are unobservable inputs for the asset or liability, which are typically based on an entity's own assumptions, as there is little, if any, related market activity. In instances where the determination of the fair value measurement is based on inputs from different levels of the fair value hierarchy, the level in the fair value hierarchy within which the entire fair value measurement falls is based on the lowest level input that is significant to the fair value measurement in its entirety. The Corporation's assessment of the significance of a particular input to the fair value measurement in its entirety requires judgment, and considers factors specific to the asset or liability.

Following is a description of the valuation methodologies used for the Corporation's more significant instruments measured on a recurring basis at fair value, including the general classification of such instruments pursuant to the valuation hierarchy.

Investment securities available for sale: Where quoted prices are available in an active market, investment securities are classified in Level 1 of the fair value hierarchy. Level 1 investment securities primarily include U.S. Treasury, Federal agency, and exchange-traded debt and equity securities. If quoted market prices are not available for the specific security, then fair values are estimated by using pricing models, quoted prices of securities with similar characteristics or discounted cash flows, and are classified in Level 2 of the fair value hierarchy. Examples of these investment securities include obligations of state and political subdivisions, mortgage-related securities, and other debt securities. Lastly, in certain cases where there is limited activity or less transparency around inputs to the estimated fair value, securities are classified within Level 3 of the fair value hierarchy. The Corporation has determined that the fair value measures of its investment securities are classified within Level 1 or 2 of the fair value hierarchy. See Note 6, "Investment Securities," for additional disclosure regarding the Corporation's investment securities.

Derivative financial instruments: The Corporation uses interest rate swaps to manage its interest rate risk. In addition, the Corporation offers customer interest rate swaps, caps, and collars to service our customers' needs, for which the Corporation simultaneously enters into offsetting derivative financial instruments (i.e., mirror interest rate swaps, caps, and collars) with third parties to manage its interest rate risk associated with the customer interest rate swaps, caps, and collars. The valuation of the Corporation's derivative financial instruments is determined using discounted cash flow analysis on the expected cash flows of each derivative and, with the adoption of SFAS 157 beginning January 2008, also includes a non-performance / credit risk component (credit valuation adjustment) not previously included.

The discounted cash flow analysis component in the fair value measurements reflects the contractual terms of the derivative financial instruments, including the period to maturity, and uses observable market-based inputs, including interest rate curves and implied volatilities. More specifically, the fair values of interest rate swaps are determined using the market standard methodology of netting the discounted future fixed cash receipts (or payments), with the variable cash payments (or receipts) based on an expectation of future interest rates (forward curves) derived from observable market interest rate curves. Likewise, the fair values of interest rate options (i.e., interest rate caps and collars) are determined using the market standard methodology of discounting the future expected cash receipts that would occur if variable interest rates fell below (or rise above) the strike rate of the floors (or caps), with the variable interest rates used in the calculation of projected receipts on the floor (or cap) based on an expectation of future interest rates derived from observable market interest rate curves and volatilities.

In accordance with the provisions of SFAS 157, the Corporation also incorporates credit valuation adjustments to appropriately reflect both its own non-performance risk and the respective counterparty's non-performance risk in the fair value measurements. In adjusting the fair value of its derivative financial instruments for the effect of non-performance risk, the Corporation has considered the impact of netting and any applicable credit enhancements, such as collateral postings, thresholds, mutual puts, and guarantees.

While the Corporation has determined that the majority of the inputs used to value its derivative financial instruments fall within Level 2 of the fair value hierarchy, the credit valuation adjustments utilize Level 3 inputs, such as estimates of current credit spreads to evaluate the likelihood of default by itself and its counterparties. The Corporation has assessed the significance of the impact of the credit valuation adjustments on the overall valuation of its derivative positions as of March 31, 2008, and has determined that the credit valuation adjustments are not significant to the overall valuation of its derivative financial instruments. Therefore, the Corporation has determined that the fair value measures of its derivative financial instruments in their entirety are classified within Level 2 of the fair value hierarchy.

Mortgage derivatives: Mortgage derivatives include rate-locked commitments to originate residential mortgage loans to individual customers and forward commitments to sell residential mortgage loans to various investors. The Corporation relies on an internal valuation model to estimate the fair value of its commitments to originate residential mortgage loans held for sale, which includes grouping the rate-lock commitments by interest rate and terms, applying an estimated pull-through rate based on historical experience, and then multiplying by quoted investor prices determined to be reasonably applicable to the loan commitment groups based on interest rate, terms, and rate-lock expiration dates of the loan commitment groups. The Corporation also relies on an internal valuation model to estimate the fair value of its forward commitments to sell residential mortgages (i.e., an estimate of what the Corporation would receive or pay to terminate the forward delivery contract based on market prices for similar financial instruments), which includes matching specific terms and maturities of the forward commitments against applicable investor pricing available. While there are Level 2 and 3 inputs used in the valuation models, the Corporation has determined that the majority of the inputs significant in the valuation of both of the mortgage derivatives fall within Level 3 of the fair value hierarchy.

Following is a description of the valuation methodologies used for the Corporation's more significant instruments measured on a non-recurring basis at the lower of amortized cost or estimated fair value, including the general classification of such instruments pursuant to the valuation hierarchy.

Loans Held for Sale: Loans held for sale, which consist generally of current production of certain fixed-rate, first-lien residential mortgage loans, are carried at the lower of cost or estimated fair value as determined on an aggregate basis. The estimated fair value is based on what secondary markets are currently offering for portfolios with similar characteristics, which the Corporation classifies as a Level 2 nonrecurring fair value measurement.

Impaired Loans: The Corporation considers a loan impaired when it is probable that the Corporation will be unable to collect all amounts due according to the contractual terms of the note agreement, including principal and interest. Management has determined that commercial-oriented loan relationships that have nonaccrual status or have had their terms restructured meet this impaired loan definition, with the amount of impairment based upon the loan's observable market price, the estimated fair value of the collateral for collateral-dependent loans, or alternatively, the present value of the expected future cash flows discounted at the loan's effective interest rate. Per SFAS 157, the use of observable market price or estimated fair value of collateral on collateral-dependent loans is considered a fair value measurement subject to the fair value hierarchy and provisions of SFAS 157. Appraised values are generally used on real estate collateral-dependent impaired loans, which the Corporation classifies as a Level 2 nonrecurring fair value measurement.

Mortgage servicing rights: Mortgage servicing rights do not trade in an active, open market with readily observable prices. While sales of mortgage servicing rights do occur, the precise terms and conditions typically are not readily available to allow for a "quoted price for similar assets" comparison. Accordingly, the Corporation relies on an internal discounted cash flow model to estimate the fair value of its mortgage servicing rights. The Corporation uses a valuation model in conjunction with third party prepayment assumptions to project mortgage servicing rights cash flows based on the current interest rate scenario, which is then discounted to estimate an expected fair value of the mortgage servicing rights. The valuation model considers portfolio characteristics of the underlying mortgages, contractually specified servicing fees, prepayment assumptions, discount rate assumptions, delinquency rates, late charges, other ancillary revenue, costs to service and other economic factors. The Corporation reassesses and periodically adjusts the underlying inputs and assumptions used in the model to reflect market conditions and assumptions that a market participant would consider in valuing the mortgage servicing rights asset. In addition, the Corporation compares its fair value estimates and assumptions to observable market data for mortgage servicing rights, where available, and to recent market activity and actual portfolio experience. Due to the nature of the valuation inputs, mortgage servicing rights are classified within Level 3 of the fair value hierarchy. The Corporation uses the amortization method (i.e., lower of amortized cost or estimated fair value measured on a non-recurring basis), not fair value measurement accounting, for its mortgage servicing rights assets. Accordingly, mortgage servicing rights are not included in the table below.

The table below presents the Corporation's investment securities, derivative financial instruments, and mortgage derivatives measured at fair value on a recurring basis as of March 31, 2008, aggregated by the level in the fair value hierarchy within which those measurements fall.

Assets and Liabilities Measured at Fair Value on a Recurring Basis

	March 31, 2008	Fair Value Measurements Using Level 1	Level 2	Level 3
	($ in Thousands)			
Assets:				
Investment securities available for sale	$ 3,616,280	$ 292,956	$ 3,323,324	$ —
Derivatives (other assets)	35,080	—	32,939	2,141
Liabilities:				
Derivatives (other liabilities)	$ 39,018	$ —	$ 39,018	$ —

Assets and Liabilities Measured at Fair Value
Using Significant Unobservable Inputs (Level 3)

($ in Thousands)	Derivatives
Balance December 31, 2007	$ (1,067)
Total gains or losses (realized / unrealized)	
Included in earnings (realized)	3,208
Balance March 31, 2008	$ 2,141

Assets and Liabilities Measured at Fair Value
on a Non-recurring Basis

	March 31, 2008	Fair Value Measurements Using Level 1	Level 2	Level 3
	($ in Thousands)			
Assets:				
Loans held for sale	$ 123,652	$ —	$ 123,652	$ —
Loans [(1)]	100,798	—	100,798	—
Mortgage servicing rights	51,013	—	—	51,013

(1) Impaired loans are included in loans.

APPENDIX THREE: SAMPLE BANKS WITH FUTURE OPERATING CASH FLOWS AT TIME *t+1*

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
1	Associated Banc-Corp	7789	ASBC	6020	BANK	10
2	Compass Bancshares Inc.	18568	CBSS	6020	BANK	9
3	Commerce Bancshares Inc	22356	CBSH	6020	BANK	4
4	Fifth Third Bancorp	35527	FITB	6020	BANK	1
5	U.S. Bancorp	36104	USB	6020	BANK	8
6	F.N.B. Corp	37808	FNB	6020	BANK	2
7	Cullen/Frost Bankers Inc	39263	CFR	6020	BANK	7
8	Golden West Financial Corp.	42293	GDW	6035	BANK	9
9	Huntington Bancshares Inc	49196	HBAN	6020	BANK	5
10	Irwin Financial Corp	52617	IRWNQ	6020	BANK	6
11	Wells Fargo & Co	72971	WFC	6020	BANK	2
12	Simmons First National Corp	90498	SFNC	6020	BANK	10
13	BB&T Corp	92230	BBT	6020	BANK	10
14	Colonial BancGroup Inc (The)	92339	CBCGQ	6020	BANK	6
15	Sterling Bancorp	93451	STL	6020	BANK	2
16	UMB Financial Corp	101382	UMBF	6020	BANK	5
17	Univest Corp of Pennsylvania	102212	UVSP	6020	BANK	4
18	Whitney Holding Corp.	106926	WTNY	6020	BANK	8
19	Chittenden Corp.	200138	CHZ	6020	BANK	8
20	City National Corp	201461	CYN	6020	BANK	10
21	WesBanco Inc	203596	WSBC	6020	BANK	1
22	Baylake Corp	275119	3BYLK	6020	BANK	2
23	First Busey Corp	314489	BUSE	6020	BANK	9
24	B F C Financial Corp	315858	BFCF	6035	BANK	6
25	Peoples Bancorp Inc	318300	PEBO	6020	BANK	3
26	Community Trust Bancorp Inc	350852	CTBI	6020	BANK	8
27	Citizens Republic Bancorp Inc	351077	CRBC	6020	BANK	2
28	Ameris Bancorp	351569	ABCB	6020	BANK	9
29	North Fork Bancorporation Inc.	352510	NFB	6020	BANK	1
30	North Valley Bancorp	353191	NOVB	6020	BANK	9
31	CVB Financial Corp	354647	CVBF	6020	BANK	2
32	FirstMerit Corp	354869	FMER	6020	BANK	10
33	TriCo Bancshares	356171	TCBK	6020	BANK	2
34	First Regional Bancorp	356708	FRGBQ	6020	BANK	10
35	Pacific Capital Bancorp	357264	PCBC	6020	BANK	7
36	TrustCo Bank Corp NY	357301	TRST	6035	BANK	1
37	National Penn Bancshares Inc	700733	NPBC	6020	BANK	6
38	Susquehanna Bancshares Inc	700863	SUSQ	6020	BANK	10
39	Central Pacific Financial Corp.	701347	CPF	6020	BANK	4

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
40	First Midwest Bancorp Inc	702325	FMBI	6020	BANK	5
41	Bank of Commerce Holdings	702513	BOCH	6020	BANK	5
42	Harleysville National Corp	702902	HNBC	6020	BANK	3
43	PAB Bankshares Inc.	705200	PABK	6020	BANK	7
44	Southside Bancshares Inc	705432	SBSI	6020	BANK	7
45	Horizon Bancorp/IN	706129	HBNC	6020	BANK	3
46	U.S.B. Holding Co. Inc.	707805	UBH	6020	BANK	7
47	First Merchants Corp	712534	FRME	6020	BANK	5
48	First Commonwealth Financial Corp.	712537	FCF	6020	BANK	4
49	Farmers Capital Bank Corp	713095	FFKT	6020	BANK	4
50	PNC Financial Services Group Inc.	713676	PNC	6020	BANK	3
51	Valley National Bancorp	714310	VLY	6020	BANK	10
52	NewBridge Bancorp	714530	NBBC	6020	BANK	10
53	First Financial Corp/IN	714562	THFF	6020	BANK	3
54	Community Banks Inc	714710	CMTY	6020	BANK	2
55	Amcore Financial Inc	714756	AMFIQ	6020	BANK	9
56	Commerce Bancorp Inc.	715096	CBH.1	6020	BANK	4
57	ACNB Corp	715579	ACNB	6020	BANK	4
58	First Charter Corp	717306	FCTR	6020	BANK	5
59	Arrow Financial Corp	717538	AROW	6020	BANK	6
60	United Security Bancshares Inc	717806	USBI	6020	BANK	7
61	First Oak Brook Bancshares Inc	717837	FOBB	6020	BANK	4
62	SVB Financial Group	719739	SIVB	6020	BANK	10
63	MainSource Financial Group Inc	720002	MSFG	6020	BANK	2
64	Hudson Valley Holding Corp	722256	HVB	6020	BANK	5
65	State Bancorp Inc.	723458	STBC	6020	BANK	1
66	Franklin Financial Services Corp	723646	3FRAF	6020	BANK	6
67	Merchants Bancshares Inc	726517	MBVT	6020	BANK	7
68	AmericanWest BanCorp	726990	AWBC Q	6020	BANK	5
69	United Bankshares Inc	729986	UBSI	6020	BANK	10
70	Washington Trust Bancorp Inc	737468	WASH	6020	BANK	8
71	First of Long Island Corp (The)	740663	FLIC	6020	BANK	2
72	Old Point Financial Corp	740971	OPOF	6020	BANK	7
73	American National Bankshares Inc	741516	AMNB	6020	BANK	4
74	Cadence Financial Corp	742054	CADE	6020	BANK	3
75	First Chester County Corp	744126	FCEC	6020	BANK	3
76	Summit Bancshares Inc	745344	SBIT	6020	BANK	9
77	MidSouth Bancorp Inc.	745981	MSL	6020	BANK	10
78	Smithtown Bancorp Inc	747345	SMTB	6020	BANK	2

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
79	Qnb Corp	750558	QNBC	6020	BANK	2
80	Auburn National BanCorp Inc	750574	AUBN	6020	BANK	10
81	Camden National Corp	750686	CAC	6020	BANK	3
82	Suffolk Bancorp	754673	SUBK	6020	BANK	5
83	Interchange Financial Services Corp	755933	IFCJ	6020	BANK	1
84	Berkshire Bancorp Inc	759718	BERK	6020	BANK	6
85	BancFirst Corp	760498	BANF	6020	BANK	10
86	Peoples BancTrust Company Inc (The)	762128	PBTC	6020	BANK	5
87	First United Corp	763907	FUNC	6020	BANK	4
88	SCBT Financial Corp	764038	SCBT	6020	BANK	9
89	Integra Bank Corp	764241	IBNKQ	6020	BANK	6
90	First Bancorp Inc/ME (The)	765207	FNLC	6020	BANK	2
91	Rurban Financial Corp	767405	RBNF	6020	BANK	3
92	Greater Community Bancorp	773845	GFLS	6020	BANK	8
93	Greater Bay Bancorp	775473	GBBK	6020	BANK	7
94	VIST Financial Corp	775662	VIST	6020	BANK	10
95	Firstbank Corp	778972	FBMI	6020	BANK	2
96	First Indiana Corp	789670	FINB	6020	BANK	6
97	NBT Bancorp Inc	790359	NBTB	6020	BANK	10
98	Alliance Financial Corp	796317	ALNC	6020	BANK	7
99	National Bankshares Inc	796534	NKSH	6020	BANK	3
100	South Financial Group Inc (The)	797871	TSFG	6020	BANK	6
101	Webster Financial Corp	801337	WBS	6020	BANK	3
102	Park National Corp	805676	PRK	6020	BANK	1
103	Bank of Granite Corp	810689	GRAN	6020	BANK	6
104	Citizens & Northern Corp	810958	CZNC	6020	BANK	6
105	First Bancorp/NC	811589	FBNC	6020	BANK	10
106	Sterling Financial Corp	811671	SLFI	6020	BANK	10
107	Santander Holdings USA Inc	811830	STD2	6035	BANK	10
108	Century BanCorp Inc	812348	CNBKA	6020	BANK	10
109	Westcorp	813461	WES.1	6035	BANK	8
110	TCF Financial Corp	814184	TCB	6020	BANK	1
111	Provident Bankshares Corp	818969	PBKS	6020	BANK	9
112	Fidelity Southern Corp	822662	LION	6020	BANK	3
113	Sandy Spring Bancorp Inc	824410	SASR	6020	BANK	4
114	Orrstown Financial Services Inc	826154	ORRF	6020	BANK	2
115	WSFS Financial Corp	828944	WSFS	6035	BANK	6
116	Community Capital Corp	832847	CPBK	6020	BANK	6
117	Republic First Bancorp Inc	834285	FRBK	6020	BANK	10

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
118	S.Y. Bancorp Inc.	835324	SYBT	6020	BANK	8
119	Federal Trust Corp	842640	3FDTR	6035	BANK	5
120	Bridge Bancorp Inc	846617	BDGE	6020	BANK	2
121	New Hampshire Thrift Bancshares Inc	846931	NHTB	6035	BANK	10
122	Great Southern Bancorp Inc	854560	GSBC	6020	BANK	5
123	MAF Bancorp Inc	854662	MAFB	6035	BANK	9
124	Sky Financial Group Inc	855876	SKYF.	6020	BANK	2
125	First Keystone Financial Inc	856751	FKFS	6035	BANK	3
126	United Community Banks Inc	857855	UCBI	6020	BANK	5
127	First Community Bancshares Inc	859070	FCBC	6020	BANK	3
128	Cathay General Bancorp	861842	CATY	6020	BANK	5
129	Financial Institutions Inc	862831	FISI	6020	BANK	5
130	Southeastern Bank Financial Corp	880116	SBFC	6020	BANK	5
131	HF Financial Corp.	881790	HFFC	6035	BANK	11
132	Union First Market Bankshares Corp	883948	UBSH	6020	BANK	4
133	Anchor BanCorp Wisconsin Inc	885322	ABCW	6035	BANK	6
134	Columbia Banking System Inc	887343	COLB	6020	BANK	4
135	Premier Financial Bancorp Inc	887919	PFBI	6020	BANK	9
136	Sterling Bancshares Inc	891098	SBIB	6020	BANK	9
137	Sterling Financial Corp/WA	891106	STSA	6036	BANK	8
138	FLAG Financial Corp	897509	FLAG.1	6020	BANK	4
139	First State Bancorporation Inc	897861	FSNMQ	6020	BANK	10
140	NB&T Financial Group Inc	908837	NBTF	6020	BANK	5
141	Astoria Financial Corp	910322	AF	6035	BANK	7
142	C&F Financial Corp	913341	CFFI	6020	BANK	4
143	Middleburg Financial Corp	914138	MBRG	6020	BANK	8
144	PennFed Financial Services Inc	920945	PFSB	6035	BANK	8
145	Republic Bancorp Inc	921557	RBCAA	6020	BANK	4
146	BBX Capital Corp	921768	BBX	6035	BANK	9
147	Hudson City Bancorp Inc	921847	HCBK	6035	BANK	6
148	Royal Bancshares of Pennsylvania Inc	922487	RBPAA	6020	BANK	10
149	Alabama National BanCorporation	926966	ALAB	6020	BANK	9
150	Washington Mutual Inc	933136	WAMU Q	6035	BANK	9
151	Community Bank Shares of Indiana Inc	933590	CBIN	6020	BANK	4
152	Downey Financial Corp	935063	DWNF Q	6035	BANK	10
153	United Western Bancorp Inc	944725	UWBK Q	6035	BANK	6
154	BNCCorp Inc	945434	BNCC	6020	BANK	6

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
155	Investors Financial Services Corp	949589	IFIN	6020	BANK	10
156	Imperial Capital Bancorp Inc	1000234	IMPCQ	6020	BANK	9
157	Capital Corp of the West	1004740	CCOWQ	6020	BANK	2
158	Dime Community Bancshares Inc	1005409	DCOM	6035	BANK	5
159	Tompkins Financial Corp	1005817	TMP	6020	BANK	6
160	Columbia Bancorp	1010002	CBBO	6020	BANK	4
161	Provident Financial Holdings Inc	1010470	PROV	6035	BANK	2
162	Gold Banc Corp Inc	1015610	GLDB	6020	BANK	7
163	Carver Bancorp Inc.	1016178	CARV	6035	BANK	8
164	Enterprise Bancorp Inc/MA	1018399	EBTC	6020	BANK	4
165	Centrue Financial Corp	1019650	TRUE	6020	BANK	4
166	Beverly Hills Bancorp Inc	1024321	BHBC	6035	BANK	3
167	Enterprise Financial Services Corp	1025835	EFSC	6020	BANK	8
168	Mid-State Bancshares	1027324	MDST.	6020	BANK	8
169	Pacific Premier Bancorp Inc	1028918	PPBI	6020	BANK	8
170	Harbor Florida Bancshares Inc	1029407	HARB	6035	BANK	1
171	Shore Bancshares Inc	1035092	SHBI	6020	BANK	3
172	StellarOne Corp	1036070	STEL	6020	BANK	3
173	Oak Financial Corp	1038459	3OKFC	6020	BANK	3
174	Eastern Virginia Bankshares Inc	1047170	EVBS	6020	BANK	6
175	Midwest Banc Holdings Inc	1051379	MBHIQ	6020	BANK	4
176	Citizens South Banking Corp	1051871	CSBC	6035	BANK	5
177	Heritage Commerce Corp	1053352	HTBK	6020	BANK	3
178	CFS Bancorp Inc	1058438	CITZ	6035	BANK	3
179	Cardinal Financial Corp	1060523	CFNL	6020	BANK	7
180	UCBH Holdings Inc	1061580	UCBHQ	6020	BANK	1
181	Harrington West Financial Group Inc	1063997	HWFGQ	6035	BANK	4
182	Superior Bancorp	1065298	SUPR	6020	BANK	7
183	Prosperity Bancshares Inc	1068851	PB	6020	BANK	7
184	First Place Financial Corp/DE	1068912	FPFCQ	6035	BANK	2
185	East West Bancorp Inc.	1069157	EWBC	6020	BANK	7
186	Provident New York Bancorp	1070154	PBNY	6035	BANK	6
187	First Federal Bankshares Inc	1075348	FFSX	6035	BANK	1
188	Central Bancorp Inc/MA	1076394	CEBK	6020	BANK	5
189	Texas Capital Bancshares Inc	1077428	TCBI	6020	BANK	6
190	Umpqua Holdings Corp	1077771	UMPQ	6020	BANK	1
191	Bank of Florida Corp	1082368	BOFLQ	6020	BANK	4
192	Pacific Continental Corp	1084717	PCBK	6020	BANK	4
193	Nexity Financial Corp	1084727	NXTYQ	6020	BANK	1

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
194	W Holding Co Inc.	1084887	WHCI	6020	BANK	1
195	Peoples Bancorp of North Carolina Inc.	1093672	PEBK	6020	BANK	1
196	MutualFirst Financial Inc	1094810	MFSF	6035	BANK	2
197	Virginia Commerce Bancorp	1099305	VCBI	6020	BANK	4
198	Centra Financial Holdings	1099932	CFHZ	6020	BANK	5
199	Santander Bancorp	1099958	SBP	6020	BANK	1
200	PacWest Bancorp	1102112	PACW	6020	BANK	6
201	Centerstate Banks of Florida Inc	1102266	CSFL	6020	BANK	4
202	Berkshire Hills Bancorp Inc	1108134	BHLB	6036	BANK	5
203	American River Bankshares	1108236	AMRB	6020	BANK	6
204	Hanmi Financial Corp	1109242	HAFC	6020	BANK	6
205	Pacific Mercantile Bancorp	1109546	PMBC	6020	BANK	5
206	First Northern Community Bancorp	1114927	FNRN	6020	BANK	6
207	Pinnacle Financial Partners Inc	1115055	PNFP	6020	BANK	4
208	Citizens First Bancorp Inc	1127442	CTZN	6036	BANK	1
209	BBCN Bancorp Inc	1128361	BBCN	6020	BANK	6
210	Sierra Bancorp	1130144	BSRR	6020	BANK	5
211	Ames National Corp	1132651	ATLO	6020	BANK	5
212	Charter Financial Corp/GA	1136796	CHFN	6035	BANK	4
213	United Security Bancshares	1137547	UBFO	6020	BANK	3
214	First Security Group Inc	1138817	FSGI	6020	BANK	3
215	MB Financial Inc	1139812	MBFI	6020	BANK	5
216	Southern Community Financial Corp	1159427	SCMF	6020	BANK	5
217	Northrim BanCorp Inc	1163370	NRIM	6020	BANK	3
218	EuroBancshares Inc	1164554	EUBK	6020	BANK	2
219	First PacTrust Bancorp Inc	1169770	BANC	6035	BANK	4
220	Center Financial Corp	1174820	CLFC	6020	BANK	4
221	Access National Corp	1176316	ANCX	6035	BANK	3
222	Alliance Bankshares Corp	1181001	ABVA	6020	BANK	4
223	BNC Bancorp	1210227	BNCN	6020	BANK	4
224	Rainier Pacific Financial Group Inc	1243800	RPFG	6036	BANK	3
225	NewAlliance Bancshares Inc	1264755	NAL	6036	BANK	2
226	Regions Financial Corp	1281761	RF	6020	BANK	1
227	Wilshire Bancorp Inc	1285224	WIBC	6020	BANK	2
228	Mercantile Bancorp Inc/IL	1289701	MBCR	6020	BANK	2
229	Bancorp Inc (The)	1295401	TBBK	6020	BANK	1
230	Kearny Financial Corp	1295664	KRNY	6035	BANK	2
231	BofI Holding Inc	1299709	BOFI	6035	BANK	2
232	Benjamin Franklin Bancorp Inc	1302176	BFBC	6036	BANK	2

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
233	BankFinancial Corp	1303942	BFIN	6036	BANK	1
234	TD Banknorth Inc	1304994	BNK	6020	BANK	1
235	First Business Financial Services Inc	1305399	FBIZ	6020	BANK	1
236	Guaranty Bancorp	1324410	GBNK	6020	BANK	1
237	Investors Bancorp Inc	1326807	ISBC	6036	BANK	2
238	Legacy Bancorp Inc	1332199	LEGC	6036	BANK	1
Total						**1229**

APPENDIX FOUR: SAMPLE BANKS WITH FUTURE OPERATING CASH FLOWS AT TIME *t+2*

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
1	Associated Banc-Corp	7789	ASBC	6020	BANK	10
2	Compass Bancshares Inc.	18568	CBSS	6020	BANK	8
3	Commerce Bancshares Inc	22356	CBSH	6020	BANK	3
4	Fifth Third Bancorp	35527	FITB	6020	BANK	1
5	U.S. Bancorp	36104	USB	6020	BANK	7
6	F.N.B. Corp	37808	FNB	6020	BANK	2
7	Cullen/Frost Bankers Inc	39263	CFR	6020	BANK	6
8	Golden West Financial Corp.	42293	GDW	6035	BANK	8
9	Huntington Bancshares Inc	49196	HBAN	6020	BANK	4
10	Irwin Financial Corp	52617	IRWNQ	6020	BANK	6
11	Wells Fargo & Co	72971	WFC	6020	BANK	1
12	Simmons First National Corp	90498	SFNC	6020	BANK	10
13	BB&T Corp	92230	BBT	6020	BANK	10
14	Colonial BancGroup Inc (The)	92339	CBCGQ	6020	BANK	6
15	Sterling Bancorp	93451	STL	6020	BANK	2
16	UMB Financial Corp	101382	UMBF	6020	BANK	4
17	Univest Corp of Pennsylvania	102212	UVSP	6020	BANK	4
18	Whitney Holding Corp.	106926	WTNY	6020	BANK	8
19	Chittenden Corp.	200138	CHZ	6020	BANK	7
20	City National Corp	201461	CYN	6020	BANK	10
21	Baylake Corp	275119	3BYLK	6020	BANK	2
22	First Busey Corp	314489	BUSE	6020	BANK	9
23	B F C Financial Corp	315858	BFCF	6035	BANK	6
24	Peoples Bancorp Inc	318300	PEBO	6020	BANK	3
25	Community Trust Bancorp Inc	350852	CTBI	6020	BANK	8
26	Citizens Republic Bancorp Inc	351077	CRBC	6020	BANK	2
27	Ameris Bancorp	351569	ABCB	6020	BANK	8
28	North Valley Bancorp	353191	NOVB	6020	BANK	9
29	CVB Financial Corp	354647	CVBF	6020	BANK	1
30	FirstMerit Corp	354869	FMER	6020	BANK	10
31	TriCo Bancshares	356171	TCBK	6020	BANK	2
32	First Regional Bancorp	356708	FRGBQ	6020	BANK	10
33	Pacific Capital Bancorp	357264	PCBC	6020	BANK	7
34	National Penn Bancshares Inc	700733	NPBC	6020	BANK	6
35	Susquehanna Bancshares Inc	700863	SUSQ	6020	BANK	10
36	Central Pacific Financial Corp.	701347	CPF	6020	BANK	4
37	First Midwest Bancorp Inc	702325	FMBI	6020	BANK	4
38	Bank of Commerce Holdings	702513	BOCH	6020	BANK	5
39	Harleysville National Corp	702902	HNBC	6020	BANK	2

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
40	PAB Bankshares Inc.	705200	PABK	6020	BANK	7
41	Southside Bancshares Inc	705432	SBSI	6020	BANK	7
42	Horizon Bancorp/IN	706129	HBNC	6020	BANK	2
43	U.S.B. Holding Co. Inc.	707805	UBH	6020	BANK	6
44	First Merchants Corp	712534	FRME	6020	BANK	5
45	First Commonwealth Financial Corp.	712537	FCF	6020	BANK	3
46	Farmers Capital Bank Corp	713095	FFKT	6020	BANK	4
47	PNC Financial Services Group Inc.	713676	PNC	6020	BANK	3
48	Valley National Bancorp	714310	VLY	6020	BANK	10
49	NewBridge Bancorp	714530	NBBC	6020	BANK	10
50	First Financial Corp/IN	714562	THFF	6020	BANK	2
51	Community Banks Inc	714710	CMTY	6020	BANK	1
52	Amcore Financial Inc	714756	AMFIQ	6020	BANK	9
53	Commerce Bancorp Inc.	715096	CBH.1	6020	BANK	4
54	ACNB Corp	715579	ACNB	6020	BANK	4
55	First Charter Corp	717306	FCTR	6020	BANK	4
56	Arrow Financial Corp	717538	AROW	6020	BANK	6
57	United Security Bancshares Inc	717806	USBI	6020	BANK	7
58	First Oak Brook Bancshares Inc	717837	FOBB	6020	BANK	3
59	SVB Financial Group	719739	SIVB	6020	BANK	10
60	MainSource Financial Group Inc	720002	MSFG	6020	BANK	2
61	Hudson Valley Holding Corp	722256	HVB	6020	BANK	4
62	State Bancorp Inc.	723458	STBC	6020	BANK	1
63	Franklin Financial Services Corp	723646	3FRAF	6020	BANK	6
64	Merchants Bancshares Inc	726517	MBVT	6020	BANK	6
65	AmericanWest BanCorp	726990	AWBC Q	6020	BANK	4
66	United Bankshares Inc	729986	UBSI	6020	BANK	9
67	Washington Trust Bancorp Inc	737468	WASH	6020	BANK	8
68	First of Long Island Corp (The)	740663	FLIC	6020	BANK	2
69	Old Point Financial Corp	740971	OPOF	6020	BANK	7
70	American National Bankshares Inc	741516	AMNB	6020	BANK	4
71	Cadence Financial Corp	742054	CADE	6020	BANK	3
72	First Chester County Corp	744126	FCEC	6020	BANK	3
73	Summit Bancshares Inc	745344	SBIT	6020	BANK	8
74	MidSouth Bancorp Inc.	745981	MSL	6020	BANK	10
75	Smithtown Bancorp Inc	747345	SMTB	6020	BANK	2

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
76	Qnb Corp	750558	QNBC	6020	BANK	2
77	Auburn National BanCorp Inc	750574	AUBN	6020	BANK	10
78	Camden National Corp	750686	CAC	6020	BANK	3
79	Suffolk Bancorp	754673	SUBK	6020	BANK	5
80	Interchange Financial Services Corp	755933	IFCJ	6020	BANK	1
81	Berkshire Bancorp Inc	759718	BERK	6020	BANK	6
82	BancFirst Corp	760498	BANF	6020	BANK	10
83	Peoples BancTrust Company Inc (The)	762128	PBTC	6020	BANK	4
84	First United Corp	763907	FUNC	6020	BANK	3
85	SCBT Financial Corp	764038	SCBT	6020	BANK	9
86	Integra Bank Corp	764241	IBNKQ	6020	BANK	6
87	First Bancorp Inc/ME (The)	765207	FNLC	6020	BANK	2
88	Rurban Financial Corp	767405	RBNF	6020	BANK	2
89	Greater Community Bancorp	773845	GFLS	6020	BANK	8
90	Greater Bay Bancorp	775473	GBBK	6020	BANK	6
91	VIST Financial Corp	775662	VIST	6020	BANK	10
92	Firstbank Corp	778972	FBMI	6020	BANK	1
93	First Indiana Corp	789670	FINB	6020	BANK	5
94	NBT Bancorp Inc	790359	NBTB	6020	BANK	10
95	Alliance Financial Corp	796317	ALNC	6020	BANK	7
96	National Bankshares Inc	796534	NKSH	6020	BANK	3
97	South Financial Group Inc (The)	797871	TSFG	6020	BANK	6
98	Webster Financial Corp	801337	WBS	6020	BANK	2
99	Park National Corp	805676	PRK	6020	BANK	1
100	Bank of Granite Corp	810689	GRAN	6020	BANK	6
101	Citizens & Northern Corp	810958	CZNC	6020	BANK	6
102	First Bancorp/NC	811589	FBNC	6020	BANK	10
103	Sterling Financial Corp	811671	SLFI	6020	BANK	9
104	Santander Holdings USA Inc	811830	STD2	6035	BANK	10
105	Century BanCorp Inc	812348	CNBKA	6020	BANK	10
106	Westcorp	813461	WES.1	6035	BANK	7
107	TCF Financial Corp	814184	TCB	6020	BANK	1
108	Provident Bankshares Corp	818969	PBKS	6020	BANK	8
109	Fidelity Southern Corp	822662	LION	6020	BANK	3
110	Sandy Spring Bancorp Inc	824410	SASR	6020	BANK	4
111	Orrstown Financial Services Inc	826154	ORRF	6020	BANK	1
112	WSFS Financial Corp	828944	WSFS	6035	BANK	6
113	Community Capital Corp	832847	CPBK	6020	BANK	6

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
114	Republic First Bancorp Inc	834285	FRBK	6020	BANK	10
115	S.Y. Bancorp Inc.	835324	SYBT	6020	BANK	8
116	Federal Trust Corp	842640	3FDTR	6035	BANK	5
117	Bridge Bancorp Inc	846617	BDGE	6020	BANK	2
118	New Hampshire Thrift Bancshares Inc	846931	NHTB	6035	BANK	10
119	Great Southern Bancorp Inc	854560	GSBC	6020	BANK	4
120	MAF Bancorp Inc	854662	MAFB	6035	BANK	8
121	Sky Financial Group Inc	855876	SKYF.	6020	BANK	1
122	First Keystone Financial Inc	856751	FKFS	6035	BANK	3
123	United Community Banks Inc	857855	UCBI	6020	BANK	4
124	First Community Bancshares Inc	859070	FCBC	6020	BANK	3
125	Cathay General Bancorp	861842	CATY	6020	BANK	5
126	Financial Institutions Inc	862831	FISI	6020	BANK	5
127	Southeastern Bank Financial Corp	880116	SBFC	6020	BANK	5
128	HF Financial Corp.	881790	HFFC	6035	BANK	11
129	Union First Market Bankshares Corp	883948	UBSH	6020	BANK	4
130	Anchor BanCorp Wisconsin Inc	885322	ABCW	6035	BANK	5
131	Columbia Banking System Inc	887343	COLB	6020	BANK	4
132	Premier Financial Bancorp Inc	887919	PFBI	6020	BANK	9
133	Sterling Bancshares Inc	891098	SBIB	6020	BANK	9
134	Sterling Financial Corp/WA	891106	STSA	6036	BANK	8
135	FLAG Financial Corp	897509	FLAG.1	6020	BANK	3
136	First State Bancorporation Inc	897861	FSNMQ	6020	BANK	10
137	NB&T Financial Group Inc	908837	NBTF	6020	BANK	5
138	Astoria Financial Corp	910322	AF	6035	BANK	7
139	C&F Financial Corp	913341	CFFI	6020	BANK	3
140	Middleburg Financial Corp	914138	MBRG	6020	BANK	8
141	PennFed Financial Services Inc	920945	PFSB	6035	BANK	7
142	Republic Bancorp Inc	921557	RBCAA	6020	BANK	3
143	BBX Capital Corp	921768	BBX	6035	BANK	8
144	Hudson City Bancorp Inc	921847	HCBK	6035	BANK	6
145	Royal Bancshares of Pennsylvania Inc	922487	RBPAA	6020	BANK	10
146	Alabama National BanCorporation	926966	ALAB	6020	BANK	8
147	Washington Mutual Inc	933136	WAMU Q	6035	BANK	9
148	Community Bank Shares of	933590	CBIN	6020	BANK	4

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
	Indiana Inc					
149	Downey Financial Corp	935063	DWNFQ	6035	BANK	10
150	United Western Bancorp Inc	944725	UWBKQ	6035	BANK	6
151	BNCCorp Inc	945434	BNCC	6020	BANK	6
152	Investors Financial Services Corp	949589	IFIN	6020	BANK	9
153	Imperial Capital Bancorp Inc	1000234	IMPCQ	6020	BANK	9
154	Capital Corp of the West	1004740	CCOWQ	6020	BANK	1
155	Dime Community Bancshares Inc	1005409	DCOM	6035	BANK	5
156	Tompkins Financial Corp	1005817	TMP	6020	BANK	5
157	Columbia Bancorp	1010002	CBBO	6020	BANK	4
158	Provident Financial Holdings Inc	1010470	PROV	6035	BANK	2
159	Gold Banc Corp Inc	1015610	GLDB	6020	BANK	6
160	Carver Bancorp Inc.	1016178	CARV	6035	BANK	8
161	Enterprise Bancorp Inc/MA	1018399	EBTC	6020	BANK	4
162	Centrue Financial Corp	1019650	TRUE	6020	BANK	4
163	Beverly Hills Bancorp Inc	1024321	BHBC	6035	BANK	2
164	Enterprise Financial Services Corp	1025835	EFSC	6020	BANK	8
165	Mid-State Bancshares	1027324	MDST.	6020	BANK	7
166	Pacific Premier Bancorp Inc	1028918	PPBI	6020	BANK	8
167	Harbor Florida Bancshares Inc	1029407	HARB	6035	BANK	1
168	Shore Bancshares Inc	1035092	SHBI	6020	BANK	3
169	StellarOne Corp	1036070	STEL	6020	BANK	3
170	Oak Financial Corp	1038459	3OKFC	6020	BANK	3
171	Eastern Virginia Bankshares Inc	1047170	EVBS	6020	BANK	6
172	Midwest Banc Holdings Inc	1051379	MBHIQ	6020	BANK	3
173	Citizens South Banking Corp	1051871	CSBC	6035	BANK	4
174	Heritage Commerce Corp	1053352	HTBK	6020	BANK	3
175	CFS Bancorp Inc	1058438	CITZ	6035	BANK	3
176	Cardinal Financial Corp	1060523	CFNL	6020	BANK	7
177	UCBH Holdings Inc	1061580	UCBHQ	6020	BANK	1
178	Harrington West Financial Group Inc	1063997	HWFGQ	6035	BANK	4
179	Superior Bancorp	1065298	SUPR	6020	BANK	7
180	Prosperity Bancshares Inc	1068851	PB	6020	BANK	7
181	First Place Financial Corp/DE	1068912	FPFCQ	6035	BANK	2
182	East West Bancorp Inc.	1069157	EWBC	6020	BANK	7

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
183	Provident New York Bancorp	1070154	PBNY	6035	BANK	6
184	First Federal Bankshares Inc	1075348	FFSX	6035	BANK	1
185	Central Bancorp Inc/MA	1076394	CEBK	6020	BANK	5
186	Texas Capital Bancshares Inc	1077428	TCBI	6020	BANK	6
187	Umpqua Holdings Corp	1077771	UMPQ	6020	BANK	1
188	Bank of Florida Corp	1082368	BOFLQ	6020	BANK	4
189	Pacific Continental Corp	1084717	PCBK	6020	BANK	4
190	Nexity Financial Corp	1084727	NXTYQ	6020	BANK	1
191	Peoples Bancorp of North Carolina Inc.	1093672	PEBK	6020	BANK	1
192	MutualFirst Financial Inc	1094810	MFSF	6035	BANK	2
193	Virginia Commerce Bancorp	1099305	VCBI	6020	BANK	4
194	Centra Financial Holdings	1099932	CFHZ	6020	BANK	5
195	Santander Bancorp	1099958	SBP	6020	BANK	1
196	PacWest Bancorp	1102112	PACW	6020	BANK	6
197	Centerstate Banks of Florida Inc	1102266	CSFL	6020	BANK	4
198	Berkshire Hills Bancorp Inc	1108134	BHLB	6036	BANK	5
199	American River Bankshares	1108236	AMRB	6020	BANK	6
200	Hanmi Financial Corp	1109242	HAFC	6020	BANK	6
201	Pacific Mercantile Bancorp	1109546	PMBC	6020	BANK	5
202	First Northern Community Bancorp	1114927	FNRN	6020	BANK	5
203	Pinnacle Financial Partners Inc	1115055	PNFP	6020	BANK	3
204	Citizens First Bancorp Inc	1127442	CTZN	6036	BANK	1
205	BBCN Bancorp Inc	1128361	BBCN	6020	BANK	6
206	Sierra Bancorp	1130144	BSRR	6020	BANK	5
207	Ames National Corp	1132651	ATLO	6020	BANK	5
208	Charter Financial Corp/GA	1136796	CHFN	6035	BANK	3
209	United Security Bancshares	1137547	UBFO	6020	BANK	3
210	First Security Group Inc	1138817	FSGI	6020	BANK	3
211	MB Financial Inc	1139812	MBFI	6020	BANK	4
212	Southern Community Financial Corp	1159427	SCMF	6020	BANK	5
213	Northrim BanCorp Inc	1163370	NRIM	6020	BANK	2
214	EuroBancshares Inc	1164554	EUBK	6020	BANK	2
215	First PacTrust Bancorp Inc	1169770	BANC	6035	BANK	4
216	Center Financial Corp	1174820	CLFC	6020	BANK	4
217	Access National Corp	1176316	ANCX	6035	BANK	3
218	Alliance Bankshares Corp	1181001	ABVA	6020	BANK	4
219	BNC Bancorp	1210227	BNCN	6020	BANK	4

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
220	Rainier Pacific Financial Group Inc	1243800	RPFG	6036	BANK	3
221	NewAlliance Bancshares Inc	1264755	NAL	6036	BANK	2
222	Wilshire Bancorp Inc	1285224	WIBC	6020	BANK	2
223	Mercantile Bancorp Inc/IL	1289701	MBCR	6020	BANK	2
224	Kearny Financial Corp	1295664	KRNY	6035	BANK	2
225	BofI Holding Inc	1299709	BOFI	6035	BANK	2
226	Benjamin Franklin Bancorp Inc	1302176	BFBC	6036	BANK	2
227	BankFinancial Corp	1303942	BFIN	6036	BANK	1
228	First Business Financial Services Inc	1305399	FBIZ	6020	BANK	1
229	Guaranty Bancorp	1324410	GBNK	6020	BANK	1
230	Investors Bancorp Inc	1326807	ISBC	6036	BANK	2
231	Legacy Bancorp Inc	1332199	LEGC	6036	BANK	1
Total						**1162**

APPENDIX FIVE: SAMPLE BANKS WITH FUTURE OPERATING CASH FLOWS AT TIME *t+3*

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
1	Associated Banc-Corp	7789	ASBC	6020	BANK	9
2	Compass Bancshares Inc.	18568	CBSS	6020	BANK	7
3	Commerce Bancshares Inc	22356	CBSH	6020	BANK	2
4	U.S. Bancorp	36104	USB	6020	BANK	6
5	F.N.B. Corp	37808	FNB	6020	BANK	1
6	Cullen/Frost Bankers Inc	39263	CFR	6020	BANK	5
7	Golden West Financial Corp.	42293	GDW	6035	BANK	7
8	Huntington Bancshares Inc	49196	HBAN	6020	BANK	3
9	Irwin Financial Corp	52617	IRWNQ	6020	BANK	5
10	Wells Fargo & Co	72971	WFC	6020	BANK	1
11	Simmons First National Corp	90498	SFNC	6020	BANK	9
12	BB&T Corp	92230	BBT	6020	BANK	9
13	Colonial BancGroup Inc (The)	92339	CBCGQ	6020	BANK	5
14	Sterling Bancorp	93451	STL	6020	BANK	1
15	UMB Financial Corp	101382	UMBF	6020	BANK	3
16	Univest Corp of Pennsylvania	102212	UVSP	6020	BANK	3
17	Whitney Holding Corp.	106926	WTNY	6020	BANK	7
18	Chittenden Corp.	200138	CHZ	6020	BANK	6
19	City National Corp	201461	CYN	6020	BANK	9
20	Baylake Corp	275119	3BYLK	6020	BANK	1
21	First Busey Corp	314489	BUSE	6020	BANK	8
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23	Peoples Bancorp Inc	318300	PEBO	6020	BANK	2
24	Community Trust Bancorp Inc	350852	CTBI	6020	BANK	7
25	Citizens Republic Bancorp Inc	351077	CRBC	6020	BANK	1
26	Ameris Bancorp	351569	ABCB	6020	BANK	7
27	North Valley Bancorp	353191	NOVB	6020	BANK	8
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29	TriCo Bancshares	356171	TCBK	6020	BANK	1
30	First Regional Bancorp	356708	FRGBQ	6020	BANK	9
31	Pacific Capital Bancorp	357264	PCBC	6020	BANK	6
32	National Penn Bancshares Inc	700733	NPBC	6020	BANK	5
33	Susquehanna Bancshares Inc	700863	SUSQ	6020	BANK	9
34	Central Pacific Financial Corp.	701347	CPF	6020	BANK	3
35	First Midwest Bancorp Inc	702325	FMBI	6020	BANK	3
36	Bank of Commerce Holdings	702513	BOCH	6020	BANK	4
37	Harleysville National Corp	702902	HNBC	6020	BANK	1
38	PAB Bankshares Inc.	705200	PABK	6020	BANK	6

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
39	Southside Bancshares Inc	705432	SBSI	6020	BANK	6
40	Horizon Bancorp/IN	706129	HBNC	6020	BANK	1
41	U.S.B. Holding Co. Inc.	707805	UBH	6020	BANK	5
42	First Merchants Corp	712534	FRME	6020	BANK	4
43	First Commonwealth Financial Corp.	712537	FCF	6020	BANK	2
44	Farmers Capital Bank Corp	713095	FFKT	6020	BANK	3
45	PNC Financial Services Group Inc.	713676	PNC	6020	BANK	2
46	Valley National Bancorp	714310	VLY	6020	BANK	9
47	NewBridge Bancorp	714530	NBBC	6020	BANK	9
48	First Financial Corp/IN	714562	THFF	6020	BANK	1
49	Amcore Financial Inc	714756	AMFIQ	6020	BANK	9
50	Commerce Bancorp Inc.	715096	CBH.1	6020	BANK	4
51	ACNB Corp	715579	ACNB	6020	BANK	3
52	First Charter Corp	717306	FCTR	6020	BANK	3
53	Arrow Financial Corp	717538	AROW	6020	BANK	5
54	United Security Bancshares Inc	717806	USBI	6020	BANK	6
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56	SVB Financial Group	719739	SIVB	6020	BANK	9
57	MainSource Financial Group Inc	720002	MSFG	6020	BANK	1
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69	Summit Bancshares Inc	745344	SBIT	6020	BANK	7
70	MidSouth Bancorp Inc.	745981	MSL	6020	BANK	9
71	Smithtown Bancorp Inc	747345	SMTB	6020	BANK	1
72	Qnb Corp	750558	QNBC	6020	BANK	1
73	Auburn National BanCorp Inc	750574	AUBN	6020	BANK	9
74	Camden National Corp	750686	CAC	6020	BANK	2
75	Suffolk Bancorp	754673	SUBK	6020	BANK	4
76	Berkshire Bancorp Inc	759718	BERK	6020	BANK	5
77	BancFirst Corp	760498	BANF	6020	BANK	9

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
78	Peoples BancTrust Company Inc (The)	762128	PBTC	6020	BANK	3
79	First United Corp	763907	FUNC	6020	BANK	2
80	SCBT Financial Corp	764038	SCBT	6020	BANK	8
81	Integra Bank Corp	764241	IBNKQ	6020	BANK	5
82	First Bancorp Inc/ME (The)	765207	FNLC	6020	BANK	1
83	Rurban Financial Corp	767405	RBNF	6020	BANK	1
84	Greater Community Bancorp	773845	GFLS	6020	BANK	7
85	Greater Bay Bancorp	775473	GBBK	6020	BANK	5
86	VIST Financial Corp	775662	VIST	6020	BANK	9
87	Firstbank Corp	778972	FBMI	6020	BANK	1
88	First Indiana Corp	789670	FINB	6020	BANK	4
89	NBT Bancorp Inc	790359	NBTB	6020	BANK	9
90	Alliance Financial Corp	796317	ALNC	6020	BANK	6
91	National Bankshares Inc	796534	NKSH	6020	BANK	2
92	South Financial Group Inc (The)	797871	TSFG	6020	BANK	5
93	Webster Financial Corp	801337	WBS	6020	BANK	1
94	Park National Corp	805676	PRK	6020	BANK	1
95	Bank of Granite Corp	810689	GRAN	6020	BANK	5
96	Citizens & Northern Corp	810958	CZNC	6020	BANK	5
97	First Bancorp/NC	811589	FBNC	6020	BANK	9
98	Sterling Financial Corp	811671	SLFI	6020	BANK	8
99	Santander Holdings USA Inc	811830	STD2	6035	BANK	9
100	Century BanCorp Inc	812348	CNBKA	6020	BANK	9
101	Westcorp	813461	WES.1	6035	BANK	6
102	Provident Bankshares Corp	818969	PBKS	6020	BANK	7
103	Fidelity Southern Corp	822662	LION	6020	BANK	2
104	Sandy Spring Bancorp Inc	824410	SASR	6020	BANK	3
105	WSFS Financial Corp	828944	WSFS	6035	BANK	5
106	Community Capital Corp	832847	CPBK	6020	BANK	5
107	Republic First Bancorp Inc	834285	FRBK	6020	BANK	9
108	S.Y. Bancorp Inc.	835324	SYBT	6020	BANK	7
109	Federal Trust Corp	842640	3FDTR	6035	BANK	4
110	Bridge Bancorp Inc	846617	BDGE	6020	BANK	1
111	New Hampshire Thrift Bancshares Inc	846931	NHTB	6035	BANK	9
112	Great Southern Bancorp Inc	854560	GSBC	6020	BANK	3
113	MAF Bancorp Inc	854662	MAFB	6035	BANK	7
114	First Keystone Financial Inc	856751	FKFS	6035	BANK	3

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
115	United Community Banks Inc	857855	UCBI	6020	BANK	3
116	First Community Bancshares Inc	859070	FCBC	6020	BANK	2
117	Cathay General Bancorp	861842	CATY	6020	BANK	4
118	Financial Institutions Inc	862831	FISI	6020	BANK	4
119	Southeastern Bank Financial Corp	880116	SBFC	6020	BANK	4
120	HF Financial Corp.	881790	HFFC	6035	BANK	10
121	Union First Market Bankshares Corp	883948	UBSH	6020	BANK	3
122	Anchor BanCorp Wisconsin Inc	885322	ABCW	6035	BANK	4
123	Columbia Banking System Inc	887343	COLB	6020	BANK	3
124	Premier Financial Bancorp Inc	887919	PFBI	6020	BANK	8
125	Sterling Bancshares Inc	891098	SBIB	6020	BANK	8
126	Sterling Financial Corp/WA	891106	STSA	6036	BANK	7
127	FLAG Financial Corp	897509	FLAG.1	6020	BANK	2
128	First State Bancorporation Inc	897861	FSNMQ	6020	BANK	9
129	NB&T Financial Group Inc	908837	NBTF	6020	BANK	4
130	Astoria Financial Corp	910322	AF	6035	BANK	6
131	C&F Financial Corp	913341	CFFI	6020	BANK	2
132	Middleburg Financial Corp	914138	MBRG	6020	BANK	7
133	PennFed Financial Services Inc	920945	PFSB	6035	BANK	6
134	Republic Bancorp Inc	921557	RBCAA	6020	BANK	2
135	BBX Capital Corp	921768	BBX	6035	BANK	7
136	Hudson City Bancorp Inc	921847	HCBK	6035	BANK	5
137	Royal Bancshares of Pennsylvania Inc	922487	RBPAA	6020	BANK	9
138	Alabama National BanCorporation	926966	ALAB	6020	BANK	8
139	Washington Mutual Inc	933136	WAMUQ	6035	BANK	8
140	Community Bank Shares of Indiana Inc	933590	CBIN	6020	BANK	3
141	Downey Financial Corp	935063	DWNFQ	6035	BANK	9
142	United Western Bancorp Inc	944725	UWBKQ	6035	BANK	5
143	BNCCorp Inc	945434	BNCC	6020	BANK	5
144	Investors Financial Services Corp	949589	IFIN	6020	BANK	8
145	Imperial Capital Bancorp Inc	1000234	IMPCQ	6020	BANK	8
146	Dime Community Bancshares Inc	1005409	DCOM	6035	BANK	4
147	Tompkins Financial Corp	1005817	TMP	6020	BANK	4
148	Columbia Bancorp	1010002	CBBO	6020	BANK	3
149	Provident Financial Holdings Inc	1010470	PROV	6035	BANK	1
150	Gold Banc Corp Inc	1015610	GLDB	6020	BANK	5
151	Carver Bancorp Inc.	1016178	CARV	6035	BANK	8

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
152	Enterprise Bancorp Inc/MA	1018399	EBTC	6020	BANK	3
153	Centrue Financial Corp	1019650	TRUE	6020	BANK	3
154	Beverly Hills Bancorp Inc	1024321	BHBC	6035	BANK	1
155	Enterprise Financial Services Corp	1025835	EFSC	6020	BANK	7
156	Mid-State Bancshares	1027324	MDST.	6020	BANK	6
157	Pacific Premier Bancorp Inc	1028918	PPBI	6020	BANK	7
158	Harbor Florida Bancshares Inc	1029407	HARB	6035	BANK	1
159	Shore Bancshares Inc	1035092	SHBI	6020	BANK	2
160	StellarOne Corp	1036070	STEL	6020	BANK	2
161	Oak Financial Corp	1038459	3OKFC	6020	BANK	2
162	Eastern Virginia Bankshares Inc	1047170	EVBS	6020	BANK	5
163	Midwest Banc Holdings Inc	1051379	MBHIQ	6020	BANK	2
164	Citizens South Banking Corp	1051871	CSBC	6035	BANK	3
165	Heritage Commerce Corp	1053352	HTBK	6020	BANK	2
166	CFS Bancorp Inc	1058438	CITZ	6035	BANK	2
167	Cardinal Financial Corp	1060523	CFNL	6020	BANK	6
168	Harrington West Financial Group Inc	1063997	HWFGQ	6035	BANK	3
169	Superior Bancorp	1065298	SUPR	6020	BANK	6
170	Prosperity Bancshares Inc	1068851	PB	6020	BANK	6
171	First Place Financial Corp/DE	1068912	FPFCQ	6035	BANK	1
172	East West Bancorp Inc.	1069157	EWBC	6020	BANK	6
173	Provident New York Bancorp	1070154	PBNY	6035	BANK	5
174	Central Bancorp Inc/MA	1076394	CEBK	6020	BANK	5
175	Texas Capital Bancshares Inc	1077428	TCBI	6020	BANK	5
176	Bank of Florida Corp	1082368	BOFLQ	6020	BANK	3
177	Pacific Continental Corp	1084717	PCBK	6020	BANK	3
178	Peoples Bancorp of North Carolina Inc.	1093672	PEBK	6020	BANK	1
179	MutualFirst Financial Inc	1094810	MFSF	6035	BANK	1
180	Virginia Commerce Bancorp	1099305	VCBI	6020	BANK	3
181	Centra Financial Holdings	1099932	CFHZ	6020	BANK	4
182	PacWest Bancorp	1102112	PACW	6020	BANK	5
183	Centerstate Banks of Florida Inc	1102266	CSFL	6020	BANK	3
184	Berkshire Hills Bancorp Inc	1108134	BHLB	6036	BANK	4
185	American River Bankshares	1108236	AMRB	6020	BANK	5
186	Hanmi Financial Corp	1109242	HAFC	6020	BANK	5
187	Pacific Mercantile Bancorp	1109546	PMBC	6020	BANK	4
188	First Northern Community Bancorp	1114927	FNRN	6020	BANK	4
189	Pinnacle Financial Partners Inc	1115055	PNFP	6020	BANK	2

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
190	BBCN Bancorp Inc	1128361	BBCN	6020	BANK	5
191	Sierra Bancorp	1130144	BSRR	6020	BANK	4
192	Ames National Corp	1132651	ATLO	6020	BANK	4
193	Charter Financial Corp/GA	1136796	CHFN	6035	BANK	2
194	United Security Bancshares	1137547	UBFO	6020	BANK	2
195	First Security Group Inc	1138817	FSGI	6020	BANK	2
196	MB Financial Inc	1139812	MBFI	6020	BANK	3
197	Southern Community Financial Corp	1159427	SCMF	6020	BANK	4
198	Northrim BanCorp Inc	1163370	NRIM	6020	BANK	1
199	EuroBancshares Inc	1164554	EUBK	6020	BANK	1
200	First PacTrust Bancorp Inc	1169770	BANC	6035	BANK	3
201	Center Financial Corp	1174820	CLFC	6020	BANK	3
202	Access National Corp	1176316	ANCX	6035	BANK	2
203	Alliance Bankshares Corp	1181001	ABVA	6020	BANK	3
204	BNC Bancorp	1210227	BNCN	6020	BANK	3
205	Rainier Pacific Financial Group Inc	1243800	RPFG	6036	BANK	2
206	NewAlliance Bancshares Inc	1264755	NAL	6036	BANK	1
207	Wilshire Bancorp Inc	1285224	WIBC	6020	BANK	1
208	Mercantile Bancorp Inc/IL	1289701	MBCR	6020	BANK	1
209	Kearny Financial Corp	1295664	KRNY	6035	BANK	1
210	BofI Holding Inc	1299709	BOFI	6035	BANK	1
211	Benjamin Franklin Bancorp Inc	1302176	BFBC	6036	BANK	1
212	Investors Bancorp Inc	1326807	ISBC	6036	BANK	1
Total						**942**

APPENDIX SIX: SAMPLE BANKS WITH FUTURE OPERATING EARNINGS AT TIME *t+1*

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of Firm-years
1	Associated Banc-Corp	7789	ASBC	6020	BANK	10
2	Compass Bancshares Inc.	18568	CBSS	6020	BANK	10
3	Commerce Bancshares Inc	22356	CBSH	6020	BANK	4
4	Fifth Third Bancorp	35527	FITB	6020	BANK	1
5	U.S. Bancorp	36104	USB	6020	BANK	10
6	F.N.B. Corp	37808	FNB	6020	BANK	1
7	Cullen/Frost Bankers Inc	39263	CFR	6020	BANK	8
8	Golden West Financial Corp.	42293	GDW	6035	BANK	9
9	Huntington Bancshares Inc	49196	HBAN	6020	BANK	4
10	Irwin Financial Corp	52617	IRWNQ	6020	BANK	6
11	Wells Fargo & Co	72971	WFC	6020	BANK	1
12	Simmons First National Corp	90498	SFNC	6020	BANK	10
13	BB&T Corp	92230	BBT	6020	BANK	10
14	Colonial BancGroup Inc (The)	92339	CBCGQ	6020	BANK	6
15	Sterling Bancorp	93451	STL	6020	BANK	1
16	UMB Financial Corp	101382	UMBF	6020	BANK	6
17	Univest Corp of Pennsylvania	102212	UVSP	6020	BANK	4
18	Whitney Holding Corp.	106926	WTNY	6020	BANK	8
19	Chittenden Corp.	200138	CHZ	6020	BANK	8
20	City National Corp	201461	CYN	6020	BANK	10
21	WesBanco Inc	203596	WSBC	6020	BANK	2
22	Baylake Corp	275119	3BYLK	6020	BANK	2
23	First Busey Corp	314489	BUSE	6020	BANK	9
24	B F C Financial Corp	315858	BFCF	6035	BANK	6
25	Peoples Bancorp Inc	318300	PEBO	6020	BANK	3
26	Community Trust Bancorp Inc	350852	CTBI	6020	BANK	8
27	Citizens Republic Bancorp Inc	351077	CRBC	6020	BANK	2
28	Ameris Bancorp	351569	ABCB	6020	BANK	9
29	North Fork Bancorporation Inc.	352510	NFB	6020	BANK	1
30	North Valley Bancorp	353191	NOVB	6020	BANK	9
31	CVB Financial Corp	354647	CVBF	6020	BANK	7
32	FirstMerit Corp	354869	FMER	6020	BANK	8
33	TriCo Bancshares	356171	TCBK	6020	BANK	2
34	Pacific Capital Bancorp	357264	PCBC	6020	BANK	10
35	TrustCo Bank Corp NY	357301	TRST	6035	BANK	1
36	National Penn Bancshares Inc	700733	NPBC	6020	BANK	6
37	Susquehanna Bancshares Inc	700863	SUSQ	6020	BANK	10
38	Central Pacific Financial Corp.	701347	CPF	6020	BANK	4
39	Bank of Commerce Holdings	702513	BOCH	6020	BANK	5
40	Harleysville National Corp	702902	HNBC	6020	BANK	4
41	PAB Bankshares Inc.	705200	PABK	6020	BANK	8

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of Firm-years
42	Horizon Bancorp/IN	706129	HBNC	6020	BANK	4
43	U.S.B. Holding Co. Inc.	707805	UBH	6020	BANK	8
44	First Commonwealth Financial Corp.	712537	FCF	6020	BANK	5
45	Farmers Capital Bank Corp	713095	FFKT	6020	BANK	3
46	PNC Financial Services Group Inc.	713676	PNC	6020	BANK	3
47	Valley National Bancorp	714310	VLY	6020	BANK	10
48	NewBridge Bancorp	714530	NBBC	6020	BANK	10
49	First Financial Corp/IN	714562	THFF	6020	BANK	2
50	Community Banks Inc	714710	CMTY	6020	BANK	3
51	Amcore Financial Inc	714756	AMFIQ	6020	BANK	10
52	Commerce Bancorp Inc.	715096	CBH.1	6020	BANK	4
53	ACNB Corp	715579	ACNB	6020	BANK	4
54	First Charter Corp	717306	FCTR	6020	BANK	6
55	Arrow Financial Corp	717538	AROW	6020	BANK	4
56	United Security Bancshares Inc	717806	USBI	6020	BANK	7
57	First Oak Brook Bancshares Inc	717837	FOBB	6020	BANK	6
58	SVB Financial Group	719739	SIVB	6020	BANK	10
59	MainSource Financial Group Inc	720002	MSFG	6020	BANK	2
60	Hudson Valley Holding Corp	722256	HVB	6020	BANK	6
61	State Bancorp Inc.	723458	STBC	6020	BANK	1
62	Franklin Financial Services Corp	723646	3FRAF	6020	BANK	6
63	Merchants Bancshares Inc	726517	MBVT	6020	BANK	7
64	AmericanWest BanCorp	726990	AWBCQ	6020	BANK	2
65	United Bankshares Inc	729986	UBSI	6020	BANK	10
66	Washington Trust Bancorp Inc	737468	WASH	6020	BANK	8
67	First of Long Island Corp (The)	740663	FLIC	6020	BANK	2
68	Old Point Financial Corp	740971	OPOF	6020	BANK	7
69	American National Bankshares Inc	741516	AMNB	6020	BANK	4
70	Cadence Financial Corp	742054	CADE	6020	BANK	2
71	First Chester County Corp	744126	FCEC	6020	BANK	3
72	Summit Bancshares Inc	745344	SBIT	6020	BANK	9
73	MidSouth Bancorp Inc.	745981	MSL	6020	BANK	10
74	Smithtown Bancorp Inc	747345	SMTB	6020	BANK	2
75	Qnb Corp	750558	QNBC	6020	BANK	2
76	Auburn National BanCorp Inc	750574	AUBN	6020	BANK	10
77	Camden National Corp	750686	CAC	6020	BANK	3
78	Suffolk Bancorp	754673	SUBK	6020	BANK	5
79	Interchange Financial Services Corp	755933	IFCJ	6020	BANK	1
80	Berkshire Bancorp Inc	759718	BERK	6020	BANK	5
81	BancFirst Corp	760498	BANF	6020	BANK	9
82	Peoples BancTrust Company Inc (The)	762128	PBTC	6020	BANK	5
83	First United Corp	763907	FUNC	6020	BANK	5

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of Firm-years
84	SCBT Financial Corp	764038	SCBT	6020	BANK	9
85	Integra Bank Corp	764241	IBNKQ	6020	BANK	6
86	First Bancorp Inc/ME (The)	765207	FNLC	6020	BANK	2
87	Rurban Financial Corp	767405	RBNF	6020	BANK	4
88	Greater Community Bancorp	773845	GFLS	6020	BANK	8
89	Greater Bay Bancorp	775473	GBBK	6020	BANK	6
90	VIST Financial Corp	775662	VIST	6020	BANK	10
91	Firstbank Corp	778972	FBMI	6020	BANK	2
92	First Indiana Corp	789670	FINB	6020	BANK	3
93	NBT Bancorp Inc	790359	NBTB	6020	BANK	10
94	Alliance Financial Corp	796317	ALNC	6020	BANK	8
95	National Bankshares Inc	796534	NKSH	6020	BANK	2
96	South Financial Group Inc (The)	797871	TSFG	6020	BANK	5
97	Webster Financial Corp	801337	WBS	6020	BANK	3
98	Park National Corp	805676	PRK	6020	BANK	1
99	Bank of Granite Corp	810689	GRAN	6020	BANK	5
100	First Bancorp/NC	811589	FBNC	6020	BANK	10
101	Sterling Financial Corp	811671	SLFI	6020	BANK	10
102	Santander Holdings USA Inc	811830	STD2	6035	BANK	10
103	Century BanCorp Inc	812348	CNBKA	6020	BANK	10
104	Westcorp	813461	WES.1	6035	BANK	7
105	TCF Financial Corp	814184	TCB	6020	BANK	1
106	Provident Bankshares Corp	818969	PBKS	6020	BANK	9
107	Fidelity Southern Corp	822662	LION	6020	BANK	3
108	Sandy Spring Bancorp Inc	824410	SASR	6020	BANK	3
109	Orrstown Financial Services Inc	826154	ORRF	6020	BANK	2
110	Community Capital Corp	832847	CPBK	6020	BANK	6
111	Republic First Bancorp Inc	834285	FRBK	6020	BANK	10
112	S.Y. Bancorp Inc.	835324	SYBT	6020	BANK	7
113	Federal Trust Corp	842640	3FDTR	6035	BANK	5
114	Bridge Bancorp Inc	846617	BDGE	6020	BANK	2
115	New Hampshire Thrift Bancshares Inc	846931	NHTB	6035	BANK	10
116	Great Southern Bancorp Inc	854560	GSBC	6020	BANK	5
117	MAF Bancorp Inc	854662	MAFB	6035	BANK	9
118	Sky Financial Group Inc	855876	SKYF.	6020	BANK	3
119	First Keystone Financial Inc	856751	FKFS	6035	BANK	3
120	United Community Banks Inc	857855	UCBI	6020	BANK	6
121	First Community Bancshares Inc	859070	FCBC	6020	BANK	3
122	Financial Institutions Inc	862831	FISI	6020	BANK	5
123	Southeastern Bank Financial Corp	880116	SBFC	6020	BANK	4
124	HF Financial Corp.	881790	HFFC	6035	BANK	10
125	Crescent Banking Co	883476	CSNT	6020	BANK	1

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of Firm-years
126	Union First Market Bankshares Corp	883948	UBSH	6020	BANK	4
127	Anchor BanCorp Wisconsin Inc	885322	ABCW	6035	BANK	6
128	Columbia Banking System Inc	887343	COLB	6020	BANK	3
129	Premier Financial Bancorp Inc	887919	PFBI	6020	BANK	9
130	Sterling Bancshares Inc	891098	SBIB	6020	BANK	9
131	Sterling Financial Corp/WA	891106	STSA	6036	BANK	9
132	FLAG Financial Corp	897509	FLAG.1	6020	BANK	4
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135	Astoria Financial Corp	910322	AF	6035	BANK	7
136	C&F Financial Corp	913341	CFFI	6020	BANK	5
137	Middleburg Financial Corp	914138	MBRG	6020	BANK	8
138	PennFed Financial Services Inc	920945	PFSB	6035	BANK	9
139	Republic Bancorp Inc	921557	RBCAA	6020	BANK	5
140	BBX Capital Corp	921768	BBX	6035	BANK	9
141	Hudson City Bancorp Inc	921847	HCBK	6035	BANK	6
142	Royal Bancshares of Pennsylvania Inc	922487	RBPAA	6020	BANK	10
143	Alabama National BanCorporation	926966	ALAB	6020	BANK	9
144	Washington Mutual Inc	933136	WAMUQ	6035	BANK	8
145	Community Bank Shares of Indiana Inc	933590	CBIN	6020	BANK	4
146	Downey Financial Corp	935063	DWNFQ	6035	BANK	9
147	United Western Bancorp Inc	944725	UWBKQ	6035	BANK	6
148	BNCCorp Inc	945434	BNCC	6020	BANK	6
149	Investors Financial Services Corp	949589	IFIN	6020	BANK	8
150	Imperial Capital Bancorp Inc	1000234	IMPCQ	6020	BANK	9
151	Capital Corp of the West	1004740	CCOWQ	6020	BANK	2
152	Dime Community Bancshares Inc	1005409	DCOM	6035	BANK	5
153	Tompkins Financial Corp	1005817	TMP	6020	BANK	6
154	Columbia Bancorp	1010002	CBBO	6020	BANK	4
155	Provident Financial Holdings Inc	1010470	PROV	6035	BANK	2
156	Gold Banc Corp Inc	1015610	GLDB	6020	BANK	7
157	Carver Bancorp Inc.	1016178	CARV	6035	BANK	8
158	Enterprise Bancorp Inc/MA	1018399	EBTC	6020	BANK	4
159	Centrue Financial Corp	1019650	TRUE	6020	BANK	4
160	Beverly Hills Bancorp Inc	1024321	BHBC	6035	BANK	3
161	Enterprise Financial Services Corp	1025835	EFSC	6020	BANK	8
162	Mid-State Bancshares	1027324	MDST.	6020	BANK	8
163	Shore Bancshares Inc	1035092	SHBI	6020	BANK	3
164	StellarOne Corp	1036070	STEL	6020	BANK	3
165	Oak Financial Corp	1038459	3OKFC	6020	BANK	3
166	Eastern Virginia Bankshares Inc	1047170	EVBS	6020	BANK	6

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of Firm-years
167	Midwest Banc Holdings Inc	1051379	MBHIQ	6020	BANK	4
168	Citizens South Banking Corp	1051871	CSBC	6035	BANK	7
169	Heritage Commerce Corp	1053352	HTBK	6020	BANK	3
170	CFS Bancorp Inc	1058438	CITZ	6035	BANK	3
171	Cardinal Financial Corp	1060523	CFNL	6020	BANK	5
172	UCBH Holdings Inc	1061580	UCBHQ	6020	BANK	1
173	Harrington West Financial Group Inc	1063997	HWFGQ	6035	BANK	4
174	Superior Bancorp	1065298	SUPR	6020	BANK	6
175	Prosperity Bancshares Inc	1068851	PB	6020	BANK	7
176	First Place Financial Corp/DE	1068912	FPFCQ	6035	BANK	2
177	East West Bancorp Inc.	1069157	EWBC	6020	BANK	7
178	First Federal Bankshares Inc	1075348	FFSX	6035	BANK	1
179	Central Bancorp Inc/MA	1076394	CEBK	6020	BANK	5
180	Texas Capital Bancshares Inc	1077428	TCBI	6020	BANK	6
181	Umpqua Holdings Corp	1077771	UMPQ	6020	BANK	1
182	Bank of Florida Corp	1082368	BOFLQ	6020	BANK	2
183	Pacific Continental Corp	1084717	PCBK	6020	BANK	4
184	W Holding Co Inc.	1084887	WHCI	6020	BANK	1
185	Peoples Bancorp of North Carolina Inc.	1093672	PEBK	6020	BANK	1
186	MutualFirst Financial Inc	1094810	MFSF	6035	BANK	2
187	Virginia Commerce Bancorp	1099305	VCBI	6020	BANK	4
188	Centra Financial Holdings	1099932	CFHZ	6020	BANK	5
189	Santander Bancorp	1099958	SBP	6020	BANK	1
190	PacWest Bancorp	1102112	PACW	6020	BANK	6
191	Centerstate Banks of Florida Inc	1102266	CSFL	6020	BANK	4
192	Berkshire Hills Bancorp Inc	1108134	BHLB	6036	BANK	5
193	American River Bankshares	1108236	AMRB	6020	BANK	6
194	Hanmi Financial Corp	1109242	HAFC	6020	BANK	5
195	Pacific Mercantile Bancorp	1109546	PMBC	6020	BANK	5
196	First Northern Community Bancorp	1114927	FNRN	6020	BANK	5
197	Pinnacle Financial Partners Inc	1115055	PNFP	6020	BANK	5
198	Sierra Bancorp	1130144	BSRR	6020	BANK	5
199	Ames National Corp	1132651	ATLO	6020	BANK	5
200	Charter Financial Corp/GA	1136796	CHFN	6035	BANK	4
201	United Security Bancshares	1137547	UBFO	6020	BANK	3
202	First Security Group Inc	1138817	FSGI	6020	BANK	3
203	MB Financial Inc	1139812	MBFI	6020	BANK	5
204	Southern Community Financial Corp	1159427	SCMF	6020	BANK	4
205	Northrim BanCorp Inc	1163370	NRIM	6020	BANK	4
206	EuroBancshares Inc	1164554	EUBK	6020	BANK	2
207	First PacTrust Bancorp Inc	1169770	BANC	6035	BANK	4
208	Center Financial Corp	1174820	CLFC	6020	BANK	1

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of Firm-years
209	Access National Corp	1176316	ANCX	6035	BANK	3
210	Alliance Bankshares Corp	1181001	ABVA	6020	BANK	3
211	BNC Bancorp	1210227	BNCN	6020	BANK	4
212	NewAlliance Bancshares Inc	1264755	NAL	6036	BANK	2
213	Regions Financial Corp	1281761	RF	6020	BANK	2
214	Wilshire Bancorp Inc	1285224	WIBC	6020	BANK	2
215	Mercantile Bancorp Inc/IL	1289701	MBCR	6020	BANK	2
216	Kearny Financial Corp	1295664	KRNY	6035	BANK	1
217	BofI Holding Inc	1299709	BOFI	6035	BANK	2
218	Benjamin Franklin Bancorp Inc	1302176	BFBC	6036	BANK	2
219	BankFinancial Corp	1303942	BFIN	6036	BANK	1
220	TD Banknorth Inc	1304994	BNK	6020	BANK	1
221	First Business Financial Services Inc	1305399	FBIZ	6020	BANK	1
222	Guaranty Bancorp	1324410	GBNK	6020	BANK	1
223	Legacy Bancorp Inc	1332199	LEGC	6036	BANK	1
Total						**1150**

APPENDIX SEVEN: SAMPLE BANKS WITH FUTURE OPERATING EARNINGS AT TIME *t+2*

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
1	Associated Banc-Corp	7789	ASBC	6020	BANK	10
2	Compass Bancshares Inc.	18568	CBSS	6020	BANK	9
3	Commerce Bancshares Inc	22356	CBSH	6020	BANK	3
4	Fifth Third Bancorp	35527	FITB	6020	BANK	1
5	U.S. Bancorp	36104	USB	6020	BANK	9
6	Cullen/Frost Bankers Inc	39263	CFR	6020	BANK	8
7	Golden West Financial Corp.	42293	GDW	6035	BANK	8
8	Huntington Bancshares Inc	49196	HBAN	6020	BANK	3
9	Irwin Financial Corp	52617	IRWNQ	6020	BANK	6
10	Simmons First National Corp	90498	SFNC	6020	BANK	10
11	BB&T Corp	92230	BBT	6020	BANK	10
12	Colonial BancGroup Inc (The)	92339	CBCGQ	6020	BANK	6
13	UMB Financial Corp	101382	UMBF	6020	BANK	6
14	Univest Corp of Pennsylvania	102212	UVSP	6020	BANK	4
15	Whitney Holding Corp.	106926	WTNY	6020	BANK	8
16	Chittenden Corp.	200138	CHZ	6020	BANK	7
17	City National Corp	201461	CYN	6020	BANK	10
18	WesBanco Inc	203596	WSBC	6020	BANK	2
19	Baylake Corp	275119	3BYLK	6020	BANK	2
20	First Busey Corp	314489	BUSE	6020	BANK	9
21	B F C Financial Corp	315858	BFCF	6035	BANK	6
22	Peoples Bancorp Inc	318300	PEBO	6020	BANK	3
23	Community Trust Bancorp Inc	350852	CTBI	6020	BANK	8
24	Citizens Republic Bancorp Inc	351077	CRBC	6020	BANK	1
25	Ameris Bancorp	351569	ABCB	6020	BANK	9
26	North Valley Bancorp	353191	NOVB	6020	BANK	9
27	CVB Financial Corp	354647	CVBF	6020	BANK	6
28	FirstMerit Corp	354869	FMER	6020	BANK	7
29	TriCo Bancshares	356171	TCBK	6020	BANK	2
30	Pacific Capital Bancorp	357264	PCBC	6020	BANK	9
31	TrustCo Bank Corp NY	357301	TRST	6035	BANK	1
32	National Penn Bancshares Inc	700733	NPBC	6020	BANK	6
33	Susquehanna Bancshares Inc	700863	SUSQ	6020	BANK	10
34	Central Pacific Financial Corp.	701347	CPF	6020	BANK	4
35	Bank of Commerce Holdings	702513	BOCH	6020	BANK	5
36	Harleysville National Corp	702902	HNBC	6020	BANK	4
37	PAB Bankshares Inc.	705200	PABK	6020	BANK	8
38	Horizon Bancorp/IN	706129	HBNC	6020	BANK	4
39	U.S.B. Holding Co. Inc.	707805	UBH	6020	BANK	7
40	First Commonwealth Financial Corp.	712537	FCF	6020	BANK	5

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
41	Farmers Capital Bank Corp	713095	FFKT	6020	BANK	3
42	PNC Financial Services Group Inc.	713676	PNC	6020	BANK	3
43	Valley National Bancorp	714310	VLY	6020	BANK	10
44	NewBridge Bancorp	714530	NBBC	6020	BANK	10
45	First Financial Corp/IN	714562	THFF	6020	BANK	1
46	Community Banks Inc	714710	CMTY	6020	BANK	2
47	Amcore Financial Inc	714756	AMFIQ	6020	BANK	10
48	Commerce Bancorp Inc.	715096	CBH.1	6020	BANK	3
49	ACNB Corp	715579	ACNB	6020	BANK	4
50	First Charter Corp	717306	FCTR	6020	BANK	6
51	Arrow Financial Corp	717538	AROW	6020	BANK	4
52	United Security Bancshares Inc	717806	USBI	6020	BANK	7
53	First Oak Brook Bancshares Inc	717837	FOBB	6020	BANK	5
54	SVB Financial Group	719739	SIVB	6020	BANK	10
55	MainSource Financial Group Inc	720002	MSFG	6020	BANK	2
56	Hudson Valley Holding Corp	722256	HVB	6020	BANK	6
57	State Bancorp Inc.	723458	STBC	6020	BANK	1
58	Franklin Financial Services Corp	723646	3FRAF	6020	BANK	6
59	Merchants Bancshares Inc	726517	MBVT	6020	BANK	6
60	AmericanWest BanCorp	726990	AWBCQ	6020	BANK	1
61	United Bankshares Inc	729986	UBSI	6020	BANK	10
62	Washington Trust Bancorp Inc	737468	WASH	6020	BANK	8
63	First of Long Island Corp (The)	740663	FLIC	6020	BANK	1
64	Old Point Financial Corp	740971	OPOF	6020	BANK	7
65	American National Bankshares Inc	741516	AMNB	6020	BANK	4
66	Cadence Financial Corp	742054	CADE	6020	BANK	1
67	First Chester County Corp	744126	FCEC	6020	BANK	2
68	Summit Bancshares Inc	745344	SBIT	6020	BANK	8
69	MidSouth Bancorp Inc.	745981	MSL	6020	BANK	10
70	Smithtown Bancorp Inc	747345	SMTB	6020	BANK	2
71	Qnb Corp	750558	QNBC	6020	BANK	2
72	Auburn National BanCorp Inc	750574	AUBN	6020	BANK	10
73	Camden National Corp	750686	CAC	6020	BANK	3
74	Suffolk Bancorp	754673	SUBK	6020	BANK	5
75	Interchange Financial Services Corp	755933	IFCJ	6020	BANK	1
76	Berkshire Bancorp Inc	759718	BERK	6020	BANK	4
77	BancFirst Corp	760498	BANF	6020	BANK	8
78	Peoples BancTrust Company Inc (The)	762128	PBTC	6020	BANK	4
79	First United Corp	763907	FUNC	6020	BANK	5
80	SCBT Financial Corp	764038	SCBT	6020	BANK	9

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
81	Integra Bank Corp	764241	IBNKQ	6020	BANK	6
82	First Bancorp Inc/ME (The)	765207	FNLC	6020	BANK	2
83	Rurban Financial Corp	767405	RBNF	6020	BANK	4
84	Greater Community Bancorp	773845	GFLS	6020	BANK	8
85	Greater Bay Bancorp	775473	GBBK	6020	BANK	5
86	VIST Financial Corp	775662	VIST	6020	BANK	10
87	Firstbank Corp	778972	FBMI	6020	BANK	1
88	First Indiana Corp	789670	FINB	6020	BANK	2
89	NBT Bancorp Inc	790359	NBTB	6020	BANK	10
90	Alliance Financial Corp	796317	ALNC	6020	BANK	8
91	National Bankshares Inc	796534	NKSH	6020	BANK	1
92	South Financial Group Inc (The)	797871	TSFG	6020	BANK	4
93	Webster Financial Corp	801337	WBS	6020	BANK	2
94	Park National Corp	805676	PRK	6020	BANK	1
95	Bank of Granite Corp	810689	GRAN	6020	BANK	4
96	First Bancorp/NC	811589	FBNC	6020	BANK	10
97	Sterling Financial Corp	811671	SLFI	6020	BANK	9
98	Santander Holdings USA Inc	811830	STD2	6035	BANK	10
99	Century BanCorp Inc	812348	CNBKA	6020	BANK	10
100	Westcorp	813461	WES.1	6035	BANK	6
101	TCF Financial Corp	814184	TCB	6020	BANK	1
102	Provident Bankshares Corp	818969	PBKS	6020	BANK	8
103	Fidelity Southern Corp	822662	LION	6020	BANK	3
104	Sandy Spring Bancorp Inc	824410	SASR	6020	BANK	2
105	Orrstown Financial Services Inc	826154	ORRF	6020	BANK	1
106	Community Capital Corp	832847	CPBK	6020	BANK	6
107	Republic First Bancorp Inc	834285	FRBK	6020	BANK	10
108	S.Y. Bancorp Inc.	835324	SYBT	6020	BANK	6
109	Federal Trust Corp	842640	3FDTR	6035	BANK	5
110	Bridge Bancorp Inc	846617	BDGE	6020	BANK	2
111	New Hampshire Thrift Bancshares Inc	846931	NHTB	6035	BANK	10
112	Great Southern Bancorp Inc	854560	GSBC	6020	BANK	5
113	MAF Bancorp Inc	854662	MAFB	6035	BANK	8
114	Sky Financial Group Inc	855876	SKYF.	6020	BANK	2
115	First Keystone Financial Inc	856751	FKFS	6035	BANK	3
116	United Community Banks Inc	857855	UCBI	6020	BANK	6
117	First Community Bancshares Inc	859070	FCBC	6020	BANK	3
118	Financial Institutions Inc	862831	FISI	6020	BANK	5
119	Southeastern Bank Financial Corp	880116	SBFC	6020	BANK	3
120	HF Financial Corp.	881790	HFFC	6035	BANK	10
121	Crescent Banking Co	883476	CSNT	6020	BANK	1
122	Union First Market Bankshares	883948	UBSH	6020	BANK	4

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
	Corp					
123	Anchor BanCorp Wisconsin Inc	885322	ABCW	6035	BANK	5
124	Columbia Banking System Inc	887343	COLB	6020	BANK	2
125	Premier Financial Bancorp Inc	887919	PFBI	6020	BANK	9
126	Sterling Bancshares Inc	891098	SBIB	6020	BANK	9
127	Sterling Financial Corp/WA	891106	STSA	6036	BANK	9
128	FLAG Financial Corp	897509	FLAG.1	6020	BANK	3
129	First State Bancorporation Inc	897861	FSNMQ	6020	BANK	10
130	NB&T Financial Group Inc	908837	NBTF	6020	BANK	5
131	Astoria Financial Corp	910322	AF	6035	BANK	7
132	C&F Financial Corp	913341	CFFI	6020	BANK	5
133	Middleburg Financial Corp	914138	MBRG	6020	BANK	8
134	PennFed Financial Services Inc	920945	PFSB	6035	BANK	8
135	Republic Bancorp Inc	921557	RBCAA	6020	BANK	5
136	BBX Capital Corp	921768	BBX	6035	BANK	8
137	Hudson City Bancorp Inc	921847	HCBK	6035	BANK	6
138	Royal Bancshares of Pennsylvania Inc	922487	RBPAA	6020	BANK	10
139	Alabama National BanCorporation	926966	ALAB	6020	BANK	8
140	Washington Mutual Inc	933136	WAMUQ	6035	BANK	7
141	Community Bank Shares of Indiana Inc	933590	CBIN	6020	BANK	4
142	Downey Financial Corp	935063	DWNFQ	6035	BANK	8
143	United Western Bancorp Inc	944725	UWBKQ	6035	BANK	6
144	BNCCorp Inc	945434	BNCC	6020	BANK	5
145	Investors Financial Services Corp	949589	IFIN	6020	BANK	7
146	Imperial Capital Bancorp Inc	1000234	IMPCQ	6020	BANK	9
147	Capital Corp of the West	1004740	CCOWQ	6020	BANK	2
148	Dime Community Bancshares Inc	1005409	DCOM	6035	BANK	5
149	Tompkins Financial Corp	1005817	TMP	6020	BANK	6
150	Columbia Bancorp	1010002	CBBO	6020	BANK	4
151	Provident Financial Holdings Inc	1010470	PROV	6035	BANK	2
152	Gold Banc Corp Inc	1015610	GLDB	6020	BANK	6
153	Carver Bancorp Inc.	1016178	CARV	6035	BANK	8
154	Enterprise Bancorp Inc/MA	1018399	EBTC	6020	BANK	4
155	Centrue Financial Corp	1019650	TRUE	6020	BANK	4
156	Beverly Hills Bancorp Inc	1024321	BHBC	6035	BANK	2
157	Enterprise Financial Services Corp	1025835	EFSC	6020	BANK	8
158	Mid-State Bancshares	1027324	MDST.	6020	BANK	7
159	Shore Bancshares Inc	1035092	SHBI	6020	BANK	3
160	StellarOne Corp	1036070	STEL	6020	BANK	3
161	Oak Financial Corp	1038459	3OKFC	6020	BANK	3

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
162	Eastern Virginia Bankshares Inc	1047170	EVBS	6020	BANK	6
163	Midwest Banc Holdings Inc	1051379	MBHIQ	6020	BANK	3
164	Citizens South Banking Corp	1051871	CSBC	6035	BANK	7
165	Heritage Commerce Corp	1053352	HTBK	6020	BANK	3
166	CFS Bancorp Inc	1058438	CITZ	6035	BANK	3
167	Cardinal Financial Corp	1060523	CFNL	6020	BANK	5
168	UCBH Holdings Inc	1061580	UCBHQ	6020	BANK	1
169	Harrington West Financial Group Inc	1063997	HWFGQ	6035	BANK	4
170	Superior Bancorp	1065298	SUPR	6020	BANK	5
171	Prosperity Bancshares Inc	1068851	PB	6020	BANK	7
172	First Place Financial Corp/DE	1068912	FPFCQ	6035	BANK	2
173	East West Bancorp Inc.	1069157	EWBC	6020	BANK	7
174	First Federal Bankshares Inc	1075348	FFSX	6035	BANK	1
175	Central Bancorp Inc/MA	1076394	CEBK	6020	BANK	5
176	Texas Capital Bancshares Inc	1077428	TCBI	6020	BANK	6
177	Umpqua Holdings Corp	1077771	UMPQ	6020	BANK	1
178	Bank of Florida Corp	1082368	BOFLQ	6020	BANK	1
179	Pacific Continental Corp	1084717	PCBK	6020	BANK	4
180	Peoples Bancorp of North Carolina Inc.	1093672	PEBK	6020	BANK	1
181	MutualFirst Financial Inc	1094810	MFSF	6035	BANK	2
182	Virginia Commerce Bancorp	1099305	VCBI	6020	BANK	4
183	Centra Financial Holdings	1099932	CFHZ	6020	BANK	5
184	Santander Bancorp	1099958	SBP	6020	BANK	1
185	PacWest Bancorp	1102112	PACW	6020	BANK	6
186	Centerstate Banks of Florida Inc	1102266	CSFL	6020	BANK	4
187	Berkshire Hills Bancorp Inc	1108134	BHLB	6036	BANK	5
188	American River Bankshares	1108236	AMRB	6020	BANK	6
189	Hanmi Financial Corp	1109242	HAFC	6020	BANK	4
190	Pacific Mercantile Bancorp	1109546	PMBC	6020	BANK	4
191	First Northern Community Bancorp	1114927	FNRN	6020	BANK	4
192	Pinnacle Financial Partners Inc	1115055	PNFP	6020	BANK	5
193	Sierra Bancorp	1130144	BSRR	6020	BANK	5
194	Ames National Corp	1132651	ATLO	6020	BANK	5
195	Charter Financial Corp/GA	1136796	CHFN	6035	BANK	3
196	United Security Bancshares	1137547	UBFO	6020	BANK	3
197	First Security Group Inc	1138817	FSGI	6020	BANK	3
198	MB Financial Inc	1139812	MBFI	6020	BANK	5
199	Southern Community Financial Corp	1159427	SCMF	6020	BANK	3
200	Northrim BanCorp Inc	1163370	NRIM	6020	BANK	4
201	EuroBancshares Inc	1164554	EUBK	6020	BANK	2

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
202	First PacTrust Bancorp Inc	1169770	BANC	6035	BANK	4
203	Center Financial Corp	1174820	CLFC	6020	BANK	1
204	Access National Corp	1176316	ANCX	6035	BANK	3
205	Alliance Bankshares Corp	1181001	ABVA	6020	BANK	2
206	BNC Bancorp	1210227	BNCN	6020	BANK	4
207	NewAlliance Bancshares Inc	1264755	NAL	6036	BANK	2
208	Regions Financial Corp	1281761	RF	6020	BANK	2
209	Wilshire Bancorp Inc	1285224	WIBC	6020	BANK	2
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211	BofI Holding Inc	1299709	BOFI	6035	BANK	2
212	Benjamin Franklin Bancorp Inc	1302176	BFBC	6036	BANK	2
213	BankFinancial Corp	1303942	BFIN	6036	BANK	1
214	First Business Financial Services Inc	1305399	FBIZ	6020	BANK	1
215	Guaranty Bancorp	1324410	GBNK	6020	BANK	1
216	Legacy Bancorp Inc	1332199	LEGC	6036	BANK	1
Total						**1081**

APPENDIX EIGHT: SAMPLE BANKS WITH FUTURE OPERATING EARNINGS AT TIME *t+3*

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
1	Associated Banc-Corp	7789	ASBC	6020	BANK	9
2	Compass Bancshares Inc.	18568	CBSS	6020	BANK	8
3	Commerce Bancshares Inc	22356	CBSH	6020	BANK	2
4	U.S. Bancorp	36104	USB	6020	BANK	8
5	Cullen/Frost Bankers Inc	39263	CFR	6020	BANK	7
6	Golden West Financial Corp.	42293	GDW	6035	BANK	7
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11	Colonial BancGroup Inc (The)	92339	CBCGQ	6020	BANK	5
12	UMB Financial Corp	101382	UMBF	6020	BANK	5
13	Univest Corp of Pennsylvania	102212	UVSP	6020	BANK	3
14	Whitney Holding Corp.	106926	WTNY	6020	BANK	7
15	Chittenden Corp.	200138	CHZ	6020	BANK	6
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36	Horizon Bancorp/IN	706129	HBNC	6020	BANK	3
37	U.S.B. Holding Co. Inc.	707805	UBH	6020	BANK	6
38	First Commonwealth Financial Corp.	712537	FCF	6020	BANK	4
39	Farmers Capital Bank Corp	713095	FFKT	6020	BANK	3
40	PNC Financial Services Group Inc.	713676	PNC	6020	BANK	2

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41	Valley National Bancorp	714310	VLY	6020	BANK	9
42	NewBridge Bancorp	714530	NBBC	6020	BANK	9
43	Community Banks Inc	714710	CMTY	6020	BANK	1
44	Amcore Financial Inc	714756	AMFIQ	6020	BANK	9
45	Commerce Bancorp Inc.	715096	CBH.1	6020	BANK	2
46	ACNB Corp	715579	ACNB	6020	BANK	3
47	First Charter Corp	717306	FCTR	6020	BANK	5
48	Arrow Financial Corp	717538	AROW	6020	BANK	3
49	United Security Bancshares Inc	717806	USBI	6020	BANK	6
50	First Oak Brook Bancshares Inc	717837	FOBB	6020	BANK	4
51	SVB Financial Group	719739	SIVB	6020	BANK	9
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56	United Bankshares Inc	729986	UBSI	6020	BANK	9
57	Washington Trust Bancorp Inc	737468	WASH	6020	BANK	7
58	Old Point Financial Corp	740971	OPOF	6020	BANK	6
59	American National Bankshares Inc	741516	AMNB	6020	BANK	3
60	First Chester County Corp	744126	FCEC	6020	BANK	1
61	Summit Bancshares Inc	745344	SBIT	6020	BANK	7
62	MidSouth Bancorp Inc.	745981	MSL	6020	BANK	9
63	Smithtown Bancorp Inc	747345	SMTB	6020	BANK	1
64	Qnb Corp	750558	QNBC	6020	BANK	1
65	Auburn National BanCorp Inc	750574	AUBN	6020	BANK	9
66	Camden National Corp	750686	CAC	6020	BANK	2
67	Suffolk Bancorp	754673	SUBK	6020	BANK	4
68	Berkshire Bancorp Inc	759718	BERK	6020	BANK	3
69	BancFirst Corp	760498	BANF	6020	BANK	7
70	Peoples BancTrust Company Inc (The)	762128	PBTC	6020	BANK	3
71	First United Corp	763907	FUNC	6020	BANK	4
72	SCBT Financial Corp	764038	SCBT	6020	BANK	8
73	Integra Bank Corp	764241	IBNKQ	6020	BANK	5
74	First Bancorp Inc/ME (The)	765207	FNLC	6020	BANK	1
75	Rurban Financial Corp	767405	RBNF	6020	BANK	3
76	Greater Community Bancorp	773845	GFLS	6020	BANK	7
77	Greater Bay Bancorp	775473	GBBK	6020	BANK	4
78	VIST Financial Corp	775662	VIST	6020	BANK	9
79	Firstbank Corp	778972	FBMI	6020	BANK	1
80	First Indiana Corp	789670	FINB	6020	BANK	1
81	NBT Bancorp Inc	790359	NBTB	6020	BANK	9

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
82	Alliance Financial Corp	796317	ALNC	6020	BANK	7
83	South Financial Group Inc (The)	797871	TSFG	6020	BANK	3
84	Webster Financial Corp	801337	WBS	6020	BANK	1
85	Park National Corp	805676	PRK	6020	BANK	1
86	Bank of Granite Corp	810689	GRAN	6020	BANK	3
87	First Bancorp/NC	811589	FBNC	6020	BANK	9
88	Sterling Financial Corp	811671	SLFI	6020	BANK	8
89	Santander Holdings USA Inc	811830	STD2	6035	BANK	9
90	Century BanCorp Inc	812348	CNBKA	6020	BANK	9
91	Westcorp	813461	WES.1	6035	BANK	5
92	Provident Bankshares Corp	818969	PBKS	6020	BANK	7
93	Fidelity Southern Corp	822662	LION	6020	BANK	2
94	Sandy Spring Bancorp Inc	824410	SASR	6020	BANK	1
95	Community Capital Corp	832847	CPBK	6020	BANK	5
96	Republic First Bancorp Inc	834285	FRBK	6020	BANK	9
97	S.Y. Bancorp Inc.	835324	SYBT	6020	BANK	5
98	Federal Trust Corp	842640	3FDTR	6035	BANK	4
99	Bridge Bancorp Inc	846617	BDGE	6020	BANK	1
100	New Hampshire Thrift Bancshares Inc	846931	NHTB	6035	BANK	9
101	Great Southern Bancorp Inc	854560	GSBC	6020	BANK	5
102	MAF Bancorp Inc	854662	MAFB	6035	BANK	7
103	Sky Financial Group Inc	855876	SKYF.	6020	BANK	1
104	First Keystone Financial Inc	856751	FKFS	6035	BANK	3
105	United Community Banks Inc	857855	UCBI	6020	BANK	5
106	First Community Bancshares Inc	859070	FCBC	6020	BANK	2
107	Financial Institutions Inc	862831	FISI	6020	BANK	4
108	Southeastern Bank Financial Corp	880116	SBFC	6020	BANK	2
109	HF Financial Corp.	881790	HFFC	6035	BANK	9
110	Crescent Banking Co	883476	CSNT	6020	BANK	1
111	Union First Market Bankshares Corp	883948	UBSH	6020	BANK	3
112	Anchor BanCorp Wisconsin Inc	885322	ABCW	6035	BANK	4
113	Columbia Banking System Inc	887343	COLB	6020	BANK	1
114	Premier Financial Bancorp Inc	887919	PFBI	6020	BANK	8
115	Sterling Bancshares Inc	891098	SBIB	6020	BANK	8
116	Sterling Financial Corp/WA	891106	STSA	6036	BANK	8
117	FLAG Financial Corp	897509	FLAG.1	6020	BANK	2
118	First State Bancorporation Inc	897861	FSNMQ	6020	BANK	9
119	NB&T Financial Group Inc	908837	NBTF	6020	BANK	4
120	Astoria Financial Corp	910322	AF	6035	BANK	6
121	C&F Financial Corp	913341	CFFI	6020	BANK	4
122	Middleburg Financial Corp	914138	MBRG	6020	BANK	7

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
123	PennFed Financial Services Inc	920945	PFSB	6035	BANK	7
124	Republic Bancorp Inc	921557	RBCAA	6020	BANK	4
125	BBX Capital Corp	921768	BBX	6035	BANK	7
126	Hudson City Bancorp Inc	921847	HCBK	6035	BANK	5
127	Royal Bancshares of Pennsylvania Inc	922487	RBPAA	6020	BANK	9
128	Alabama National BanCorporation	926966	ALAB	6020	BANK	7
129	Washington Mutual Inc	933136	WAMUQ	6035	BANK	6
130	Community Bank Shares of Indiana Inc	933590	CBIN	6020	BANK	3
131	Downey Financial Corp	935063	DWNFQ	6035	BANK	7
132	United Western Bancorp Inc	944725	UWBKQ	6035	BANK	5
133	BNCCorp Inc	945434	BNCC	6020	BANK	4
134	Investors Financial Services Corp	949589	IFIN	6020	BANK	6
135	Imperial Capital Bancorp Inc	1000234	IMPCQ	6020	BANK	8
136	Capital Corp of the West	1004740	CCOWQ	6020	BANK	1
137	Dime Community Bancshares Inc	1005409	DCOM	6035	BANK	4
138	Tompkins Financial Corp	1005817	TMP	6020	BANK	5
139	Columbia Bancorp	1010002	CBBO	6020	BANK	3
140	Provident Financial Holdings Inc	1010470	PROV	6035	BANK	1
141	Gold Banc Corp Inc	1015610	GLDB	6020	BANK	5
142	Carver Bancorp Inc.	1016178	CARV	6035	BANK	8
143	Enterprise Bancorp Inc/MA	1018399	EBTC	6020	BANK	3
144	Centrue Financial Corp	1019650	TRUE	6020	BANK	3
145	Beverly Hills Bancorp Inc	1024321	BHBC	6035	BANK	1
146	Enterprise Financial Services Corp	1025835	EFSC	6020	BANK	7
147	Mid-State Bancshares	1027324	MDST.	6020	BANK	6
148	Shore Bancshares Inc	1035092	SHBI	6020	BANK	2
149	StellarOne Corp	1036070	STEL	6020	BANK	2
150	Oak Financial Corp	1038459	3OKFC	6020	BANK	2
151	Eastern Virginia Bankshares Inc	1047170	EVBS	6020	BANK	5
152	Midwest Banc Holdings Inc	1051379	MBHIQ	6020	BANK	2
153	Citizens South Banking Corp	1051871	CSBC	6035	BANK	6
154	Heritage Commerce Corp	1053352	HTBK	6020	BANK	2
155	CFS Bancorp Inc	1058438	CITZ	6035	BANK	2
156	Cardinal Financial Corp	1060523	CFNL	6020	BANK	4
157	Harrington West Financial Group Inc	1063997	HWFGQ	6035	BANK	3
158	Superior Bancorp	1065298	SUPR	6020	BANK	4
159	Prosperity Bancshares Inc	1068851	PB	6020	BANK	6
160	First Place Financial Corp/DE	1068912	FPFCQ	6035	BANK	1
161	East West Bancorp Inc.	1069157	EWBC	6020	BANK	6
162	Central Bancorp Inc/MA	1076394	CEBK	6020	BANK	5

Firm	Name	CIK Number	Ticker Symbol	Standard Industry Classification Code	Industry Format	Number of firm-years
163	Texas Capital Bancshares Inc	1077428	TCBI	6020	BANK	5
164	Pacific Continental Corp	1084717	PCBK	6020	BANK	3
165	Peoples Bancorp of North Carolina Inc.	1093672	PEBK	6020	BANK	1
166	MutualFirst Financial Inc	1094810	MFSF	6035	BANK	1
167	Virginia Commerce Bancorp	1099305	VCBI	6020	BANK	3
168	Centra Financial Holdings	1099932	CFHZ	6020	BANK	4
169	PacWest Bancorp	1102112	PACW	6020	BANK	5
170	Centerstate Banks of Florida Inc	1102266	CSFL	6020	BANK	3
171	Berkshire Hills Bancorp Inc	1108134	BHLB	6036	BANK	4
172	American River Bankshares	1108236	AMRB	6020	BANK	5
173	Hanmi Financial Corp	1109242	HAFC	6020	BANK	3
174	Pacific Mercantile Bancorp	1109546	PMBC	6020	BANK	3
175	First Northern Community Bancorp	1114927	FNRN	6020	BANK	3
176	Pinnacle Financial Partners Inc	1115055	PNFP	6020	BANK	4
177	Sierra Bancorp	1130144	BSRR	6020	BANK	4
178	Ames National Corp	1132651	ATLO	6020	BANK	4
179	Charter Financial Corp/GA	1136796	CHFN	6035	BANK	2
180	United Security Bancshares	1137547	UBFO	6020	BANK	2
181	First Security Group Inc	1138817	FSGI	6020	BANK	2
182	MB Financial Inc	1139812	MBFI	6020	BANK	4
183	Southern Community Financial Corp	1159427	SCMF	6020	BANK	2
184	Northrim BanCorp Inc	1163370	NRIM	6020	BANK	3
185	EuroBancshares Inc	1164554	EUBK	6020	BANK	1
186	First PacTrust Bancorp Inc	1169770	BANC	6035	BANK	3
187	Access National Corp	1176316	ANCX	6035	BANK	2
188	Alliance Bankshares Corp	1181001	ABVA	6020	BANK	1
189	BNC Bancorp	1210227	BNCN	6020	BANK	3
190	NewAlliance Bancshares Inc	1264755	NAL	6036	BANK	1
191	Regions Financial Corp	1281761	RF	6020	BANK	1
192	Wilshire Bancorp Inc	1285224	WIBC	6020	BANK	1
193	Mercantile Bancorp Inc/IL	1289701	MBCR	6020	BANK	1
194	BofI Holding Inc	1299709	BOFI	6035	BANK	1
195	Benjamin Franklin Bancorp Inc	1302176	BFBC	6036	BANK	1
Total						**875**