**The Role of Exports in African Economic Development:
A Comparative Study of Mauritius and Tunisia**

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Abstract

Mauritius and Tunisia stand out as two remarkable exceptions to the African economic growth experience. Since their respective independences in 1968 and 1956, both have achieved average real GDP per capita growth well in excess of three percent per year. Export policies featured highly in the developmental strategies of both countries as they transitioned through a dependency on agriculture into manufacturing and then services. What makes this comparison so interesting is that despite such similar success, Tunisia and Mauritius are fundamentally very different. This study comprises the first ever in-depth comparison of these two countries, presenting a qualitative analysis and then augmenting it with a comprehensive set of econometric tests. The focus is on the relationship between exports and economic growth, but the discussion explores the wider context in both countries. Using the Granger-causality approach, we find strong evidence for export-led growth in Mauritius, but no significant evidence of any causal relationship in Tunisia. On the basis of a broader analysis we argue that exports were still important in both countries, but appear to have been more central to the growth process in Mauritius. This broader analysis also highlights that other factors – such as a strong institutional environment – were important in facilitating or directly contributing to such consistent growth.

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Chapter 1: Introduction and Overview

Africa has long surprised and bewildered development economists. A great number of scholars, advisors and political figures from a wide array of disciplines have endeavoured to bring us closer to an understanding of what can be done to raise the standard of living for the millions of impoverished people living in Africa. This focus may well be justified: questions that can be asked of Africa hold interest not only for professional economists, but also for the general globally-minded individual. Although complete answers to such questions are far beyond the scope of this study, we may well wonder why such a resource-rich continent with so much international attention – ranging from aid money and advice to technological transfer and direct physical intervention – maintains such a high incidence of poverty. Or why African living standards have stagnated for so long, while those in Asia – once so comparable – have experienced rapid improvement over the past few decades. Recent evidence may indicate that economic growth is beginning to raise incomes in Africa (Sala-i-Martin & Pinkovskiy, 2010), but the fact is that millions still remain in life-threatening poverty.

Of course, there *are* countries within Africa which have gone against the regional trend. One only needs to look at countries like Mauritius and Tunisia to be reminded that poor economic performance need not be the benchmark for African economies; both of these countries experienced such rapid and consistent economic growth over the past few decades that their real per capita incomes far more than tripled (International Monetary Fund, 2010a). These examples demonstrate that economic success is not unobtainable, despite such a dismal performance in the region generally. For Mauritius and Tunisia in particular, outward-focussed policy initiatives seem to have played a large role in the structural transformation of their economies, and may have been a significant engine of growth. As outward-focussed government policies are not necessarily predetermined by historic or inherent country-specific factors (such as colonial history, geographical endowments or development levels), the application of similar policies to other countries may well be viable. This study will examine

Mauritius and Tunisia from this perspective; analytically dissecting the economic growth in each of the respective countries in order to determine what causes lie behind it and the role that export policies – in particular – had to play.

1.1 Research Questions

Clearly, the unusual successes of Mauritius and Tunisia may hold insights into growth-enhancing strategies that could be employed by other countries, in Africa or elsewhere. In light of this, as well as the apparent centrality of export strategies in these two countries, the following questions are explored here:

- Which underlying factors are responsible for the rapid economic growth that Mauritius and Tunisia have experienced since their respective independences? Specifically;
- What role did the promotion of exports play in this economic growth?
- How has this experience differed across the two countries, and what can be understood from this?

Although there has already been some discussion around the first question in relation to each of the countries separately, there exists no comparison of them both together. An answer to the second question has been attempted in the literature – certainly for other countries and to some degree for Mauritius and Tunisia – but not comprehensively and with no robust conclusions for either country. The last question in particular remains entirely unanswered in the existing literature – no one has made a thorough comparison of these two countries to date.

It is surprising that there has not already been a comparison of these two nations, given the position of Mauritius and Tunisia as two of the most successful African countries in terms of consistent income growth over the past few decades. If there was some common cause for this success, identifying it may well assist other still impoverished nations to follow in their

footsteps and achieve strong economic growth. If the underlying causes of this growth are different in each country, then understanding the differences could help us to better comprehend the context behind the success of various growth policies. Either way a comparison of these two success stories will help us to better understand the growth process. But why a particular focus on the export sector? Exports have already been identified as a possible growth-driver in both of these countries, and export policies are suitably reproducible for their analysis to have wider application. Export data is sufficiently obtainable to allow an in-depth econometric analysis; adding weight to the more qualitative discussion. Moreover, export policies may be particularly important for low-income countries, because of the growth-restricting nature of small domestic markets.

1.2 Background, Rationale and Motivation

A short introduction to each country will serve us well at this point. As *Figure 1.1* shows, Mauritius sits in the Indian Ocean, five hundred miles off the coast of Madagascar, and consists of one small island and a number of even smaller ones. The country is distinctly lacking in natural resources and its tropical climate makes it prone to (sometimes devastating) cyclones. English is the official language in Mauritius, but it has an ethnic makeup that says nothing about its rule and administration by various European powers over the years; its population of almost 1.3 million is predominantly Indo-Mauritian and Creole. It is a strongly democratic society and has been ever since its independence from Britain in 1968 (CIA, 2011). Years of successive governments pushed hard for ongoing economic development programmes in Mauritius – focussing on education, health and welfare and export-promotion.

Figure 1.1 Mauritius and Tunisia¹

In contrast to Mauritius, Tunisia occupies a very central location on the tip of Northern Africa and can in many ways associate with Africa, Europe or the Middle East (it is officially part of the Maghreb group of countries as well as the Middle East and North Africa (MENA) region). It is prone to periodic droughts, but has a generally temperate climate and was fortunate enough to inherit substantial natural petroleum reserves. Its official languages are Arabic and French – the latter a legacy of years as a French protectorate – and ethnically the population of well over 10 million is almost entirely Arabic (CIA, 2011). Since its independence from France in 1956, the country has been ruled by two long-lasting authoritarian regimes. Despite this, it has developed a strong institutional framework and managed to carry out years of economic and social reform – focussing on social policy and structural transformation (of which exports played a large part).

¹ Figure constructed by the author, using a license-free image.

Recently, Tunisia has undergone a period of dramatic social and political change in the face of widespread rioting. Ben Ali, the president for life-cum-authoritarian dictator since 1987, gave up office and fled the country on the 14th of January 2011 (BBC, 2011a). The *Jasmine Revolution* – as it has been termed – has already led to a wave of similar protests across North Africa (and beyond), and is far from over. It is presently unclear what the end result of this monumental change will be, and as such we focus on Tunisia's history from 1956 to November 2010 – just before the beginning of the protests. We will make some mention of recent events, but the central discussion will be around Tunisia before this time. This is appropriate, given the success of the country over the 54 year period following independence and the uncertainty surrounding current events. Commentators may have been wrong in their assertion that Tunisians have always preferred “organised and regular government over personal liberty” (Julien, 1970), but this discussion is best left for another study.

So Mauritius and Tunisia provide a fascinating comparison for two reasons: firstly, they have both experienced remarkable rates of economic growth and development over the decades since independence; and secondly, their similar growth experiences took place despite remarkable differences in the countries themselves. Both incomes and levels of human development improved rapidly in response to government policies, accentuating the difference between these two countries and most other African nations. *Figure 1.2* below gives an indication of the relative magnitude of this success:

Figure 1.2 African GDP Per Capita 2010, Current International Dollars²

Mauritius and Tunisia stand out alongside Libya, Botswana, Gabon and South Africa. What makes the income levels of the former two stand out from these six is the consistently high growth rates of the past few decades that underlie this. Both Mauritius and Tunisia experienced relatively steady real per capita GDP growth rates that averaged around 3.4% from 1962-2007, while rates were significantly smaller in Gabon and South Africa and much more volatile in Botswana and Libya.³ The dismal level of per capita GDP in most of Africa is also strikingly apparent in *figure 1.2*. Authors such as Naudé (2010) put this incredibly poor performance down to a number of factors including: adoption of poor growth policies, weak institutional environments, adverse historical (often colonial) legacies, widespread political instability and civil conflict, geographical limitations and a negative trade orientation in an increasingly globalised environment. Whatever the cause, the potential for these countries to learn something from the experiences of Mauritius and Tunisia provides another key motivation for this study.

² IMF (2010b). These are Purchasing Power Parity (PPP) adjusted. Note that we have only included nations with populations over 1 million.

³ Authors calculations using data from Heston et al. (2009).

Previous studies have tended to focus either on what these struggling nations have done wrong, or on what other developed countries outside Africa have done so well. However a study of two such successful countries from *within* the continent has far more potential for relevant applications to these less-developed nations. The trading environment in other parts of the world is quite different to that experienced by Africa, and the success of various export policies is likely to be related to this. A similar argument can be made for other aspects of Mauritius' and Tunisia's growth and development strategies.

1.3 Structure of the Thesis

We set about exploring answers to these questions in the following way. Chapter 2 first examines in detail the literature relating to this topic – including studies of economic growth, African development and Mauritius and Tunisia in particular. A special section is dedicated to the extensive empirical literature on export-led growth. In chapter 3 we progress to a more detailed examination of Mauritius and Tunisia; including a timeline of relevant economic and social events since their respective independences and a more formal look at various aspects of their economies. This is followed by an explicit comparison of the two countries. In chapter 4 we outline our empirical approach to testing for export-led growth – examining the data and methodology in detail. This highlights one of the key contributions of this study: a comprehensive approach to testing for export-led growth, including a degree of sensitivity analysis not yet undertaken in the case of these two countries. Chapter 5 presents the findings of this approach, and then in the final chapter we discuss the conclusions to be drawn and insights provided into future economic growth strategies. Some discussion is also made as to where the research might feasibly and fruitfully be extended. Overall, therefore, the study comprises a new contribution to the literature on African growth and development, based on a strong combination of qualitative and quantitative analysis. In the words of Bhagwati (1998, p.36), we employ a “mix of analytical insights, casual empiricism, and econometric evidence” in order to better understand these two international success stories.

Chapter 2: Literature Review

2.1 Economic Growth and Development

2.1.1 General overview

The study of economic growth is perhaps the most fundamental pursuit in all macroeconomics, since the achievement of sustained growth is undoubtedly the most vital underlying force for better living standards. Although economic growth in the wider economy is not in itself *sufficient* to universally raise living standards, it provides the resources necessary to eliminate extreme poverty, increase education, improve health and provide the standard of living which many consider a basic human right. In one respect it is difficult for macroeconomics not to contribute to the study of economic growth, but the centrality of economic growth in economic research has been far from consistent over the years.

Solow (1956) and Swan (1956) are responsible for the neoclassical form of the production function used in many modern economic growth models, although modern growth theory finds its roots in the seminal work of Ramsey (1928), who applied mathematical techniques to the study of consumer optimisation. It wasn't until the 1980s however, that authors such as Romer (1986) and Lucas (1988) gave wings to the idea of *endogenous* growth models, where the long-run rate of growth is determined without reliance on factors exogenous to the model itself. Although we are not constructing an economic growth model for Mauritius or Tunisia per se, the foundations laid by this and subsequent economic growth research provide an important context for this study and are worth exploring.

Since the late 1980s a number of possible determinants of growth have found their place within the framework of various economic growth models, which provide some legitimacy for their use in this research. *Capital* and *labour* have long been included as the two fundamental inputs to the production process comprising the core of the original Solow-Swan model, along with technology. The importance of *human capital* in the production process was highlighted as

early as Smith (1776), but it was Alfred Marshall (1920) in his volume on the *Principles of Economics* that prompted widespread acceptance of the view that human capital is a distinct input in the production process. Economists such as Schultz (1961) argued strongly for the inclusion of human capital explicitly when modelling growth, and as such the exclusion of human capital from any comprehensive growth model would now be considered unusual. An example of a neoclassical growth model augmented with human – as well as physical – capital is found in Mankiw, Romer and Weil (1992). Numerous growth accounting exercises have demonstrated that human capital accounts for a significant proportion of what was previously considered on aggregate as total factor productivity (TFP). Many models of economic growth were also adapted to account for an open economy, realising the importance of international trade and the world market in the growth process. We shall discuss the role of trade, and specifically *exports*, in more detail later.

Of course, there are many other possible determinants of long-run economic growth that have been included in these models. Other factors which are believed to be highly important have proved very difficult to account for explicitly – a key example being *institutional quality*, which brings to the forefront the importance of governance and the institutional environment in the growth process. The significance of institutions has been stressed by economists like Douglass North (1989) and the strong correlation between institutions and economic growth has been emphasised by major global development organisations such as the International Monetary Fund (IMF; 2003). However, the inclusion of an institutional variable in time-series economic growth models remains problematic due to its empirical intractability, and we are compelled to exclude it here. This study makes use of estimation techniques that avoid the use of structurally defined growth models (the details of which will be described later), but it is clear that the variables used in these models have strong theoretical reasons for inclusion that are grounded in this expansive literature on economic growth theory.

Moving away from theory for a moment, there is also a vast economic literature describing (and seeking to explain) the progression of economic growth since the industrial revolution of the

eighteenth and nineteenth centuries. Far from the predictions of Malthus (1798), per capita GDP in many countries has achieved a steady increase in real terms – leading to higher living standards for a large portion of the world’s population. Barro and Sala-i-Martin (2004) use data from the end of last century alongside estimates from a previous study to describe the key features of world economic development from 1970-2000. Despite steady worldwide population growth, world real per capita GDP increased by approximately 70% across the period with most countries achieving growth in per capita incomes. Although most countries have made improvements, Barro and Sala-i-Martin show that the gap between the richest and poorest countries has significantly widened. Making regional generalisations, they note that over the period the countries in the Organisation for Economic Co-operation and Development (OECD) began the wealthiest, experienced slightly above average growth, and are now the wealthiest countries by a long way. Most of Asia began poor, experienced rapid growth and ended up with medium to high incomes, while most of Latin America began with medium to high incomes, experienced below average growth and ended up with medium incomes. Sub-Saharan Africa – a region which includes Mauritius, though not Tunisia – began with low incomes, experienced very slow growth for the most part, and ended up the poorest by far.

The authors emphasise the possibility that – due to a larger share of this increase in incomes going to the rich – this aggregate rise in income could still have occurred hand-in-hand with a rise in world poverty. However, they find that this was not so: using the \$1 per day (1985 USD)⁴ convention as a benchmark, they calculate that the proportion of people living in extreme poverty worldwide declined from 20% in 1970 to 7% in 2000, and that even despite the rapid increase in population over the period this still equated to a 280 million person reduction (Barro & Sala-i-Martin, 2004). Another important realisation is that even a rise in per capita incomes in a country does not necessarily equate to a rise in *living standards*. A recent publication by the UK’s Overseas Development Institute (2010) noted the importance of economic growth in the achievement of the Millennium Development Goals (MDGs), but

⁴ Equivalent to approximately \$2.09 USD per day or \$763 per year, as at February 2011 (McMahon, 2011).

argued that without effective government redistribution of the gains from growth – through the tax system and publically funded investments into health, education and social welfare – this may never equate to improvements in living standards for the majority of the population. We pick this notion up again in chapter 4. Barro and Sala-i-Martin do note, however, that the regions with highest growth had the most successful reductions in poverty rates.

On the whole we have seen an overall, yet regionally diverse, rise in per capita incomes. In some cases this has led to a rise in living standards, but in others this has not been so. Mauritius and Tunisia stand out as high achieving non-OECD countries where the benefits of rising GDP per capita have been widely shared among the population.

2.1.2 The role of trade, particularly exports

Returning to the theory, it is worth exploring in more detail the ways in which exports – the main focus of this study – are believed to influence economic growth. Of course, in one sense exports will always contribute to aggregate output since they are one component of it, but there is reason to believe that they stimulate growth in aggregate output beyond their own direct contribution. One of the earliest comprehensive accounts of these possible externalities is Emery (1967), where the author separates the impacts of exports into primary and secondary effects. One thing clear from this discussion is that there are strong reasons to believe that exports may have a strong positive impact on aggregate output.

The first of these is the increased capacity to purchase imported goods that export earnings provide (often known as a loosening of the foreign exchange constraint). In this sense, exports allow a country to make the most of the international division of labour to purchase imported goods using a lower input of labour and capital than they would otherwise be able to – and in some cases even purchase goods which aren't available domestically. The impact is even more pronounced where the imports are capital goods that directly impact on domestic production, and Krueger (1998) suggests that growth in developing countries may even be contingent upon greater access to these goods. Secondly, productivity improves as a rise in exports allows the

economy to specialise in sectors where it enjoys a comparative advantage and trade for other goods it requires. Thirdly, increased exports effectively enlarge the market in which domestic firms operate, allowing them to take advantage of economies of scale. Again, Krueger proposes that the benefits of access to a larger market can be more pronounced in developing countries because of significantly lower domestic incomes. Fourthly – relating to trade in general – increased exposure to foreign competition breeds efficiency in domestic firms as they strive to compete in world markets. A fifth direct effect, which Emery excludes but can be found in Balassa (1977), is a contribution to increased employment in countries with surplus labour. In themselves, these direct benefits can be significant.

Emery also suggests that the less obvious *secondary* benefits are substantial. The first of these is an increased investment in export industries as well as the ancillary and supporting industries that are closely associated with them. This investment may be domestic or foreign, the latter being more likely with the presence of large multinational firms. The second is increased consumption due to what Emery terms the *demonstration effect*. Through increased trade, consumers are exposed to a world market with a greater variety (and possibly quality) of goods, which encourages them to consume more and consequently stimulates demand. The final less direct effect is that as the export sector expands it encourages a flow of technological and market innovations, which eventually improve productivity and efficiency. This final notion is not given much attention in Emery's study, but was subsequently adopted in the literature by economists such as Paul Romer. Romer (1993) coined the term *idea gaps* to describe the difference in technological knowledge between the developed and developing countries and emphasised that, through trade, knowledge spillovers can facilitate significant economic growth. Overall, Balassa (1977) suggests that some of these effects – such as increased employment – will have a one-off impact on output, while others – such as technological improvements – can have an ongoing impact. So the literature provides a strong theoretical basis for what has become known as the *export-led-growth* (ELG) hypothesis.

However, it is widely believed that there is a reciprocal relationship whereby output growth also causes export growth. Bhagwati (1988) was quick to point out that unless economic growth leads to a reduction in the propensity to trade, economic growth from other factors will naturally lead to export growth in line with the growth in output. Giles and Williams (2000) also note that economic growth may lead to export growth through improvements in skills and technology and the export-inclined comparative advantage this provides the economy. This notion is now known as the *growth-led-exports* (GLE) hypothesis.

The complex relationship between exports and economic growth has become the subject of a vast array of empirical studies, which will be reviewed later on in the chapter.

2.1.3 Export processing zones

Before moving on to a discussion of the country-specific literature, it is worth briefly introducing the concept of *export processing zones* (EPZs),⁵ which played a role in both Mauritian and Tunisian development. The World Bank defines export processing zones as “fenced-in industrial estates specializing in manufacturing for exports that offer firms free trade conditions and a liberal regulatory environment” (Madani, 1999, p.5), but more generally they refer to groups of export oriented firms that are (geographically or just legislatively, as in the Mauritian case) separated from other domestic firms and subject to favourable government treatment. They offer a way to promote export development while sheltering the rest of the economy from the same liberal treatment, and where successful have been recognised as promoting foreign direct investment (FDI; Kinunda-Rutashobya, 2003), lowering unemployment (Boyenge, 2007), and stimulating development of the domestic export sector (Johansson & Nilsson, 1997). However, there is also a strong critique of EPZs in the literature, stemming from the failure of EPZ experiments in many developing countries in Africa and South America. Madani (1999) suggests that they are often far too enclave in nature, with foreign firms comprising most of the economic activity and with limited spillovers to the domestic economy.

⁵ Also known as free trade zones or special economic zones.

Wiessman (1996) argues that special circumstances led to EPZ success in the East-Asian Tiger economies, and that the concept is largely dependent on immoral labour rights exemptions. Johansson and Nilsson (1997) even suggest that the presence of EPZs has allowed governments to delay the liberalisation of the rest of the economy. The Mauritian EPZ features quite highly in the literature, but there still seems to be no consensus about its impact. Kinunda-Rutashobya (2003) hails it as a good example for other nations but questions its replicability and Sawkut, Vinesh and Sooraj (2009) undertake a cost-benefit analysis, concluding that overall the EPZ cost more to the government than it delivered to the economy in benefits. The jury may still be out with regards to EPZs, but their importance for Mauritius and – to a lesser extent – Tunisia, remains apparent.

2.2 Africa

Placing Mauritius and Tunisia in their African context requires some discussion about the continent itself. No matter how you define it, Africa has undoubtedly had the worst economic performance of any region since the industrial revolution. Low, often negative, economic growth has meant rising poverty and a divergence between Africa and most other regions. A testimony to the region's poor aggregate development is its poor score on the UNDP's human development index (HDI): in 2009 African nations constituted 29 of the 30 lowest ranked countries in the world for measures of standards of living, life expectancy and literacy.⁶ Maddison's (1995) estimates of per capita GDP suggest that even as far back as 1820 Africa was the least developed region in the world, which has continued until the present day.⁷ Moreover, the gap between Africa and the leading region grew from a factor of 2.9 in 1820 to a massive 16.2 by 1992, showing a dramatic widening of the rich-poor gap (Maddison, 1995). African nations were subject to colonial powers for many years, but even the widespread onset of independence in the mid 20th century – which initially seemed positive – didn't bring about

⁶ UNDP (2009). Afghanistan was the only non-African country.

⁷ Aside from a short period around the 1950s when Africa briefly overtook the Asia & Oceania region (excluding Australia and New Zealand)

sustained growth. Poverty, famine, disease, war and poor human development – all acutely linked to low economic development – have been more persistent in Africa than any other region. Of course, among the 53 countries of Africa there have been some exceptions to this – two of which are the focus of this study. Naudé (2010) includes Botswana, Ghana and South Africa alongside Mauritius in a comparison of what he terms Africa's *role models*. He argues that despite very different characteristics and poor initial conditions all these countries were able to achieve sustained growth through good governance and the establishment of strong institutions, coupled with the promotion of good macroeconomic and trade policies. Similarly, Ndikumana et al. (2009) include Namibia and Botswana alongside both Mauritius *and* Tunisia in a study of competitiveness, finding that good governance and transparent public institutions have been key in maintaining long term development commitments.

Relating this back to our brief discussion earlier, mainstream economic growth theory has struggled to explain the particularly poor performance of Africa. A number of cross-country studies, such as Barro (1991), Easterly and Levine (1998) and Englebert (2000), have identified a puzzling phenomenon: the presence of an unexplained dummy variable for the continent. Various justifications for this have been suggested and are worth examining to see how they relate to Mauritius and Tunisia. Acemoglu, Johnson and Robinson (2001) argue that a combination of Africa's largely tropical environment and the onset of colonialism led to the development of extractive institutions detrimental to growth. Bloom and Sachs (1998) also mention the importance of Africa's colonial legacy, along with other explanations: a heavy dependence on a narrow range of primary exports which experienced declining and volatile terms of trade; poor political and social institutions rife with corruption and instability; inward looking economic policies and a large social sector; rapid population growth and other demographic changes; and social conditions such as deep ethnic divisions and low levels of health and education. The authors argue, however, that a very important factor in African development is its "extraordinarily disadvantageous [tropical] geography" (p.211), which they estimate has been a stronger hindrance to economic growth than poor economic policies. Collier (2007) further emphasises the unusual geographic features of Africa. Collier and

Gunning (1999) also propose tropical geography and colonial heritage as issues inherent to the continent, along with low population density, a largely landlocked population and a lack of democracy in a context of extensive ethno-linguistic diversity. Interestingly, they argue that although inherent geographic issues have hindered Africa historically, poor economic policies are the chief cause of slow growth more recently. They also suggest the presence of so-called poverty traps, where poverty itself is a self-reinforcing process. This interesting and somewhat compelling notion has been explored in a more general context by authors such as Azariadis and Stachurski (2005), who argue that institutional failure can lead to an endogenous mechanism of perpetual poverty. Overall, the literature seems to suggest that historical and geographical conditions have led to the establishment of political and social institutions that are unconducive to economic development. Where better institutions have developed, economic growth has been far more prevalent. Given how difficult some of these factors are to quantify – as well as various endogeneity problems that arise in empirical applications – it is understandable that the African growth story has been poorly explained within the standard economic growth models.

We now proceed to investigate in some detail the literature relating to Mauritius and Tunisia, exploring the main themes relating to economic growth and development. We end each section by pulling together these themes into a coherent précis of the literature's current position.

2.3 Mauritius

Modern literature on Mauritian development starts with a report published by a British commission sent to Mauritius eight years before the country's independence. The Meade Report (1961) – as it is now known – famously predicted that Mauritian development was doomed by the rapid expansion of its population, which had grown at an annual rate as high as three percent during the 1950s (IMF, 2010a). The report took a Malthusian tone, stressing the

need for Mauritius to tackle its population problem first and foremost before peaceful development would be possible. Although the report has since been described by authors such as Subramanian and Roy (2003, p.4) as *famously wrong*, it highlighted the fact that the initial conditions in Mauritius at independence seemed all but conducive to growth. Aside from rapid population growth, Meade et al. (1961) described the poor prospects brought about by scarce natural resources, an unpredictable tropical climate, low income levels, a very small and isolated domestic market, lack of technical and managerial expertise, a very diverse and ethnically fragmented population and the economy's heavy dependence on sugar production. As we shall see it was later argued that some of these 'unfavourable' initial conditions were actually growth *enhancing*, but more recent authors such as Sacerdoti et al. (2005) and Subramanian and Roy (2003) have reiterated that overall Mauritius' initial conditions were highly unfavourable, and possibly even worse than the average African economy. It is hard to say that the Meade Report was entirely incorrect, because the post-independence government did eventually undertake the "great revolution in economic policies" (p.228) that the report had suggested – particularly with regard to diversifying the economy away from a reliance on sugar. Perhaps the failure to foresee what followed is a testimony to the unexpected nature of Mauritius' success. Different aspects of the Mauritian experience have been emphasised in the literature, but we will show that when consolidated they provide a reasonably cohesive argument for what drove such rapid growth.

2.3.1 Openness and Trade

Naturally, the literature has not failed to take note of the rapid expansion in exports that accompanied Mauritian economic growth. Discussion around whether this was a key engine of economic growth overwhelmingly favours the notion that exports did in fact play a large part in driving the economy forward, and many studies even assert that this is the case without venturing into a discussion. Lall and Wignaraja (1998) for example – in a study of export competitiveness – assert that "outward-oriented development has translated into a high per capita income with enviable living standards" (p.9). Similarly, Frankel (2010, p.28) claims that Mauritius demonstrates that "trade is the key to growth". This reflects a seemingly common

feeling in the literature – that exports have been a clear driver of growth in the Mauritian economy.

A number of studies look into the nature of Mauritian exports, to determine what it was about Mauritius' export strategy – if anything – that made it so successful in stimulating growth. As Subramanian and Roy (2003) emphasise, Mauritian export performance in terms of *volume* wasn't that exceptional. It was good compared to the rest of Africa, but Sacerdoti et al. (2005) suggest that it was well below the East Asian miracle economies and that trade protection remained high for much of the period post-independence. They argue that on this basis, it can't have been openness in itself that was so important, it must rather have been something unique about the Mauritian system of trade. One suggestion is that it was the differential treatment of export firms and other domestic firms that allowed the government to simultaneously achieve two development objectives: protecting domestic industries *and* promoting exports. Rodrik (1999) describes how this facilitated the development of a vibrant export sector, while maintaining the incentives and protection for the import-competing industries critical to the country's development. The government was able to do this through the policy tool of the EPZ, which itself has received significant attention in the literature. Authors like Alter (1991) have argued that the EPZ was a clear engine of growth and development in Mauritius, and Woldekidan (1994) goes so far as to claim that the EPZ facilitated export-led growth primarily through foreign exchange earned by exports of clothing. Subramanian and Roy (2003) consider this *heterodox opening* phenomenon to be the most convincing explanation for the apparently strong impact of exports on economic growth, although Sacerdoti et al. (2005) argue that the explanation is incomplete, since the effective subsidy to firms with an EPZ certificate didn't fully offset the anti-export bias of trade protection.

The other suggestion is that there was something particular about the nature of FDI into Mauritius that meant it was especially conducive to the transfer of ideas and technology – more so than FDI into other countries. Romer (1992) has argued that Mauritian success was largely

based on the importation of ideas through foreign investment, and that this was a result of the attractive climate created by the EPZ. Subramanian and Roy (2003) play down Romer's argument, noting that as a result of high domestic savings the Mauritian EPZ had an unusually significant local presence, and that the policy of supporting an EPZ was not unique to Mauritius. However, their arguments are not complete either. As Ancharaz (2003) argues, although the volume of FDI into Mauritius was relatively small, the *nature* of this FDI was such that it still had a significant impact on the international flow of ideas and technology. Ancharaz emphasises that FDI into Mauritius was largely from east-Asian countries like Hong Kong, with the purpose of circumventing textile trade quotas that had been reached domestically. As such, the investments were far from passive and brought with them a wealth of technical know-how, managerial skills, entrepreneurship and technology which were subsequently transmitted throughout the Mauritian economy. Although there is some debate on this, it seems that since Mauritius was a developing country far from any production technology 'frontier', the improvements in technology and organisation brought about by increased foreign investment in the export sector could well have had a substantial impact on the overall economy. Certainly, the empirical literature on export-led growth has found support for the notion that increased openness caused increased growth. Durbarray (2004) finds that exports seem to have caused growth – particularly tourism – and Mukungu (2008) also finds evidence that exports have caused growth (and vice versa). This will be discussed in more detail later in the chapter.

Ndikumana et al. (2009) and others have suggested that the structural transformation and diversification of the economy – largely through diversification of the export sector – was also crucial for Mauritian development. Meade et al. (1961) noted the perils of remaining a monocrop economy and relying on exports of sugar to finance imports of goods as vital as food. Through incentivising the export of textiles and other manufactured goods, Mauritius was able to develop additional sectors and protect the economy from the instability inherent to a reliance on sugar. Ancharaz (2003) is probably correct to assert that the narrow focus of FDI held back diversification for many years, and others – such as Lall and Wignaraja (1998) – have noted the need to continue diversification, but given the economy's initial position Mauritius

has done remarkably well at diversifying over the years. Sacerdoti et al. (2005) describe how the economy grew through a sequence of leading sectors to eventually become an economy based around five key sectors: sugar, textiles, tourism, financial services and (more recently) ICT. It is interesting to note that all five of these sectors are largely export-based, which demonstrates the important role that exports and trade had to play in the structural transformation of the Mauritian economy. The authors suggest that this diversification in turn strengthened Mauritius' external position, so the relationship between exports and diversification may well be reciprocal.

However, even if Mauritius' export strategies can be identified as the set of policies that led to rapid economic growth, is this enough to explain why Mauritius did so much better than other countries who attempted similar things? Is there a deeper explanation as to why these policies seem to have been so successful? It has been suggested by authors such as Kinunda-Rutashobya (2003) that the socio economic and political environment was instrumental in the success of Mauritius' openness strategy, and it is this wider context to which we now turn.

2.3.2 Institutions

There is a strong argument in the literature that institutional quality may be the underlying reason why the Mauritian development strategy was so successful, and as Subramanian and Roy (2003) suggest, the high quality of Mauritian institutions is indicative of the important role they played in economic growth. Authors such as Ndikumana et al. (2009) have stressed the same. They argue that the functioning of the market in Mauritius is underpinned by sound state institutions; highlighting the country's strong and transparent public institutions, its judicial independence and its well protected property rights.

The main argument in the literature is that the high quality of Mauritian institutions *facilitated* growth. This is not to say that they *caused* growth, but rather they provided an environment that allowed for the successful implementation of growth-causing policies and ensured that gains from growth were not misspent. According to Kiiza (2006), strong institutions provided a

context for successful developmental nationalism. As in many other African countries this involved the heavy influence of the state in economic affairs, but while in most this led to corruption and cronyism, in Mauritius a strong institutional environment translated state involvement into what Kiiza terms *durable developmental dividends* (p.16). Frankel (2010) and Sacerdoti et al. (2005) underline this, arguing that successful interventionism would not have been possible without such high quality institutions and political processes. As an example, Sacerdoti et al. discuss the government's wise use of sugar rents, noting that while many other African countries overexploited their most abundant resources, Mauritius protected and nurtured the sugar sector – protecting landowners' rights, providing a relatively extensive crop insurance system and skilfully entering into favourable international trade agreements. The EPZ is hailed by the authors as another example of institutional quality and effective management.

Subramanian (2001) suggests that the stability of the Mauritian economy over the years has also been largely the result of the country's strong institutions, finding evidence in the ability of successive (and politically different) governments to tackle domestic macroeconomic imbalances in the early 1980s. He argues that an environment of participation and transparency created good early warning signals and feedback mechanisms that helped prevent further crises. Similarly, the African Development Bank (ADB; 2009) has suggested that this is what put Mauritius in such a strong position in the wake of the more recent global financial crisis. Of course the impact of high quality institutions is very closely linked to that of good governance and visionary leadership – which Mauritius has undoubtedly enjoyed over the years. The literature acknowledges that the country's political leaders have followed a long-run, holistic view of development, and the fact that this has been constant during a number of governing parties is considered to be a testimony to the country's strong economic and political institutions. The origin of this strong institutional arrangement is not within the scope of this study, however Frankel (2010) provides some insight here. He argues that good choices around the time of independence set the country into a virtuous circle of institutional development,

and that the lack of any indigenous ethnic group delivered the country from conflicts common to such countries.

2.3.3 Exogenous Factors and ‘Luck’

Despite bleak initial conditions, it would certainly be wrong to ignore that Mauritius has greatly benefitted from positive exogenous influences over the years.⁸ Three positive exogenous influences feature in the literature, although the third only subtly. The first is the preferential trade access to the sugar and textiles markets that Mauritius enjoyed for many years. Sacerdoti et al. (2005) describe how in 1975 the Mauritian government secured sugar quotas into the European Union (EU; formerly the European Economic Community; EEC) at prices which, as it eventuated, were higher than the international market price for every subsequent year except one. A number of other countries had the opportunity to undertake similar deals with the EEC but chose not to, which is a strong indication that the remarkably high sugar prices were not foreseeable and that Mauritius was in fact fortunate. Sacerdoti et al. estimate that the additional revenue from this agreement amounted to an annual average of more than 6% of Mauritian GDP from 1975-2000. They argue that this situation provided the much needed investment capital for Mauritius’ diversification. Preferential access to the textiles market came through the Multi Fibre Agreement (MFA), which both Mauritius and Tunisia were a part of until 2005. The benefits of the MFA are less obviously quantifiable – as the agreement led to increased direct investment in Mauritius from East Asia to circumvent the quotas – but according to Ndikumana et al. (2009) the benefits were substantial. While these events were largely outside of Mauritian control, the authors underline the role played by the government in taking advantage of the opportunities presented to it.

The second positive exogenous influence was ethnic diversity. The Meade Report suggested that Mauritian diversity would be a hindrance to development, as it seems to have been in a number of African countries (consider the ethnic tensions in Rwanda, Somalia or Zimbabwe).

⁸ By *exogenous* here I mean outside the direct control of the government.

However, Subramanian (2001; 2009), Frankel (2010) and Subramanian and Roy (2003) argue that quite the opposite was true – ethnic diversity was beneficial to Mauritius. Subramanian (2009) goes as far as to suggest that the consequences of diversity largely explain the portion of growth that has previously been unexplained in typical cross-country growth regressions. Each of Subramanian's papers suggest that ethnic diversity had *three* particular benefits. Firstly, as Mauritius had no truly 'indigenous' inhabitants, the diverse population provided good external business and social links – particularly to Asia – and these facilitated the flow of investment and ideas. Secondly, diversity combined with other factors led to the preservation of the sugar industry, the country's cash cow. The separation of economic and political power – the former lay in the hands of the French minority for historical reasons while democracy gave the latter to the Indian majority – meant that the sugar industry was cultivated and not over-exploited. A balance was struck whereby ownership rights stayed with the French, who allowed a small tax to be levied on sugar rents in return. As we have already mentioned, tax revenues from this sector remained central to the government. It is not clear how much of this can be attributed to ethnic diversity versus the institutional environment but Subramanian and Roy highlight the probable existence of a strong endogeneity between these two factors. That ethnic diversity hasn't produced the same results in other countries does somewhat temper how much we attribute to this, however.

Although it is not so overtly discussed in the literature, the timing of Mauritius' development may be considered a third positive exogenous factor. As Subramanian and Roy (2003) note, the trading environment early in the country's development was much more favourable due to various international agreements and Mauritius was able to diversify its economy into new profitable sectors as they emerged. To some extent this was not solely an exogenous factor, however, as the government made a conscious and focussed effort to promote and develop newly emerging sectors.

2.3.4 A Consensus?

Overall, the literature certainly seems to endorse Mauritius' export development strategy as a key cause of its rapid and sustained economic growth. It is clear however, that although the country's export policies were effective, their successful implementation was largely due to the context in which they were undertaken. The most widely endorsed reason for this favourable environment is the strong social and economic institutional framework that existed in the country at the time, and which continued to develop alongside the economy. But even the environment created by Mauritius' institutions is not a complete picture of what took place. It seems that historical and exogenous factors such as the country's ethnic makeup and the trading arrangements it was offered played a significant role in the development of Mauritius. Translating these positive circumstances into sustained, equitable economic growth and development, however, clearly required a more complex combination of factors – foremost among them institutions and trade policies. Overall the literature does attribute Mauritius' rapid economic growth to its export and trade policies, but only once we take into account this exceptionally favourable environment. This will be important to bear in mind in later chapters, when we empirically test the relationship between exports and growth.

Health and education have received less attention in the literature over the years, and have certainly not been credited with driving Mauritian development to the same extent as exports. This is interesting given that, according to Ndikumana et al. (2009), education was one of the main determinants of TFP gains from 1960 to 1990, and the general level of both health and education among the population grew rapidly – as we shall see in the next chapter. Frankel (2010) attributes some success to education, but this is overshadowed by the praise given to exports. This may be because investments into these sectors were in fact made possible from the economic gains already being made, but it seems likely that even if health and education improvements didn't *initiate* Mauritian economic growth they may well have driven it forward in later years.

2.4 Tunisia

Unlike Mauritius, the literature claims that aside from political instability, conditions in Tunisia at independence were relatively conducive to growth. Morrison and Talbi (1996) argue that by the end of the 1950s Rostow's famous *preconditions for growth* had all been met: Tunisia had a relatively modern administration, there was an independent government and a sense of national identity, there was sufficient modern infrastructure and institutional framework and the agriculture sector was partially modernised and oriented towards exports. This view is perhaps overly optimistic, given the political instability at the time of independence and the resulting difficulties.

Although most of the literature focuses on the country's rapid growth in per capita incomes, many authors stress that Tunisia's development was far more than just economic – it included an equally remarkable social and cultural dimension. Authors like Morrison and Talbi (1996) note that many of these great developmental achievements are not portrayed in income statistics; like the elimination of extreme poverty and widespread improvements in gender equality. Despite such rapid economic and social development, the literature generally regards Tunisia's development experience as far from perfect. Boughzala (1995) notes that reforms were implemented far too slowly, and other authors highlight the burdensomeness of the government during the socialist period of the 1960s and periods of macroeconomic instability. Although these mistakes made Tunisian economic growth relatively less stable than in Mauritius, Morrison and Talbi (1996) argue that mistakes were consistently overcome and learnt from, so that the long-term impacts on growth were tempered over the years. There are a number of explanations for the country's success, but as with Mauritius we will demonstrate that when consolidated they put the success of export policies into context and provide a reasonably cohesive picture of what was driving Tunisian growth.

2.4.1 *Openness and Trade*

Trade and export policies feature highly in the literature on Tunisian economic development, and there is some suggestion that exports were more important for growth during particular periods. Ghali and Mohnen (2004) argue that from 1971 to 1986 exports became a key driver of the Tunisian economy, initiated by the passing of new laws giving special advantages to exporting firms in 1972. Interestingly, Bechri and Naccache (2003) suggest that this special export focus may have been inspired by Mauritius – where the EPZ initiative was just beginning to realise some success. Morrison and Talbi (1996) claim that exports became even more important from the mid-1980s, demonstrating that exports outstripped domestic demand between 1986 and 1991 and positing this as clear evidence of “export led growth” (p.75) over this period. There are a limited number of studies where the export-led growth hypothesis has explicitly and solely been tested for Tunisia, and these have tended to find evidence for a bi-directional relationship: exports cause economic growth, which simultaneously causes growth of the export sector. This is the case in both Ghali (2000) and Hachicha (2003), which will be examined in more detail later in the chapter.

Comprehensive explanations for this apparent relationship between exports and economic growth in Tunisia are less prevalent. Morrison and Talbi (1996) find evidence that domestic total factor productivity was significantly associated with productivity increases in the most advanced economies, attributing this to Romer-type technology spillovers. They run a series of regressions and find that the only significant means of technological transfer was through the importation of capital goods, which is to be expected given that Tunisia has typically relied on imports for almost all of its capital goods. Although this may seem like evidence that openness in general affected growth, it was the foreign exchange earnings of the export sector that essentially made these imports possible. The literature also highlights the relationship between exports and the diversification of the Tunisian economy because – as Balamoune-Lutz (2009) notes – the government pursued export diversification as part of an overall strategy to diversify production. Ghali and Mohnen (2004) argue that one of the government’s key priorities was the structural reform of the economy and that this was an important factor in enhancing the

economy's competitiveness. Balamoune-Lutz (2008) examines the long-run relationships between these factors and finds a significant relationship between diversification, openness (trade as a percentage of GDP) and FDI, indicating the importance of the export sector in Tunisia's diversification process.

2.4.2 Investment

Because of a lack of private domestic savings, the literature argues, a substantial level of investment in Tunisia came in the form of FDI. Chemingui and Colton (2005) describe how the government provided investment incentives as early as the beginning of the 1970s, focussing on those firms whose investments were partially or entirely export oriented. Balamoune-Lutz (2009) suggests that the resulting FDI flows were significant, and supported and encouraged the country's diversification largely through the export sector. Ghali and Mohnen (2004) claim that the association agreement with the EU – primarily formed in order to increase trade in manufactured goods between Tunisia and the EU – led to a large investment into the Tunisian economy. Exports, therefore, played an important role in promoting foreign investment in Tunisia.

The other major contributor to domestic investment was the government; and the impact of government investments on Tunisian growth is prevalent in the literature. Ghali and Mohnen (2004) claim that high growth in the socialist period of the 1960s was *driven* by public investments in basic infrastructure – setting the foundations for the economy (albeit at a cost of rising public debt). They claim that this tended to take the form of specifically 'public-natured' investments that would largely contribute to growth only in the longer-term, like basic infrastructure and the promotion of human capital. In line with this, Morrison and Talbi (1996) argue that much of the government's spending was into infrastructure and that this further contributed to growth by driving a rise in TFP and encouraging private investment. They claim that approximately half of Tunisia's growth from 1960 to 1996 can be attributed to capital accumulation, and that in some years more than half of this was due to public investment. Public investments were high even after the socialist period had ended, although authors like

Pfeifer (1999) argue that it was really in the earlier years after independence that Tunisia experienced public-investment led growth; after the IMF-imposed structural reforms other factors became increasingly important. Overall, Morrison and Talbi argue that investment was the principal factor of GDP growth up to at least 1996, primarily through a rapid expansion of the capital stock.

2.4.3 Social Policy

Although it has tended to take a backseat in the literature on Mauritius, the literature on Tunisian development features social policy as a fundamental driver of the country's rapid economic growth. Ghali and Mohnen (2004) discuss the specific measures introduced to combat poverty – including public works programmes, food subsidies, housing rehabilitation schemes and housing finance subsidies – and they argue that these have cut the poverty rate dramatically, from 21.9% in 1975 to 4.2% in 2000 (p.24). Of all the social policies, education is particularly prominent in the literature. Boughzala (1995) considers human capital accumulation to have been one of the key factors in achieving competitiveness and this is reinforced by Morrison & Talbi (1996), who find that education accounts for two-thirds of the increase in TFP from 1960-1995. They state that education “had a direct, favourable impact on the efficiency of the economy” (p.52). Ghali and Mohnen argue that education was one of the country's most important areas of development, not just in the way it made the workforce more productive but also in terms of reducing poverty.

A related aspect of Tunisia's social policy which is particularly emphasised in the literature is the empowerment of women – partly through greater access to education but also through direct legislation to combat gender inequalities. The main way this is thought to have contributed to economic growth is through population growth rates, which fell rapidly as a result. Balamoune-Lutz (2009) claims that these falling growth rates explain much of the country's exceptional growth in per capita income; higher incomes then reinforced the effect through even better access to education and increased female participation in the labour force. Bechri and Naccache (2003) describe this phenomenon as a virtuous circle, which contributed greatly

to Tunisia's economic growth. According to Ghali and Mohnen (2004, pp.35-36) the lowering of population growth to 1.2 percent increased annual income per capita growth by 2 percentage points, while also enhancing income equality and contributing to social stability.

This emphasis on social policy has also had an impact on growth through other channels. Boughzala (1995) argues that it was largely public schooling and health improvements that led to a more equitable distribution of income and the establishment of a significant middle class. This demographic provided an important pool of skilled labour, entrepreneurs and managers, and according to the author was "obviously a major asset and a source of growth" (p.2). Ghali and Mohnen (2004) also underline the importance of the middle class for Tunisian development. Balamoune-Lutz (2009) suggests that social policy played an important role in enabling the diversification of the export sector and overall economy, and that it also made the labour force more productive. Ghali and Mohnen go so far as to claim that two of the four main factors behind the positive performance of the economy were the priority given to social policy and the slowdown in population growth, although it could be argued that the latter is a result of the former. From existing literature it seems, therefore, that social policy played an important role in Tunisian development.

2.4.4 Institutions and Governance

As with Mauritius, the literature recognises the importance of institutions and governance in the Tunisian success story. A relatively strong institutional framework is considered to have provided the favourable context for Tunisia's growth-enhancing policy initiatives, although there is also an appreciable focus on the political will of the government to push forward a developmental agenda. Morrison and Talbi (1996) note the importance of those such as the *Banque Centrale de Tunisie* (the Central Bank of Tunisia (BCT), est. 1958) in semi-autonomously advising the government and providing a public check of the government's decisions, as well as encouraging the financial development of the economy. Boughzala (1995) asserts that the country's institutions helped it undertake a smoother transition and integration into a new international environment, and were fundamental in helping to achieve competitiveness. He

and others accept that while the Tunisian institutional arrangement was better than in many surrounding countries and certainly improved, it was never outstanding. Ghali and Mohnen (2004) argue that although a number of institutions have been established or enhanced over the last few years, measures of institutional quality still rank Tunisia fairly modestly. The Arab World Competitiveness Review (2010) of the World Economic Forum (WEF) is more positive – it claims that “the country’s efficient government institutions remain its main strength” (p.16), highlighting factors such as public trust of politicians and strong property rights. This is interesting given that public *distrust* of politicians seems to have been at the heart of recent protests. Governance, however, still features highly in the literature.

In terms of what Balamoune-Lutz (2009) calls ‘democratic institutions’ or ‘political institutional quality’ the author describes Tunisia as weak, but Ghali and Mohnen (2004) claim that authoritarianism was seen as necessary for the creation of a strong, independent state. This is common to the MENA region according to Murphy (1999), and in fact the literature claims that strong governance played a major part in pushing forward the Tunisian development process. Balamoune-Lutz (2004) suggests that it was due to a strong resolution that the Neo-Destour – the initial ruling party – was able to neutralise the competition between powerful interest groups that would have held back successful implementation of reforms; something which Boughzala (1995) also emphasises. Similarly, Ghali and Mohnen (2004) argue that it was the *political will* to modernise and develop the country that allowed it to successfully carry out significant reforms in the face of challenges. They suggest that the public sector’s management has been of central importance to the economy, aside from the direct effect it has had on employment. The change of governance as part of the reforms in 1987, and the way in which economic growth subsequently picked up, is an indication of the importance of governance in Tunisia’s growth process. The literature suggests that other policies – such as those around openness, diversification and social welfare – may not have succeeded without such strong governance. This is interesting in light of recent events and the unknown impact they will have on the structure of the country’s government.

2.4.5 Exogenous Factors and ‘Luck’

Tunisia has also benefitted from factors outside of the government’s control. Ghali and Mohnen (2004) suggest that although the country is not particularly resource-rich, it has benefitted from a significant oil output since independence, particularly during the 1970s and 1980s. Balamoune-Lutz (2009) notes that the climate is especially good for tourism and agriculture. She notes too that the country’s location has been an important enabler of trade and FDI with the EU, particularly France and Italy. Ghali (2000) goes even further, highlighting the wealth of technical support and increased market access for agriculture and services that trade with the EU has facilitated. Finally, the literature notes that the country has been the recipient of a significant amount of international assistance, not only from the EU but also in terms of loans and advice from the World Bank and IMF – much of which went directly into economic and social programmes. On the whole, exogenous factors seem to have had a positive influence in Tunisia, although arguably less than they did in Mauritius.

2.4.6 A Consensus?

The literature emphasises the complexity and dynamism of the growth process in Tunisia. Exports certainly feature heavily and are often heralded as the cause for such rapid economic development through impacts on technology, competitiveness and diversification. Undoubtedly, investment has also been a crucial factor. But the literature makes it clear that there was a strong two-way relationship between investment and the development of exports, and that public investment – particularly in basic infrastructure – was a key facilitator. The social nature of Tunisia’s development has had important implications for Tunisian society. Aside from its direct contribution, it facilitated increases in productivity and efficiency and provided skilled workers for the newly developing export sectors. As Ghali and Mohnen (2004) make clear, “while growth and poverty reduction in Tunisia were driven largely by the economic reforms of the late 1980s, they were augmented and reinforced by the pursuit of economic and social policies that focused on improving individual and collective welfare, especially in education, health, and social assistance” (p.2). Institutions were developed

enough to allow for the smooth structural change and opening of the economy, but it seems that strong governance and visionary leadership – albeit authoritarian – was the key underlying factor in the success of development policies. The country benefitted from a number of exogenous factors, which may have reinforced a dependence on the export sector. Overall the literature suggests that although there is a good case for the export-led growth hypothesis in Tunisia, we must appreciate the context and acknowledge that there is a much stronger emphasis on social policy than there is in Mauritius. This will be important to remember when we empirically test the relationship between exports and growth in later chapters.

2.5 Empirical Export-led Growth Literature

Earlier in the chapter, we discussed the theoretical reasons why exports might encourage economic growth. In this section, we look at the empirical literature which has tested the validity of this claim. The literature is extensive – hundreds of studies have tested the Export-led Growth Hypothesis (ELGH) across different countries and time periods, using various data transformations, disaggregations and methodologies. Only a concise overview is possible here, but after a brief background discussion we will look at some of the specific studies on Mauritius and Tunisia in more detail.

The earliest empirical literature to explicitly test the relationship between exports and output used cross-sectional data and generally examined rank correlation coefficients. It soon moved on to simple cross-sectional regressions, where export and output data were included for a multitude of countries. The results of these early studies found overwhelming evidence in support of the ELGH even after various other factors were added as explanatory variables (such as capital formation and the size of the labour force). There was a common misperception as to the ability of these studies to identify *causal* relationships, however, and even though they found evidence for nothing more than statistical association between the variables they typically claimed to support the notion that exports were causing growth. From the early

1970s, the empirical literature began to appreciate the nature of time-series data in allowing for an examination of *causality*, rather than just association. Granger's (1969) work introduced a test for a notion of causality in time series data, by suggesting that because *cause* must necessarily come before *effect*, *predictability* and *causality* are very closely aligned. Granger asserted that if one variable's values in the previous period(s) could help predict the value of another variable in the current period, then this predictability could be interpreted as evidence of a causal relationship. While there are obvious limitations to this approach – foremost among them the fact that although causality implies predictability, the reverse is not always true – Granger's approach provided a way to very simply test for causality where all that had gone before had been limited to statistical association.

The ELG literature jumped on the Granger-causality methods and the focus quickly shifted from cross-sectional to time-series studies. Perhaps spurred on by the successful export-led development strategies of a number of East-Asian economies, the 80s and 90s became the 'golden years' for export-led growth literature and studies of ELG began to fill journals. Unlike their cross-country predecessors, these studies struck contrasting results – sometimes finding evidence of ELG, but just as often finding evidence for GLE, bi-directional causality or no causality at all.

There were still major errors in much of the literature, as non-stationarity characteristics in the data series were often ignored. As Nelson and Plosser (1982) argue, the presence of non-stationary variables (commonly integrated of order 1, which is known as a *unit root*) in a regression context leads to non-standard asymptotic distributions of the resulting test statistics and renders normal hypothesis tests incorrect. In order to test for the existence of unit roots in a VAR, Dickey and Fuller (1979) suggested the use of a now-popular pretesting method that became known as the Augmented Dickey-Fuller (ADF) test. In the presence of unit roots, data series could then be converted to stationary series by means of first-differencing, which led to the use of vector-autoregression-with-differencing (VARD) models to test the relationship between exports and growth. Engle and Granger (1987) subsequently argued that in situations

where two non-stationary variables exhibit a long-run – cointegrating – relationship, the use of VARD models is also inappropriate. They provided a way to test for causality in this case, by explicitly including the long-run relationship in what became known as vector error-correction models (VECM). A few years later, Toda and Yamamoto (1995) and Dolado and Lütkepohl (1996) developed another technique to allow for non-stationarity and cointegration. They showed that augmenting a standard vector autoregression (VAR) of true order p with q additional lags – where q is the highest order of integration among the data series – and estimating a VAR($p+q$) restores the standard asymptotic distributions of the test statistics and allows for normal testing. This latter approach is much simpler, but comes at the cost of efficiency and reduces the power of such tests.⁹ The majority of modern ELG studies make use of one or the other of these two approaches in testing for Granger-causality (although not exclusively).

The wide variety of outcomes in the time series literature is ultimately reflective of the wide variety of assumptions and methods that are involved in this area of study, and in order to provide the context for the test in this study, we will examine some of these now. The first set of choices involves the form that the variables will take; which itself exhibits a wide range of variety in the literature. The very definition of “exports” and “output” are important, and these differ widely. While most use aggregate exports and GDP, GNP or some equivalent, many other papers use a more specific definition such as agricultural exports and agricultural output (Arnade & Vasavada, 1995) or aggregate output and a smaller sector of exports (Boltho, 1996). Generally the variables are included in real terms, as this controls for the possible impact of price changes on the causal outcomes. Another relatively common approach is to control for the impact of population growth by including one or some of the variables in per capita terms (Ahmad & Harnhirun, 1996, for example), although when natural logs of each variable are used – which occurs in the overwhelming majority of studies – this amounts to using population as a regressor with restrictions on the coefficients and creates difficulties for interpretation. Natural

⁹ Studies have shown that in higher-order systems (where p , the order of the VAR, is larger) this loss of efficiency is relatively small. See Giles and Williams (2000, pp.276-277).

logs make sense in a linear regression if we consider the relationship between unlogged variables to follow some multiplicative (e.g. Cobb Douglas), rather than linear, form. Although in itself the choice of the form of the variables differs widely, there are a number of other differences between the studies. Firstly, the time period and observation frequency vary widely – usually due to data availability. Most studies tend to look at the longest range of data possible, but even small variations in time period can alter the conclusions of causality tests. While most studies tend to use annual data, the use of more frequent data – quarterly or even monthly – also takes place. The latter encounters a new issue of seasonal adjustment, which provides more potential for divergent results. And while many papers include only exports and GDP, more recent studies tend to include other possible explanatory variables in multivariate regressions – which Lütkepohl (1982) argued can have significant impacts on causality outcomes.

Moving beyond the initial choice of variables and the form that they take, there are still a wide variety of approaches employed to test for causality. Of the different methods used to test for integration the ADF test is most common (which in itself involves decisions around the inclusion of deterministic trend terms and lag length), though when a structural break is present the test of Phillips and Perron (1988) is sometimes employed (Cheng & Chu, 1996, for example). The choice of lag length in the time series studies is also important to the causality result. Although some of the literature chooses lag length arbitrarily, the general method is to employ some sort of lag selection method – the most common being Akaike's Final Prediction Error (FPE), the Schwartz Information Criterion (SIC), the Hannan-Quinn Criterion (HQ) and the Akaike Information Criterion (AIC). Thirdly, the form of model used to test for causality is important, and exhibits wide variation in the literature. Perhaps the most common approach in the presence of significant cointegration is to use the VECM, but there are a number of modern studies which make use of the Augmented Lags (Ozturk & Acaravci, 2010, for example) or other approaches.

So this (brief) discussion underlines the lack of consensus as to how best to test for the impact of exports on growth. The wide variety of approaches and outcomes – many of which are documented in Giles and Williams (2000) – shows that these decisions are important, and yet most papers fail to adequately test for the robustness of their results. The ease with which one can adjust these assumptions and methodologies in order to obtain a pre-specified causality result should warn critical readers of the fragility of ELG conclusions. The literature demonstrates the importance of pre-determining the most appropriate methods, and then experimenting with changes to key assumptions in order to be transparent about the robustness of the results.

Before we move on to some of the specific studies, it is worth briefly considering a number of newer or less widely applied approaches in the literature. Sims (1972) took Granger's notion of causality one step further, suggesting that for unidirectional causality to run from an exogenous variable (or variables) to an endogenous variable, a regression of the endogenous variable on past, current *and future* values of the exogenous variable must find zero coefficients on the future values. The idea behind this is that future variation cannot impact on the past. This approach has been used in some studies – such as Chow (1987) – but it is not nearly as common as the Granger approach which, according to Ahmad (2001), is known to perform slightly better. Two other approaches are not to conduct formal coefficient tests to identify causality, but rather to examine forecast error variance decomposition or impulse response functions based on estimated models. These methods can also be used to determine causal relationships, although Giles and Williams (2000) suggest that there are complications to the application of either approach. A number of older cross-sectional studies – Ram (1987) for example – find that the impact of exports on growth may be subject to threshold effects. Although interesting, this notion does not find strong support in the literature despite the use of threshold regression techniques in newer studies such as Foster (2006). Finally, there is a field of literature which examines the impact of *imports* on output growth (see Awokuse, 2007, for example). While imports are an equally legitimate measure of an economy's openness,

import-led growth is not as attractive a focus as export-led growth since governments have less direct influence over a country's imports.

2.5.1 Africa

A number of studies over the years have examined the ELGH for the case of one or more African countries, and we will examine some of these briefly here. Africa has been examined as a sub-set containing many of the world's Least Developed Countries (LDCs) in a number of cross country studies, such as Fosu (1990). In this study, the author uses pooled data in a cross-sectional, rather than time series, fashion and concludes that although the 28 African countries seemed to benefit less from export growth than other LDCs from 1960-80, the difference is insignificant. This methodology is common to a number of similar studies (see Mbaku, 1989, for example), but is somewhat redundant given the critiques of cross-country studies discussed earlier. Amoateng and Amoako-Adu (1996) also undertake a study of African countries, arguing that external debt servicing may have a significant effect on the causality between exports and economic growth. In light of this they conduct a trivariate analysis for 35 African countries and conclude that for sub-Saharan Africa, middle income Africa and low income Africa there is evidence for both ELG and GLE over the period 1971-90. Unfortunately, although Granger-causality tests are employed, the paper's methodology is not entirely transparent.

Of course, there have also been a number of single-country time-series studies undertaken for African countries, and these have found mixed results. There are many ELG studies, but there are also some interesting ones which take a slightly different approach. Nicita (2008) looks at the presence of export-led growth in Madagascar, with particular focus on the textile export sector and its impact in the reduction of poverty across the island. Using data from household surveys in an econometric and micro-simulation exercise, the author finds that growth from the textile sector did reduce poverty but at the same time caused an increase in income inequality. Although the methods are different to those employed here, this demonstrates that other interesting and relevant approaches exist in the literature.

There are a small number of studies which have exclusively examined either Mauritius or Tunisia, and we will now look at these in some detail.

2.5.2 Mauritius

Formal tests of the ELGH are relatively scarce for Mauritius, despite its strong export-based growth strategy. Perhaps the only directly comparable study is Mukungu (2008), where the causal relationship between real exports and GDP in Mauritius is examined using annual data from 1970 to 2004 and including – although with limited justification – three additional explanatory variables: real terms of trade, gross fixed capital formation and the US index of industrial production as a proxy for foreign output shocks. Data for this five-variable model comes from the IMF's IFS database, but it is unclear where the associated price index or indices come from. Although the author uses the Johansen and Juselius (1990) technique to identify the presence of cointegrating vectors between these variables, he does not proceed with a VECM framework. Rather, after pre-testing for the maximum order of integration for these variables in natural logs using the ADF and Phillips-Perron tests and determining the appropriate lag-length of the associated VAR using the AIC, HQC and SIC, he then applies the augmented-VAR method of Toda and Yamamoto (1995) to explore the Granger-causality results. The tests for both a long-run relationship and short-run causality are inconclusive – they suggest that there is a bi-directional causal relationship between export growth and output growth. The paper was published as part of the proceedings from a conference on African business and development, and lacks any practical or useful conclusions other than highlighting the need for more rigorous analysis.

The only other study to take a similar approach also tests the impact of disaggregated export sectors, focussing on tourism. Durbarray (2004) first examines the case for ELG in Mauritius over the period 1952-1999, undertaking all the necessary pre-tests for stationarity and cointegration and then estimating the bivariate relationship between the natural logs of output growth and export growth in a VECM framework. Using Granger-causality techniques, he finds evidence for a one-way causal relationship from export growth to output growth, suggesting that “exports

have been the engine of growth over the past few decades” (p.398). Following this, the author disaggregates exports into three sectors – sugar, EPZ exports and tourism – and explores the possibility of tourism-led growth (TLG) from 1970-99. Although cointegrating relationships are found, Granger-causality tests are not performed due to the limited availability of disaggregated data. Looking at the long-run relationships, however, Durbarry finds evidence consistent with a positive impact from all three export sectors on growth – estimating elasticities of 0.4, 0.5 and 0.8 for sugar, manufactured goods and tourism, respectively. The paper’s conclusion is that although these findings cannot be generalised, they indicate the potential of tourism in enhancing economic growth.

Aside from these studies Mauritius is also included in a number of multi-country studies, the results of which tend to vary. An example of these is Love (1994), which examines twenty developing countries and finds no causality between exports and growth in Mauritius from 1960-90. Neither these exclusively Mauritius studies nor the multi-country studies include any comprehensive robustness checks, however.

2.5.3 Tunisia

There is a similar dearth of empirical ELG studies which focus exclusively on Tunisia. The earliest such study is Ghali (2000), in which the author undertakes a bivariate analysis using real, natural-logged annual data on aggregate exports and GDP over the period 1963-1993. Both variables are pre-tested for unit roots using both the ADF and Phillips-Perron stationarity tests. Using the VECM framework with lag lengths determined by the FPE and cointegration tested for using the Johansen Juselius method, the author tests for Granger-causality and finds bi-directional causality in the long-run error correction term – indicating a stable long-run relationship – but no causality in the short-run. As this could be interpreted as evidence for either ELG or GLE, the author then undertakes a variance decomposition and finds that economic growth is more responsive to export growth than vice versa, indicating stronger evidence for the ELGH. The author’s overall suggestion is that export promotion in Tunisia has been – and will continue to be – a successful policy towards achieving higher rates of economic

growth. Although Ghali claims that the results are robust, there are no tests for the sensitivity of the results to the inclusion of additional variables, the form of the data or a number of other key assumptions.

The other study which looks exclusively at export-led growth in Tunisia is Hachicha (2003). In this case, the author uses a slightly longer dataset with annual data from 1961-1995 and undertakes a disaggregated analysis of the impact of different export sectors. The three export sectors included are manufacturing (including textiles, clothing and leather, mechanical and electrical and fertilisers), food processing and tourism. The methodology is more complex than the standard approach as the author constructs a series of VECMs based on an underlying neo-classical export-augmented production function and export market equations. All variables are logged and then pre-tested for unit roots using the ADF or Phillips-Perron tests, cointegrating vectors are determined by the Johansen-Juselius method and the order of each of the VECMs is determined by the AIC. Hachicha finds a significant total export elasticity of growth of 0.32, and that the contributions of the disaggregated sectors are 0.37% for manufactured exports, 0.14% for tourism and only 0.03% for food exports. The author concludes that the study finds support for the ELGH. However, he also notes a significant impact of GDP growth on export growth that would be consistent with the GLE hypothesis. The author's methods are not entirely clear: Granger-causality has not been directly tested for in the short-term coefficients and the significance of the error-correction terms appears to be the only indication of any form of causality; the other results being limited to statistical association. It is also unclear how robust the results are to various assumptions.

A third study looks more specifically at the impact of international tourism on economic growth. Cortés-Jiménez et al. (2011) – in a similar fashion to Durbarry (2004) for Mauritius – examine the case for TLG in Tunisia over the period 1975-2007. In addition, they explicitly test for the TKIG hypothesis – which suggests that tourism causes capital good imports, which in turn causes economic growth. Using Granger-causality analysis in a VECM framework, they isolate the long-run and short-run effects of each variable (a slightly different approach to the

one we take here). They find evidence for a uni-directional relationship from economic growth to international tourism, as well as evidence to suggest that the TKIG dynamic is taking place only in the short-run. The authors argue that the insignificant impact of international tourism directly on economic growth was due to the nature of Tunisian tourism. Low-cost mass beach tourism, they suggest, is not differentiated enough from competing Mediterranean destinations to be an effective engine of economic growth. Interestingly, they suggest that more *niche* tourism – presumably such as that found in Mauritius – offers far greater potential to contribute directly to growth.

Aside from these three investigations, Tunisia is also included in a number of multi-country studies, the results of which tend to vary. An example is found in Sharma and Dhakal (1994), which includes a time series study of 30 developing countries and finds evidence for GLE in Tunisia from 1960-1988. Interestingly, this approach included labour and capital alongside exports and GDP. As was the case with the Mauritian literature, both the exclusively Tunisian studies and the multi-country studies omit any comprehensive robustness checks, however, and it seems that there is real need of a broader empirical study of the relationship between exports and growth.

Chapter 3: The Mauritian and Tunisian Economies

To set the scene for our empirical analysis, this chapter complements and deepens our comprehension of the existing literature by presenting our own qualitative examination of Mauritius and Tunisia. This allows for better understanding of the processes which were taking place in these countries and sets the wider context – something highly important in any discussion of export-led growth. We take each country in turn, presenting relevant events chronologically, then looking into certain aspects of their economies in more detail. The chapter concludes with a direct comparison of the key similarities and differences.

3.1 Mauritius

Mauritius has what Toussaint (1978, p.1) describes as a “turbulent social and political background”. Initially uninhabited, it was discovered by Arab or Swahili sailors in the 10th century A.D., before being scouted and mapped by the Portuguese and temporarily colonised by the Dutch (who named the island after their *stadthouder* Maurice of Nassau). As a small, tropical island 500 miles off the coast of Madagascar – a perfect haven for ships in the Indian Ocean – Mauritius eventually found itself in the middle of a struggle for power between the French and British, both of whom left their legacy. The French occupied Mauritius from 1715 to 1810, during which time they established ports, built roads and buildings and introduced sugarcane as an industry, heavily reliant on Creole slave labour (Toussaint, 1978). Ensuing control by the British lasted from 1810 until independence and led to even further development. The banking sector was founded, the rupee began to circulate, the sugar industry expanded greatly in response to improved terms of trade with Britain and the island’s army of Creole slaves was replaced by an even larger pool of indentured labour from India. During the latter years of British rule social and medical conditions began to deteriorate, and eventually independence was peacefully granted by the British on March 12, 1968. Despite

ending colonial ties after 150 years of British rule and with an ethnically diverse population, the newly independent Mauritius was distinctly French in culture. British government was established, but the French custom, legal system and language were maintained (Toussaint, 1978).

3.1.1 Independent Mauritius (1968-2010)

3.1.1.1 1968-1979

Upon independence, Mauritius' first Prime Minister was Sir Seewoosagur Ramgoolam, a "quiet and unspectacular" (Ndikumana, 2009, p.141) politician who managed to establish independence in a peaceful manner despite major social unrest around the country's great racial, ethnic and religious diversity. He pushed for universal health and education and a strong social security system, and began the process of modernisation. The economy of the newly independent Mauritius relied on low productivity agricultural exports of sugar and molasses, which accounted for approximately 35% of GDP and 97% of the country's total exports (Durberry, 2004), and was an inheritance from its organisation as a colonial plantation. Income and wealth were unequally distributed, domestic markets were small, there were no economically valuable natural resources on the island and it was struggling with high unemployment and falling living standards – which an import-substitution strategy in place since 1964 had failed to appease (Kinunda-Rutashobya, 2003). High population growth threatened to undermine living standards and social stability even further unless something akin to Meade's suggested "great revolution in economic policies" (Meade et al., 1961, p.228) took place.

In order to deal with this, the government did undertake a series of economic reforms. The reforms were based on partnership between private and public enterprises, with the aim of achieving capitalist economic growth and a modern welfare state. One of the key development policy tools that this involved was the creation in 1970 of an island-wide EPZ – the first of its kind in Africa – and the adoption of a more liberal FDI policy. According to Kinunda-Rutashobya

(2003), the EPZ was modelled after successful EPZ endeavours in the east-Asian miracle economies (Singapore, Hong Kong, Taiwan), and eventually led to a significant increase in FDI, manufacturing exports and trade in general. As the government's reforms led to improvements in various areas of the economy, foreign investors were attracted to Mauritius by a number of factors: a cheap, literate, bilingual, reasonably productive and disciplined labour force; the favourable market access enjoyed by Mauritian exports; a stable economic and political environment; limited bureaucracy; and a market-friendly atmosphere for business (Lall & Wignaraja, 1998). The setup of the EPZ allowed the government to retain high protection in most of the economy while greatly sheltering the export sector from the negative effects of this protection and largely offsetting the anti-export bias through it. Tax and employment rules differed between the EPZ sector and the rest of the economy, and the former employed a much larger proportion of female workers (at a lower minimum wage). This practical segmentation of the labour market cushioned the rest of the economy from rising wages in the EPZ, which would have disadvantaged the import-substituting industries that the government was simultaneously trying to promote (Subramanian & Roy, 2001).

The EPZ – which made steady but relatively slow progress throughout the 1970s – primarily comprised manufacturing enterprises and facilitated a growth of manufacturing exports from almost nothing in 1970 to 24% of total exports by 1977 (Kinunda-Rutashobya, 2003, p.229). During this time the government also promoted investment in tourism – which benefitted from various incentives under the country's first five-year development plan of 1971-1975 – and a thriving tourist sector began to emerge. Particularly successful sugar production during the 1970s coupled with a relatively small tax on sugar profits provided the government with the funds it needed to actively pursue its diversification and welfare priorities. A public works programme funded by the government strongly contributed to the twin priorities of developing the island's infrastructure and reducing unemployment, employing over five thousand people during the decade (Meisenhelder, 1997). The government dedicated a large portion of its resources to improvements in education, and from 1976 free education was universally available at the primary and secondary level. This contributed significantly to increased literacy

rates and an up-skilling of the Mauritian labour force, which was especially important given the increase in female participation. The government simultaneously prioritised health and welfare spending, providing wider access to medical care and safe drinking water and driving improvements in indicators such as life expectancy and infant mortality (Metz, 1994).

Despite this success, the 1970s were far from stable in Mauritius. The end of the decade brought a worldwide recession and falling sugar prices, and the island was hit hard by annual cyclones from 1979-1981. Falling revenues from a slumping economy coupled with continued government spending and fuel price shocks made the economy increasingly unstable and by 1979 the government's deficit had reached 13 percent of GDP (Bräutigam, 1997). The government adopted a World Bank and IMF structural adjustment package in 1979, which supplied loans to cover the state's expenditures provided that more financially conservative economic policies were adopted. These policies included reductions in welfare and infrastructure spending.

3.1.1.2 The 1980s

With the new policies of the structural adjustment programme (SAP) the government was able to rein in its deficits, but economic prosperity did not immediately follow. By 1982 unemployment was at 21% and inflation had soared to over 30% (Bräutigam, 1997, p.50). A new government after 1982 continued adhering to these policies, however, and economic growth soon returned. From 1983 to 1988 the EPZ boomed as new incentives attracted a large number of firms. This was aided by the establishment of the Mauritius Export Development and Investment Authority (MEDIA) in 1983, which had as its chief aim the promotion of good and service exports from Mauritius (Joomun, 2006). A major reason why exports so successfully contributed to the economy was that for many years Mauritius enjoyed preferential access to its two largest export markets – the EU and the US. Since 1968 the country had been guaranteed a certain volume of sugar exports at inflated prices to the European Union, which generated gains estimated at an average 5.4% of GDP per year (Subramanian & Roy, 2001, p.20). Alongside this, the Multi Fibre Agreement – which lasted

from 1982 to 2005 – imposed quotas on textile and clothing exports into the EU and US that were exhausted in other countries but not in Mauritius, providing it an advantage over countries which had lower production costs but had reached the ceiling for their exports. Firms in countries like Hong Kong invested into Mauritius to circumvent the restrictions, which boosted the country's exports further and brought rents estimated to have been over 3.5% of GDP by 1999 (Subramanian & Roy, 2001, p.21). An additional benefit to the export sector was the World Trade Organisation's (WTO) characterisation of Mauritius as a *developing country*, which exempted it from having to remove its other protectionist policies.

The extraction of enormous rents from these favourable external conditions led to high domestic savings, which financed domestic investment and turned what was initially FDI funded development into a largely Mauritian owned EPZ. It has been suggested that it was because of this large domestic presence that the EPZ remained such a stable engine of growth, particularly during episodes when FDI may have been susceptible to capital flight. Before long, a rapid economic and developmental transformation had kick-started productivity growth and a thriving manufacturing export sector had emerged, replacing sugar as the country's main export earner (Lincoln, 2006). The tourism sector also developed rapidly, its contribution rising from 1.6% to 2.5% of GDP over the decade as the government took advantage of the country's tropical island appeal to promote it as an exclusive tourist destination (Sacerdoti et al., 2005, p.7). As the economy grew, the unemployment rate fell steadily – down to under 2%. Per capita incomes improved and so did the distribution of incomes, aided by a strong social welfare system (Meisenhelder, 1997, pp.290-291). In 1989 the government established a stock exchange in Port Louis, and set up the framework for an offshore financial sector. The country's institutional framework had grown to feature a respected independent judiciary, efficient customs and port administration and other public institutions that were well-run by a capable bureaucracy under a stable democratic government (Sacerdoti et al., 2005).

3.1.1.3 The 1990s

Despite changes to the government in the 1990s, the country's leaders consistently guided Mauritius down the path of stable development and GDP continued to grow at a sustained pace. By 1990 the Mauritian EPZ had grown to incorporate nearly six hundred firms (primarily in the textile and garment industry) and employed almost one-third of the island's total workforce. Exports from EPZ firms accounted for 15% of the country's entire GDP (Meisenhelder, 1997, p.290). Over the decade the EPZ remained an important engine of the economy, although a decline in EPZ production took place as the cost of domestic labour eventually rose and Mauritian firms began investing abroad – particularly into sugar and textile manufacturing in Madagascar and Mozambique. Although the sugar sector was waning in importance, it remained an important source of investment capital. Investment was high throughout the decade, averaging 27.3% of GDP from 1990-2000 (Sacerdoti et al., 2005, p.7).

Tourism continued to increase rapidly over the 1990s, and by 1998 more than half a million tourists were visiting the island annually (up from around 27,000 in 1970) – primarily from France and the French Island of Reunion. Tourism grew faster than either agriculture or manufacturing over the decade, partly due to increased spending by tourists as the government promoted Mauritius as a destination for the more upmarket tourist (Durberry, 2004, pp.863-864). Offshore banking services took off early in the decade, along with significant growth in the stock market. By the end of the 1990s the Mauritian economy was built around the four 'pillars' of sugar, EPZ, tourism and financial services (Sacerdoti et al., 2005). Diversity was still moderate, however, as sugar dominated agriculture and textiles dominated manufacturing. The state's emphasis on welfare improvements meant that even by the start of the period the United Nations had categorised Mauritius as a *medium human development* country.¹⁰

¹⁰ Meisenhelder (1997, p.291). It is now classified as a *high development* country (UNDP, 2010).

3.1.1.3 2000 onwards

In 2000 the newly elected government announced that it would be driving forward a diversification of the economy into the Information and Communication Technology (ICT) sector, with the development of new *Cyber Cities*. The country's first completed complex – Ebene Cyber City – opened in 2004 and has successfully attracted investment from a number of international ICT companies. Despite the shock to international tourism in 2001, Mauritian tourism has continued its steady growth (Sacerdoti et al., 2005). Recent tax reforms have brought the overall rate of taxation to 18% of GDP – one of the lowest in the world – and contributed to Mauritius' reputation as a low-tax gateway for investing into other countries (ADB, 2009). On the whole, the service sector – principally comprising ICT, tourism and banking – has become the country's largest sector, accounting for over 70% of GDP in 2008 (Ondiege, 2010). The government published a proactive plan to reduce sugar production and improve productivity and, as expected, the EU phased out all sugar preferences by the end of 2008. Despite accounting for 80% of all utilised land and a large portion of employment, the sugar industry now only contributes 3% of GDP (ADB, 2009, p.2). The MFA was also terminated in 2005, contributing to strongly negative growth rates in the EPZ sector in the first half of the decade (Joomun, 2006). With government support the textile industry eventually adapted to this, and has moved into a higher value-added niche of the textile market. In 2008 the textile industry employed 11% of the labour force and provided 19% of all foreign exchange earnings (ADB, 2009, p.2).

The improvement in the economy during the second half of the decade is largely attributable to a series of reforms made by Ramgoolam's new government in 2005, centred around improving public sector finances, enhancing competitiveness, improving the business and investment climate, increasing participation in the economy and reducing the incidence of poverty. It reinvigorated economic growth, absorbed excess unemployment, increased investment, reduced the fiscal deficit and lowered the level of public debt (ADB, 2009). Partly as a result of this, Mauritius did much better than most economies in the 2007/2008 global financial crisis. The economy was largely sheltered from the initial wave of financial collapses by a well

regulated and highly liquid banking system (Ndikumana, 2009), but once the world economy entered a recessionary phase economic growth began to slow in Mauritius – the effects of which were channelled through significantly lower international trade (such as tourism and textile exports). In October 2008 the government rolled out an extensive stimulus package amounting to a fiscal input of almost 4% of GDP, as well as expansionary monetary policy measures. This has successfully buffered the Mauritian economy so far, although both the government deficit and current account deficit have been steadily rising. Through all this, the macroeconomy remains stable and the government has secured the option of financial support from the ADB and IMF if required (OECD, 2010).

As a result of the generous social welfare system, levels of education and health are now high and the incidence of absolute poverty has declined remarkably. The WEF's most recent Global Competitiveness report (2010-2011) ranked Mauritius as the 55th most competitive country in the world, emphasizing the country's strong and transparent institutions and efficient government (WEF, 2010). To maintain competitiveness internationally, the government is now prioritising the negotiation of more favourable trading relations with the EU (under the Economic Partnership Agreement) and the US (under AGOA, the African Growth and Opportunity Act), and is actively involved in various other multilateral trading relations.¹¹

There are a number of issues facing Mauritius in the future if it is to remain competitive, including: falling demand in the face of the global economic downturn; infrastructural bottlenecks; the need for further diversification of many sectors; the shortage of highly skilled workers associated with this; and the need for improved public sector efficiency in the light of lower tax revenues. In addition, access to funds for firms, rising unemployment and a recent increase in the rate of poverty will continue to challenge the government as it implements its long-term development goals (OECD, 2010). As outlined in the government's *Vision 2020* report, these are to retain a holistic approach to development – emphasising education,

¹¹ These include the Common Market for Eastern and Southern Africa (COMESA), the Southern African Development Community (SADC) and the Indian Ocean Commission (OIC). African Development Bank (2009, p.8).

personal freedom, democracy and an outward looking economy – with the aim of expanding into high value-added, knowledge-based sectors (ADB, 2009).

3.1.2 The overall situation in Mauritius since independence

3.1.2.1 GDP

Perhaps the most obvious indication of the rapid development of the Mauritian economy has been the remarkable rise in GDP per capita since independence. *Figure 3.1* charts the progression of GDP per capita since 1961 in real 2008 Mauritian rupees, based on data from the IMF's International Financial Statistics (IFS) database.

Figure 3.1 Real GDP per capita in Mauritius 1961-2008 (IMF, 2010a)

The outstanding rise in average income is immediately apparent. Since independence real incomes have increased more than fourfold – from just under Rs 47,000 in 1968 to over Rs 207,000 by 2008 (in constant 2008 rupees).¹² Aggregate real GDP grew more than sevenfold –

¹² All figures for this section are based on the author's own calculations, using data IMF (2010a), unless stated otherwise.

from just under 38 billion rupees at independence to 265 billion rupees by 2008 – the difference attributable to a 60% increase in population. This amounts to an average annual per capita growth rate of 3.9% and aggregate GDP growth rate of 5.1%. According to IMF estimates, Mauritius now has the 65th highest real per capita incomes in the world, in international dollars, which account for PPP (IMF, 2010b). As *figure 3.1* shows, per capita GDP growth was particularly steady over the period, aside from a sharp drop from 1979-1980 as a result of macroeconomic instability and the strict economic reform policies necessitated by the adoption of the SAP. Beyond the timeframe displayed here, growth has slowed in response to declining world demand. Mauritian GDP was resilient to the first wave of the financial crisis, but in 2009 GDP growth is estimated to have fallen to 2.8% (down from 5.1% the previous year). This is estimated to have picked up again in 2010 (OECD, 2010a).

3.1.2.2 The Economy

The remarkable macroeconomic stability that Mauritius maintained for most of the period strengthened investor confidence and prevented harmful episodes of capital flight. The one main episode of instability at the end of the 1970s involved substantial increases in the money supply to cover the government's deficits, which led to inflation as high as 42% in 1980 and had the potential to undermine the successes of previous years (World Bank, 2010). *Figure 3.2* shows that this was successfully reined in and inflation generally remained under 10% subsequently – a testimony to the government's resolve to maintain a favourable economic climate.

Figure 3.2 Mauritian Consumer Price Index (CPI) 1968-2008 (World Bank, 2010)

Although recent events have again threatened the stability of the Mauritian economy, the government has some room to move given increases in tax revenues in recent years, inflation at its lowest rate for 20 years (2.5%), and growth forecast to pick up again in the near future (OECD, 2010a).

The most significant aspect of this stability is that it has allowed the government to focus efforts on a remarkable policy of structural transformation. The move from agriculture to manufacturing, tourism, financial services and ICT, respectively, has been one of the most defining characteristics of the Mauritian development story. *Figure 3.3* below shows the current structure of the economy. Service industries now comprise the dominant pillar of the economy, but manufacturing is still important – particularly with the government’s recent endorsement of aquaculture and the processing of seafood.

Figure 3.3 Mauritian GDP by sector, 2009 (OECD, 2010a)

This structural transformation was very closely related to the export sector. The government effectively channelled the gains from successful sectors into the promotion of new ones, each of which had a largely export-focussed nature and was aided by the adoption of policies conducive to increased FDI. It has been argued that this increased foreign input was crucial in the structural transformation of the economy, particularly in the early days of the Mauritian export drive when it brought not only capital but also technology and technical knowledge (Ancharaz, 2003).

3.1.2.3 International Trade

The centrality of international trade has already been highlighted. What is interesting, however, is that the government's trade policies didn't promote *free* trade, but rather constituted what Rodrik (1999) termed *heterodox opening* – returns to the export sector were kept high through subsidies and the absence of restrictions while the rest of the economy remained relatively closed. The first and most obvious fruit of the government's export strategy was the EPZ, which by the turn of the millennium accounted for 66% of the country's total exports (Subramanian & Roy, 2001, p.23). Although successful, EPZ performance has been far outshone by those in Malaysia, Taiwan and Hong Kong where, unlike in Mauritius,

production quickly moved onto more technologically intensive sectors such as electronics. Overall, the amount of trade undertaken by the country has been average – not as exceptional as in East-Asia – but as the literature review suggested, it still seems to have played a crucial role. Mauritius' main trade partners reflect its historical and ethnic identity: its main trading partner is the EU, which accounts for 38.6% of total trade (27.2% of imports but 64.3% of exports); followed by India with 17.4% of total trade (24.8% of imports but only 0.6% of exports; European Commission, 2006). *Figure 3.4* reflects the importance of services in the composition of current exports. Tourism and other service exports are followed by the declining sectors of textiles and clothing and sugar, and then the rising sector of processed fish products.

Figure 3.4 Mauritian Exports, 2008¹³

3.1.2.4 Finance and Investment

The country's financial system was well established at the time of independence, having developed in order to smooth seasonal fluctuations in accessible credit (Sacerdoti et al., 2005). The economy and financial system complemented one another over the years, with the

¹³ African Development Bank (2009, p.2); data from the Bank of Mauritius (BOM) and the Central Statistics Office of Mauritius.

diversification of the economy facilitated by a well established and sophisticated system of borrowing and lending. The recent move to diversify the economy into offshore financial services is a testimony to the strength of Mauritius' financial regulations. Domestic savings played a key role in the country's development, and the gross national savings rate remained well above 25% from 1986-2003 (World Bank, 2010). This was aided by rents from preferential access and meant that capital accumulation was primarily financed domestically. Investment has remained high, but the proportion attributable to FDI has stayed relatively low (Ancharaz, 2003). Despite this, the Board of Investment (BoI) has worked since 2001 to actively promote foreign investment into what the government considers its key priority sectors.

Sustained economic growth has allowed the government to pursue an ambitious programme of spending without ever resorting to high taxes. A small tax on sugar – introduced by the newly independent government – initially allowed it to pursue its health and welfare and infrastructure programmes. Reforms to further lower taxes on trade in 1994 and 1995 were accompanied by the introduction of a value-added tax (VAT) in 1998. Corporate and personal income tax rates are very low compared with countries at a similar level of development internationally, which is part of the attraction for foreign enterprises to operate there (Sacerdoti et al., 2005). Early government spending focussed on the funding of social services – health, education and food subsidies – and core efficiency enhancing infrastructure such as rural electrification. It was then spent designing, subsidising and guiding the establishment of the EPZ, which required a great deal of infrastructure, including good ports, roads, utility supply and structures (Meisenhelder, 1997). Public expenditure has continually been poured into health, education and social security, as well as key areas of infrastructure. Since 2009, public finances have been focussed on the provision of the large anti-recessionary stimulus package, but significant amounts are also going into increased infrastructure for tourism – including a 1 billion rupee extension of the airport and 750 million rupee upgrade of the main seaport (OECD, 2009).

3.1.2.5 Social Welfare

This steady investment by the government has reaped significant societal rewards through a considerable rise in levels of human development. General health has improved, problematic tropical diseases such as malaria and tuberculosis have been controlled, access to safe drinking water has been universal since 1993, and the majority of the population get more than their daily nutritional requirements (Metz, 1994). In light of this, life expectancy rose steadily from just under 62 years at independence to almost 73 years by 2008 – as *figure 3.5* below demonstrates.

Figure 3.5 Mauritian Birth/Death Rates and Life Expectancy 1960-2008 (World Bank, 2010)

Population growth – which primarily reflects the difference between the crude birth and death rates – fell from over 2% per year just prior to independence to 0.65% in 2008 – proving Meade’s prediction of Malthusian stagnation incorrect. The unusually rapid decline in birth rates reflects improvements in education and gender equality. Not surprisingly, infant mortality has also improved – from 6.2% at independence to 1.5% in 2008 (World Bank, 2010). The Gini coefficient declined from 0.5 in 1962 to 0.42 in 1975 and had dropped to 0.37 by 1987,

showing a strong improvement in income equality (Subramanian & Roy, 2001, p.7). This was largely due to the dispersal of economic benefits to the population by means of an extensive social security system, which included free healthcare and education, a universal non-contributory pension scheme, the unemployment benefit, an extensive national savings scheme, government subsidies on basic foods (rice, flour) and state housing provisions (ADB, 2009). Overall the rate of human development is the highest in Sub-Saharan Africa according to the latest UNDP rankings (OECD, 2009). Fewer than 1% of the population live with less than the US\$1 a day absolute poverty line, and the few remaining pockets of poverty are targeted by the government's Eradication of Absolute Poverty (EAP) program (ADB, 2009).

As a result of resources being ploughed into the education system, education has improved markedly since independence. By providing free universal primary and then secondary education, gross primary enrolment rates went from 96% in 1970 to almost universal coverage by 2008 and gross secondary enrolment rates rose from 30.7% to 87.6% across the same period. By 2008 the adult literacy rate had reached 87.5% (World Bank, 2010). Although this is good by regional standards, the WEF ranks Mauritius' educational system poorly – based largely on enrolment rates and teaching quality – and there are still limited tertiary education options (WEF, 2010). Unemployment at independence was very high, and even by the beginning of the 1980s the unemployment rate sat at around 21%. This fell rapidly across the 1980s to almost 3%, but then began to gently climb again from the early 1990s – leading to a U-shaped unemployment curve (Sacerdoti et al., 2005). This is believed to have been due to labour market rigidities and structural changes in the economy. As knowledge-intensive sectors have grown so has the demand for higher qualified workers, but the educational system has struggled to keep up. Educational reforms have been underway for some years to rectify this, which will be important if the economy is to continue its diversification process.

3.1.2.6 Institutions

Many scholars believe that institutional development has been one of the key catalysts for economic growth and macroeconomic stability in Mauritius.¹⁴ The country's institutions steadily improved despite ongoing changes of government, contributing to a culture of transparency and participation and the continuity of policy priorities. Mauritius' institutions rank far higher than the African average in terms of a number of indices: voice and accountability; political stability; government effectiveness; regulatory burden; and rule of law. The legal and judicial system is independent of the political system and there is significant public confidence in the rule of law (Sacerdoti et al., 2005). As the literature review revealed, it seems that this institutional environment may have been the result of a combination of good early policy decisions and a particular type of ethnic fragmentation. Government policies which promoted growth and diversification in such a vulnerable open economy may only have been possible due to the high quality of public institutions, and confidence in the country's institutional arrangements certainly aided the EPZ's development – assuring investors of predictable treatment and limited rent seeking by the Mauritian government (Sacerdoti et al., 2005). The institutional environment has followed an ongoing process of improvement over the years, and the government's recent endeavour to position Mauritius as the regional centre for international arbitration is a testimony to how high the level of institutional quality now is.

3.2 Tunisia

Tunisia has quite a different history to Mauritius, which is largely a result of its rather more central position at the top of Africa – very near to the Middle East, Europe and the rest of Africa. Originally inhabited by the Berber people, the area was subject to a myriad of different occupants and regimes – starting with the Romans, Vandals and Byzantines. The 7th century conquest of Tunisia by the Arabs lasted until the 16th century and left possibly the largest and most enduring legacy of any of the occupancies, deeply transplanting the Arabic way of life into

¹⁴ Examples include: Subramanian & Roy (2001); Sacerdoti et al. (2005).

Tunisia, including the language, faith and culture (Julien, 1970). Tunisia eventually came under the rule of the Turks, but as vying European powers – particularly France, Italy and Britain – began to exert themselves in the country in various ways, the Turks soon ceded control of Tunisia to the French in the form of a protectorate. French rule was not smooth sailing, but although French interests were prioritised in various ways the financial situation improved, exports (to France) grew rapidly, and infrastructure was developed. Increased education in French led to the widespread dissemination of the language and associated western ideas. In the wake of increasing poverty and hardship at the end of the first world war, political activist Habib Bourguiba began to rally support for the country's independence, but it wasn't until political violence at the end of the second world war sufficiently undermined French control that independence was made possible. Bourguiba – supported by his *Neo-Destour* party – became Tunisia's first president in 1956; inheriting a politically fragmented country rife with inequality and continuing violent unrest (Perkins, 2004).

3.2.1 Independent Tunisia (1956-2010)

3.2.1.1 1956-1960

From 1956-1960 Tunisia began to work through the new experience of independence. Bourguiba's government was still relatively fragile and was influenced by the main trade union of the modern-sector working class, who pushed for socialist measures in reaction to lingering French control in many of the country's key sectors (including rail transport, utilities, mining and banking). This meant the *Tunisification* (the establishment of Tunisian ownership) of these sectors and many others as the government obtained direct control, including the re-acquisition of prime agricultural land from the French government. An important move for the development of Tunisian industrial production was the cessation of a customs union with France during this period, which was serving primarily French interests and hampering other international trading relations. Almost all the French civil servants were dismissed from their positions by the new regime, and the combination of political and economic changes led to mass capital flight from Tunisia and a period of economic stagnation, until good weather

sparked the resumption of growth in 1958. The greatest direct contribution to economic growth during this period came from agriculture and food processing, and the manufacturing sector remained weak. The national saving rate was relatively high at independence at 16% of GDP – exceeding the investment rate – but soon declined in the face of uncertain political circumstances and capital flight (Morrison & Talbi, 1996).

3.2.1.2 1961-1970

The steadily increasing influence of key union member Ahmed Ben Salah largely contributed to a move into full-fledged socialism, which lasted from 1961-1970. Appointed head of the new Secretariat of State for Planning and Finance in 1961, Ben Salah sought to develop Tunisia through a focus on the industrial sector, increased investment and the collectivisation, monopolisation and central planning of most of the economy (including measures such as fixed wages). This was not a popular move, especially among the peasant farmers being forced into collectivisation. New institutional structures were set up to allow for the increased state involvement, and the government undertook significant investment into the country's infrastructure (Ghali & Mohnen, 2004).

The government's budget rose significantly, and public savings largely replaced private savings. With the massive increase in costs of the civil service, however, public savings could not keep up with public investment and as a result public debt more than doubled. Capital accumulation was largely based on foreign investment and an import substitution strategy constrained export growth, so from 1961 to 1967 debt servicing rose from 1.6% to 26.1% of exports and the country began to experience difficulties with international borrowing (Morrison & Talbi, 1996, p.40). Interest rates were kept artificially low by budget subsidies, the exchange rate was kept artificially high, and an extensive tariff system allowed domestic enterprises to remain uncompetitive. The two key aspects of central planning that cost the economy the most in efficiency terms were the collectivisation of land and the development of capital-intensive state industries. The collectivised farms were poorly managed by a central ministry, worked by peasants with little or no incentives to work hard, inadequately financed and artificially forced

to adopt new technologies; which meant the stagnation of agricultural production – then key for the Tunisian economy. State manufacturing enterprises received too much capital investment, which was one of the reasons for a sharp fall in productivity over this period. However, many of the government's large infrastructure investments had medium-term impacts on production, so positive benefits spilled over into the following period (Morrison & Talbi, 1996).

On the social side, there were certainly benefits from the increase in government spending. Social policies enacted to protect the poor aimed to provide for a guaranteed minimum income (Ghali & Mohnen, 2004). Education spending rose, reaching 8% of GDP by 1969 and surpassing many of the developed countries at the time (Morrison & Talbi, 1996, p.88). Health spending also rose, and the government targeted reproductive health and population control as part of a program of extremely progressive reforms related to women's rights – prompting hostility from many other Arab nations (Bali moune-Lutz, 2009). As a result of these measures the proportion of the population living in absolute poverty declined dramatically and the economic involvement of women began to increase. By 1969 the situation was comparable to that in the communist bloc in terms of state control and involvement (Morrison & Talbi, 1996). Despite social improvements, economic problems meant that President Bourguiba was forced to dismiss Ben Salah and begin undoing the extensive collectivisation that had taken place. The decade certainly had a mixture of positive and negative impacts on the economy – real per capita incomes were more than 25% higher in 1969 compared with 1961 (IMF, 2010a) – but overall it is estimated that the economic mismanagement of the socialist period constrained the Tunisian economy to at most 80% of its full potential by 1969 (Morrison & Talbi, 1996).

3.2.1.3 1971-1986

With the removal of Ben Salah from the civil service and the subsequent appointment of Prime Minister Hédi Nour, the country moved into a mixed economy period which lasted from 1971 to 1986. The focus was on balancing market mechanisms alongside the state control of basic sectors, while encouraging agricultural development, entry into foreign markets and foreign

investment. The economy was decollectivised and small and medium enterprises were actively promoted (Ghali & Mohnen, 2004). This never went as far as a complete return to a market economy as the state retained ownership of many sectors, control of the financial sector, a system of fixed prices and high protection over imports. The influence of relatively socialist France, the retention of officials from the socialist period and the security brought about by fixed prices all hindered liberalisation from being wholly pursued. This meant that incentives were still distorted towards collusion and inefficiency and away from innovation and quality improvement (Morrison & Talbi, 1996). Tunisia's position as a net oil exporter meant that the two oil shocks of the 1970s (in 1973 and 1979) financed significant Tunisian investment and domestic subsidisation of certain goods. Oil production increased significantly over the period, constituting more than half of all exports by 1981 (Ghali & Mohnen, 2004, p.7). This – along with good rainfall and a steadily up-skilling labour force – allowed the Tunisian economy to perform well during the 1970s. From the 1980s this turned less favourable with a reversal of the country's good fortunes, including droughts, a drop in oil prices and a decrease in remittances.

Productivity in the industrial sector remained low during most of this period, as the continually heavy involvement of the state meant overstaffing and mismanagement. The level of taxes and public spending was similar to developed countries by the end of the period, making them significantly higher than in countries at a comparable level of development. However, rather than finances being dedicated to military pursuits this was focussed on education, infrastructure and economic intervention. The poor were not forgotten – investment in poorer regions was encouraged, public investment into social welfare remained high and prices for basic foods were kept low. Interestingly, public expenditure only briefly declined at the end of the socialist period, then quickly surpassed its 1960s level – going from 24% of GDP in 1969 to almost 40% after the oil shocks, which was highly unsustainable (Morrison & Talbi, 1996, p.81).

During this period of liberalisation, exports began to find a place in the country's development strategy, although protection remained high. Import substitution policies were replaced with

an incentive system which gave special privileges to export firms and encouraged private investment in the manufacturing sector (Ghali & Mohnen, 2004). With the removal of strong socialist policies came the restoration of domestic savings, which rose to over 20% from the early 1970s onwards, although primarily through increased public savings (Morrison & Talbi, 1996, p.39). In the early 1970s this was accompanied by a similar and stable investment rate, but the two oil shocks caused a public enterprise propelled increase of the investment rate to an average of around 30% of GDP and pushed the gap between savings and investment to twelve percentage points by 1982. This led to an increase in the burden of foreign debt service – up to 32% of exports by 1986 – and threatened the economy with financial crisis (Morrison & Talbi, 1996, pp.40-45). The government budget was in poor shape as it tried to cope with a large administrative burden, inflation began to increase, growth in the real economy fell sharply and both exports and imports actually decreased (Ghali & Mohnen, 2004). Measures to counter this did not come early enough and in 1986 Tunisia signed up to an IMF structural adjustment programme to avert a crisis.

3.2.1.4 1987-2010

From 1987 onwards the country pursued a process of true economic liberalisation, abruptly initiated by the strict measures demanded by the SAP, including measures to steady the macroeconomy, lower the tax burden and allow greater freedom to the market. This meant stripping away much of the remaining state control – investment authorisation, price controls, fixed interest rates, predetermined wage rates, direct state control of certain industries and trade barriers – which brought about increased competition through a greater foreign presence. Tax reforms kept public debt high, which crowded out private borrowing and investment. Greater openness to world markets brought about more than just increased competitiveness; it also contributed to technological gains through capital improvements and the reallocation of investment to more productive sectors and generated economies of scale for Tunisia's relatively small domestic market (Morrison & Talbi, 1996). The political situation changed abruptly in 1987, when Ben Ali ousted longstanding president Habib Bourguiba on the basis (or pretence) of his medical condition. While this swift transfer of power was bloodless, it

certainly contributed to a time of significant change. The state remained large and pervasive, but made progress towards a much more competitive market environment. Exports were actively encouraged as the exchange rate was allowed to devalue significantly, export licences and taxes were largely eliminated and export facilities were improved. Exports had continued to grow at roughly the same rate as domestic demand in the early 1980s (as they had in the 70s), but after the SAP they outgrew domestic demand (Morrison & Talbi, 1996).

Despite the global economic downturn, key sectors in the Tunisian economy have continued to perform successfully in recent years. The service sector grew by 5.5% in 2009, largely driven by growth in the financial and ICT sectors, which have benefitted from large investments in projects such as the Tunis Financial Harbour (the first offshore financial services centre in North Africa), and various cyber parks (OECD, 2010b). In recent years the ICT sector has acquired a large portion of the offshore French-language call centre market, but although the sector is growing, its potential contribution to the economy and capacity to export remains limited by high government involvement (OECD, 2009b). Tourism has benefitted from similarly large investments and weathered the crisis remarkably well, with an increase in Maghreb visitors offsetting the recent decline in European visitors (ADB, 2009b). National savings remain significant as a result of large remittances from expatriate Tunisians – 600,000 of whom live in France (OECD, 2009b). Liberalisation continues with privatisation of state enterprises and progression by the BCT towards a free floating exchange rate. The resulting depreciation in the dinar has made exports more competitive in recent years (OECD, 2010b).

It is obvious from this discussion that although the road has been far from smooth, Tunisia has experienced remarkable economic development since independence. Consistently, state investment has been high, education has received substantial resources, tourism has been promoted, and the rights of women have been advanced. Moreover, this has been achieved in the absence of a democratic system of government, but has taken place through two authoritarian regimes. This *had* been interpreted as evidence that authoritarianism could work at least as well as democracy for economic development, but recent events cast doubt upon

the sustainability of such a regime. Nevertheless, Tunisia was able to achieve national solidarity after a long period of foreign rule and establish a strong institutional framework with one of the most attractive business environments in the region. The WEF's most recent Global Competitiveness report (2010-2011) ranked Tunisia as the 32nd most competitive country in the world – 23 places above Mauritius (WEF, 2010). Tunisia's long-term development goals are clearly outlined in a series of five-year plans (the latest covering 2007-2011). These goals aim particularly at economic growth and job creation, and are anchored around the three pillars of strengthening macroeconomic policies and accelerating reforms, modernising the country's infrastructure and reinforcing the public sector, and consolidating human capital (ADB, 2009b).

As with Mauritius, however, there are a number of issues facing Tunisia if it is to retain competitiveness and strong economic growth into the future. The most pressing issue is the current political crisis. It is hoped that this will lead to the establishment of a government with greater national support and public trust but, even if it does, it is likely to cause a number of immediate and short-term issues. Even before the "Jasmine Revolution" the country was facing lower foreign demand as a result of the global economic downturn and there was a major need to revitalise the financial sector and diversify trading partners. The government's budget was under pressure, and there was a major and ongoing unemployment problem – particularly among the most highly educated. These factors were a driving force behind the popular uprising, but it certainly hasn't helped to improve the situation in the short-term. Early news reports suggest that tourism has already been significantly affected, the country's credit rating has worsened (Afrol News, 2011), stock market values have fallen, and there is suggestion that the events may lead to a decline in economic activity of around 4.5% of GDP in the coming year (IMF, 2011). Tunisia now faces the difficult task of appointing a new government who can maintain the confidence of the people while addressing these – and other – ongoing issues. Elections are scheduled for the 24th of July, 2011 (BBC, 2011b).

3.2.2 The overall situation in Tunisia since independence

3.2.2.1 GDP

Across these varied periods of development, what has happened to GDP on aggregate? While incomes certainly underwent periods of stagnation, the overall growth in per capita GDP has been equally as remarkable as in Mauritius. *Figure 3.6* charts the progression of incomes since 1961 in real 2008 Tunisian dinar, based on data from the IMF's IFS database.

Figure 3.6 Real GDP per capita in Tunisia 1961-2008 (IMF, 2010a)

The upward trend is immediately apparent. Since the beginning of the socialist period real incomes have grown more than fourfold – from just over 1100 dinar in 1961 to almost 5000 dinar by 2008 (in constant 2008 dinars).¹⁵ Over the same period, aggregate real GDP grew more than tenfold – from just under 5 billion dinar to over 50 billion dinar – with the difference coming from an enormous 137% increase in the country's population. This amounts to an average annual per capita growth rate of 3.3% and aggregate GDP growth rate of 5.2%. The IMF estimates that Tunisia now has the 89th highest real per capital incomes in the world, in

¹⁵ All figures for this section are based on the author's own calculations, using data from IMF (2010a).

PPP adjusted international dollars (IMF, 2010b), 24 places behind Mauritius. As *figure 3.6* shows, growth was consistently positive aside from two notable periods – one at the end of the socialist period, and one during the macroeconomic instability of the late 1980s. More recently, growth has slowed in response to falling world demand – particularly in the European market. In 2009 GDP growth is estimated to have fallen to 3.1% (down from 4.6% the previous year). This was forecast to increase again from 2010 onwards (OECD, 2010b), but is now highly uncertain.

3.2.2.2 The Economy

Tunisia's economic growth did not take place in the context of a consistently stable macroeconomy. Balamoune-Lutz (2009) notes that macroeconomic stability was important in the Tunisian development experience, although the two distinct periods of macroeconomic instability did threaten to undermine the country's success. The macroeconomic crisis at the end of the 1960s socialist period was largely a result of public mismanagement of the economy – high public debt and current account deficits – but was made worse by difficulties in the agricultural sector after sustained periods of drought (Balamoune-Lutz, 2009). The preference for expansionary fiscal and monetary policy during the mixed economy phase of the 1980s again raised the level of public debt and the current account deficit (Ghali & Mohnen, 2004). *Figure 3.7* provides an indication of the stability maintained after the 1986 SAP.

Figure 3.7 Tunisian Consumer Price Index (CPI) 1963-2008 (World Bank, 2010)

Structural transformation took place throughout this entire period, sometimes even contributing to the economy's instability. Socialist development was characterised by significant public investment into agricultural production, and during the mixed economy phase the manufacturing industry was encouraged and grew rapidly, along with Tunisian exports. Mass beach tourism had been suggested as part of a development plan as early as 1962, but it wasn't until the 1970s that the government began to make significant investments and promote international investment into the tourism sector (Poirer, 1995). The stability achieved after the SAP allowed the government to actively promote much broader diversification of the economy, through direct investments and various schemes to attract both domestic and foreign private investment into priority sectors (Baliamoune-Lutz, 2009). Before long, tourism and other service industries replaced manufacturing as the cornerstone of the Tunisian economy. *Figure 3.8* below shows the structure of the economy in 2008.

Figure 3.8 Tunisian GDP by sector, 2008 (OECD, 2010b)

The largest disaggregated sector graphed is a combination of service-based sectors – including the public administration – which indicates the importance of services in the modern Tunisian economy. Manufacturing and agriculture remain important, but their importance is waning in comparison to the service sector, particularly as the government encourages further development of the flourishing ICT and offshore financial services sectors and as tourism continues to expand even in light of the world recession (OECD 2010b). *Energy* primarily constitutes crude oil production, and this is likely to increase over the next few years in light of increased investment and prospecting (OECD, 2009b).

3.2.2.3 International Trade

This discussion has highlighted the importance of trade – particularly the export sector – in Tunisian development. Import-substitution policies were replaced by an emphasis on export production, encouraged by a law passed in 1972 which gave special privileges to export firms (including duty free imports and tax exemptions). Structural adjustment after 1986 aimed to further liberalise the economy and establish an open export-oriented economy – which

included the deregulation of imports and further promotion of Tunisian exports (Boughzala, 1995). *Figure 3.9* shows the remarkable growth in real exports that occurred as a result.

Figure 3.9 Aggregate Real Exports of Goods & Services from Tunisia, 1961-2008 (IMF, 2010a)

The composition of exports has progressed over the years, reflecting changes in the wider economy. At independence exports almost entirely comprised agricultural products and phosphates, but high oil prices and increased production meant that by 1981 oil products made up 54% of total exports (Ghali & Mohnen, 2004, p.7). Manufactured exports of textiles, leather and electronics steadily increased; so much so that aggregate real exports grew more than 450% between 1986 and 2008 despite waning oil exports (IMF, 2010a). This was reinforced by the steady increase of service exports, such as tourism and ICT. As *figure 3.10* shows, goods still make up the majority of Tunisia's exports, followed by petrol and minerals, tourism and food products. A large (and increasing) portion of other exports is taken up by services other than tourism.

Figure 3.10 Tunisian Exports, 2008 (IMF, 2010a)

Exports were not well diversified for many years, but from the late 1980s new manufacturing industries appeared – including chemical and electrical production – which were driven largely by significant FDI inflows. Tourism – undoubtedly one of the key service exports – also expanded after the reforms and has been an important source of foreign currency and both direct and indirect employment (Hachicha, 2003).

While the diversity of exports has been improving, the diversity of export *markets* remains an issue. Various trading agreements have aided exports over the years, but they have also served to deepen a narrow range of trading relationships. The MFA encouraged trade with Europe, as did the more recent free-trade agreement (FTA) with the EU. *Figure 3.11* demonstrates Tunisia's heavy reliance on the European market for most of its goods exports. We know the same to be true for a large portion of service exports, as tourism mainly consists of mass beach tourism from the European continent and other services such as French call centre operations also naturally gravitate that way. Efforts are underway to diversify markets through new bilateral and multilateral trading agreements – particularly with other African nations (ADB, 2009b).

Figure 3.11 Tunisian Goods Exports by Destination, 2009 (INS, 2010)

3.2.2.4 Finance and Investment

Upon independence the government sought to *Tunisify* the financial sector and encourage increased domestic financial savings, but as much of the existing savings belonged to foreigners Tunisification led instead to capital flight. From the 1970s there was rapid growth in the country's liquidity, as the banking sector grew and private domestic savings increased. The government actively promoted national saving, but this was limited by negative real interest rates from 1974-1984 (Morrison & Talbi, 1996). Financial liberalisation under the SAP had a positive impact on savings, and savings now stand at around 23.4% of gross national disposable income and only 1.5 percentage points below investment.¹⁶ Investment, on the other hand, has been consistently high in Tunisia since shortly after independence – reaching a high of 34% of GDP in 1982 when the savings rate was around 20% (Morrison & Talbi, 1996, pp.12-13). As a result of this remarkably high level of investment the capital stock has grown at an astonishing pace over the years, so much so that some – such as Ghali & Mohnen (2004) have argued that Tunisia overinvested in capital at various times since independence. Investment levels have been kept roughly in line with savings since the late 1980s, but the majority of domestic investment is now foreign (OECD, 2010b).

¹⁶ As at 2008, African Development Bank (2009b), Annex II.

The public sector played a major role in domestic investment – more so than in many other countries according to Morrison and Talbi (1996). Encouraged by socialist policies in the 1960s and very high revenues from the 1970s oil shocks, the state's revenue and expenditure as a percentage of GDP increased consistently after independence and didn't decline until after 1990. The most significant area of public spending has consistently been economic expenditure, including subsidies on key consumer goods and infrastructure spending. The latter has been particularly important and has included major investments in agriculture (such as dams), telecommunications, roads, port and airport facilities and key industries, which has enhanced the efficiency of private capital and encouraged foreign investment. After economic expenditure, the government's main spending priority has been education, followed by health and social/cultural affairs. Spending on civilian sovereignty (including justice, foreign affairs etc) and the military has always been modest in comparison to these other spending priorities (Morrison & Talbi, 1996). As we have discussed already, at various times since independence government expenditures outpaced revenues. Recent Tunisian fiscal policy has been much more prudent, and although the current economic downturn has reduced tax revenue and led to an increase in the budget deficit, the overall level of public debt remains manageably below 50% of GDP (OECD, 2010b).

3.2.2.5 Social Welfare

As in Mauritius, rapid growth in incomes has occurred alongside a significant rise in the overall level of human development in Tunisia. Free access to basic healthcare is now available to almost the entire population and indicators portray a rapid improvement in general health since independence: from 1960 to 2000, the number of physicians, dentists, pharmacists and nurses per million Tunisians increased by a staggering 646%, 800%, 138% and 745%, respectively (Ghali & Mohnen, 2004, p.24). As *figure 3.12* shows, life expectancy also rose dramatically, from just under 49 years in 1960 to over 74 years by 2008.

Figure 3.12 Tunisian Birth/Death Rates and Life Expectancy 1960-2008 (World Bank, 2010)

Figure 3.12 also shows a decline in both the crude birth and death rates over the period. As the gap narrowed, the population growth rate also declined – from over 2% per year in the mid-1960s to under 1% in recent years (World Bank, 2010). The marked decline in the birth rate is a strong indication of the priority given to family planning initiatives and the promotion of women's rights (Baliameune-Lutz, 2009). Although near universal access to healthcare benefitted the poor in many ways, the government also directly targeted poverty by implementing initiatives designed to reduce the adverse effects of liberalisation on the poor. Periods of drought have worsened poverty a number of times over the years, but overall the poverty rate fell from 21.9% in 1975 to 4.2% in 2000 and extreme poverty has been largely eliminated. The GINI coefficient measure of inequality fell slightly, from 0.44 in 1975 to 0.409 in 2000, indicating a modest improvement in income equality (Ghali & Mohnen, 2004, pp.27-28).

Although the government dedicated significant resources to health, even more were dedicated to education. Real education spending increased by a factor of 6.5 from 1960-1988 – particularly during the socialist period of the 1960s (Morrison & Talbi, 1996, p.53) – and is still the largest item of government spending, accounting for 28% of central government expenditure (OECD, 2009b). As a result, primary school enrolment increased rapidly, particularly as young girls began attending school. From 1956 to 1991 the secondary school enrolment rate increased 14-fold, and this was accompanied by a rise in female enrolment from 20% to 47% – near perfect gender equality – in which private schools played a significant role. The average level of education of the labour force rose from 1.5 years of schooling in 1960 to 6 years by 1989 – increasing in quality at the same time – and this contributed significantly to an increase in productivity (Morrison & Talbi, 1996, pp.54-56). A major reform of the education system took place in 1989, when the age of free and compulsory education was raised to 16, more qualified teachers were recruited and the education system modernised. Tertiary enrolment continues to expand rapidly, although the quality of Tunisian universities remains low. Unfortunately, factors such as highly protective labour regulations and skills mismatches mean that unemployment is persistently high – particularly among the most highly qualified. The authorities have rolled out a new policy to tackle this unemployment with public sector hiring, but more needs to be done at a structural level to properly resolve the issue in the longer term (OECD, 2010b). Overall, these policies around health and education (and other social policies) are credited with much of Tunisia’s developmental success (Ghali & Mohnen, 2004). They resulted in the establishment of a large middle class, expanding the market for goods and services and providing a supply of capable managers for public and private enterprises (Boughzala, 1995).

3.2.2.6 Institutions

Tunisian government has so far evaded democracy – the Economist’s Economic Intelligence Unit’s (2008) Democracy Index placed Tunisia at 141st out of the 167 included countries and categorised it as an “authoritarian regime” (p.7), a sentiment which has been echoed loudly during public demonstrations in 2011. This ranking is low even for Africa and, by comparison,

Mauritius ranks at 26th as a “full democracy”. Perhaps surprisingly, perceptions of corruption have generally been lower than in countries with similarly authoritarian governments, possibly because the government went to great efforts to establish (the perception of) social consensus and public support for its actions. While its institutional framework is similarly undemocratic (Baliamoune-Lutz, 2009), it is nevertheless still very strong and has undoubtedly contributed to the country’s great economic and social success. Tunisia’s experience thus demonstrates the prospect for strong institutions to develop even under the rule of a deep-rooted dictatorship. The initial constitution guaranteed fundamental rights and clearly distinguished between executive and judicial powers (Morrison & Talbi, 1996), and institutional reform continued to be prioritised early in Tunisia’s development. Women were given more equitable legal status from the outset – including the right to vote and stand for election – and the legal system in general was modernised.

The most recent Global Competitiveness Report of the WEF (2010) suggests that the country’s institutions are comparatively far better than similar nations – particularly in measures of public efficiency. The country’s institutional quality and strength of leadership – rather than the particular style of government – has been credited with the success of the major economic reforms that took place in Tunisia, as well as its smooth transition and integration into international markets.¹⁷ Institutional reform is clearly still needed, however, as a number of institutional failures have contributed to the recent social uprising.

3.3 Key Similarities and Differences

This discussion has brought to light a number of similarities and differences in the growth and development experiences of Mauritius and Tunisia, and it is worth explicitly highlighting some of these before we move on. It is apparent that despite their common African roots, their historical backgrounds are quite different. Both governments had distinct issues to address

¹⁷ See, for example: Boughzala (1995); Ghali & Mohnen (2004).

upon independence, yet both were able to achieve remarkable economic growth and development over the following decades. As the literature clearly shows, both made a strong impression on the international scene in terms of their overall success. *Table 3.1* and *figure 3.13*, below, help to put these two countries in perspective.

Table 3.1 Key Economic Indicators

	Mauritius	Tunisia	Africa Mean	World Mean	OECD Mean
Average annual real GDP per capita growth 1961-2008 (%) ^a	3.06%	3.25%	-	-	-
Real GDP per capita (2007, \$USD) ^b	11,296	7,520	2,729	9,972	32,647
Rate of natural population increase (%) ^c	0.7	1.0	2.3	1.2	0.4
Urbanisation proportion (%) ^c	42.6	67.3	4.6	2.6	76.8
Openness (trade as a % of GDP) ^d	132.27	114.82	83.25	100.14	-

Sources: a) Calculated using data from the IMF (2010a). b) As at 2007. UNDP (2009). c) For 2005-2010. UNDP (2009) d) As at 2007. Heston et al. (2009). Some values not included in the datasets.

Figure 3.13 Real GDP Growth Indices for Mauritius and Tunisia, 1961-2008 (IMF, 2010a)

As this demonstrates, both nations experienced rapid growth in real per capita incomes. Tunisia started from a significantly lower position than Mauritius, but slightly faster growth

overall reduced the gap somewhat (although post-independence, growth was slightly faster in Mauritius). Income growth experienced some volatility in both countries over the period, but was relatively more stable in Mauritius. In general, this reflects the macroeconomic situation as well. Tunisia had a bumpy road to success, while the Mauritian economy managed to avoid major macroeconomic imbalances barring the one period during the late 1970s. Overall growth rates were very similar in both countries, though slightly more steady in Mauritius.

Health and welfare certainly featured highly on the agendas of both governments over the years, although social policy in general seems to have been more central to the Tunisian development strategy. This may have reflected the lower socio-economic position from which Tunisia was coming, given that Tunisia's life expectancy at independence was less than 49, compared to 62 in Mauritius (World Bank, 2010). Given the likely presence of decreasing returns to investment in health and welfare, Tunisia seems to have had more to gain from these investments. Similarly, education was central to the development strategies of both countries, but it seems it was more important in the Tunisian experience. Significant resources were put into the education systems of both, but Tunisia had additional ground to gain due to its initially incredibly low female participation rates. Marginal returns from increased female participation rates were much higher in Tunisia than Mauritius. Overall therefore, social policy appeared to be more valuable in Tunisia due to the country's relative catch-up potential. Undoubtedly both countries benefitted greatly from health, welfare and educational development, but it seems that investment in social policy simply had higher marginal returns in Tunisia.

Structural transformation was remarkably similar in both countries – each was based largely on agriculture at independence, but soon moved into manufacturing (with an emphasis on textiles) followed by services (with an emphasis on tourism and growing focus on ICT). There were differences, but overall both countries gradually diversified their economies into emerging sectors through the successful re-investment of gains. The public sector played an important facilitating role in both countries, but had a much more direct role in investments in Tunisia than in Mauritius because private savings and investment were relatively more important. The

benefits of *foreign* investment have been emphasised more for Mauritius, and the country seemed to shift its focus to key sectors slightly ahead of Tunisia. It is not clear why this is the case, although in the early years the government's attempt to appease its more socialist stakeholders certainly impeded the pursuit of more liberal development policies.

Thankfully – given that it is the focus of this study – trade seems to have played a very important role in the economic growth and development of both countries. As *table 3.1* shows, the relative volume of trade is much higher in Mauritius, something which we would expect given the above discussion. It seems obvious that the export sectors of both countries contributed increasingly to the structural diversification, growth and development of the countries, directly or indirectly, but exports appear to have played a more central role in Mauritius. Tunisia did not really encourage development of the export sector until into the 1970s, by which time the Mauritian EPZ had already started to gain some momentum. Trade was in some respects easier for centrally-located Tunisia, but, as we have described, it seemed to be one aspect of an overall development strategy where more funding and focus was given to other areas – particularly in the earlier years following independence. Although not exceptional in terms of trade volume, the export and import sectors in Mauritius were key from the outset and remained the central aspect of its developmental strategy. The relatively much smaller size of the Mauritian economy may have driven this reliance on foreign trade, and certainly just before independence the country depended on foreign exchange earnings for some very basic commodities (Meade et al., 1961).

Finally, a comparison of the governance and institutional arrangements in each country is particularly interesting. In both cases it is apparent that a strong institutional environment was central to long-term success, but the overarching governmental framework could not have been more different. Tunisia developed strong institutions in the face of authoritarianism, Mauritius did it in parallel with democracy, yet the Global Competitiveness Report ranks Tunisia's institutional quality as 23rd out of 139 countries while Mauritius comes in at 43rd (WEF, 2010). Institutions have clearly been important for both countries, and while we are not able to

test directly for the impact of institutions and governance in our empirical section, this context is critical to an understanding of the true nature of the exports-growth relationship.

Where does this leave us as we move into the empirical section of the paper? Both the literature review and this detailed discussion of the two economies have illustrated the centrality of exports in the development strategies of Mauritius and Tunisia. However, this chapter has underlined that while export policies are credited with much of the economic success of these two countries, it is important to understand the wider context in which they were implemented. No export strategy is an island, as it were. Export policies were only successful given the favourable environment in which they were initiated and developed, and they seem to have been more central to the Mauritian experience than in Tunisia, where other policies – such as those relating to the inclusion of women – had greater scope to contribute to growth. As we turn to the empirical tests, therefore, we have good reason to expect a positive and significant relationship between exports and growth, particularly in Mauritius. Although our econometric analysis is more narrow in scope and will not shed any more light on the importance of these other factors (such as institutions and governance) it is important that we bear the findings of this qualitative analysis in mind.

Chapter 4: Data and Methodology

In order to examine the true impact of exports on economic growth in Mauritius and Tunisia, we undertake a sequence of different ELG tests for each country. This constitutes the core empirical contribution of the study, which is to provide a more in-depth analysis of the relationship between exports and output growth than has been previously undertaken.

To keep the analysis tractable, we focus on the relationship between exports and growth. We do include a wider number of possibly influential variables in many of our models, but incorporate them as *control variables* in order to better identify the true relationship between exports and output. While our preference would be to explore the entire set of possible relationships between all inputs to the growth process in-depth, this is not possible given the data available. We choose instead to prioritise robustness, and use additional variables to help shed light on the exports-growth relationship. It is important to note that this limits the scope of the econometric analysis – it does not provide any additional insights into the importance of institutions or governance, for example. This is why the qualitative analysis of earlier chapters provides such an important background and context to the results of this analysis. The structure of this chapter is as follows. After introducing the data to be used in the analysis, we then discuss the methodology and outline the specific tests employed.

4.1 Data

In order to keep the analyses as comparable as possible, key data for both countries come primarily from one source – the International Monetary Fund’s (IMF) International Financial Statistics (IFS) database. This database is a standard source of international statistics, kept and maintained by the IMF’s Statistics Department. It includes time series data on various key economic and financial series for most countries, including some as far back as 1948. For the most part, these statistics are drawn directly from the governments and statistical agencies of the subject countries themselves, and this is the case for both Mauritius and Tunisia. The key

series that form the basis of the following tests – output, exports and capital – all come from this dataset, and the following descriptions of these series apply to both countries. Discussion of why each variable is included will be left for the *methodology* section.

Output

The variable used to measure output and economic growth is gross domestic product (GDP). Although authors like Stiglitz, Sen, and Fitoussi (2010) argue that often this does not adequately capture welfare or living standards as such – excluding, for example any measure of greater freedom or equality – the discussion in previous chapters has demonstrated that in these two cases economic growth and development were in fact highly correlated. For Mauritius, GDP is measured as the aggregate money value of all final goods and services produced within the country, before any provision for the consumption of fixed capital. Similarly, for Tunisia GDP is measured as the aggregate money value of final consumption plus gross capital formation and net exports (the expenditure approach).

Exports

In order to measure exports, we use an aggregate measure of the exports of both goods and services. This measure includes commodities such as food or manufactured products, but also items such as international tourism. According to the official definition used by the IMF, this follows the concept of goods and service exports followed in national accounts and includes all transactions in goods and services between residents and non-residents (regardless of where they are living at the time).

Capital

Gross fixed capital formation (GFCF) is used as a proxy for capital in the model and is our primary control variable. GFCF in the IFS dataset is measured by the total value of acquisitions of fixed assets minus disposals of fixed assets over the accounting period (in this case the calendar year). A certain specified expenditure on services that add to the value of these assets

is also included (European Commission et al., 2009, pp.198-211). Fixed assets, consequently, are defined as goods and services that are used in production for more than a year. In this sense, GFCF is a flow – not a stock – variable. It is *gross* in the sense that it does not account for the ‘consumption’ of fixed capital – chiefly depreciation. Although countries produce using their *stock* of productive capital, this is still meaningful as a measure of the change in productive capital in the economy, which is expected to have a significant impact on production. Data on *net* fixed capital – which takes into account depreciation and other factors lowering the stock of fixed capital – was not available, but if GFCF remains approximately proportionate to the capital stock then it remains a good proxy for the capital input.

Each of these three key variables is measured by value, in nominal domestic currency. In order to take account of the possible impact of price changes (inflation or deflation), each series has been deflated using a price index. Although the best technique is to apply a specific deflator series to each of the variables – in order to account for the impact of divergent prices in each series – the limited availability of price deflator series meant that each series has instead been deflated using an aggregate *GDP* deflator series. Although not ideal, this transforms GDP into real GDP and generates something very close to real exports and real gross fixed capital formation. Using the two *GDP deflator* series we obtain real values of GDP, exports and capital in 2005 Mauritian rupees and 2005 Tunisian dinars, respectively.

As with most studies, the timeframe is restricted by the availability of the data. This data, including the deflator series, are available as far back as 1953 for Mauritius, although unfortunately there is an obvious and well-known error in the data for the years prior to 1960. Similarly, Morrisson and Talbi (1996, p.33) argue that it is meaningless to include Tunisian data before 1960 as during that time the reliability of the data is questionable; and, since we only have these data in real terms from 1961 anyway, we choose to include data from 1961 onwards. So for the bivariate and trivariate tests using these series, we keep the analysis comparable by examining the period 1961-2008 for Tunisia (48 observations) and the fractionally longer period 1961-2009 for Mauritius (49 observations) due to more up-to-date

figures for this country. Again, data availability has limited us to the use of annual series, but the advantage is that this compels us to avoid the difficulties inherent in testing for causal relationships using seasonal data.

Employment and Education

In order to broaden the scope of our tests, we include two other control variables into our models. A justification for this inclusion will be given in the methodology section, and as these two variables differ slightly for each country we will consider each in turn.

For Mauritius, we include the variables *employment* and *education*. Employment is a count of all full-time equivalent employees in Mauritius over the period, and is used as a proxy for the labour input to the production process. Data comes directly from the Central Statistical Office (CSO) of Mauritius and is unpublished prior to 1983. *Education* measures the percentage of the working age population (those aged 15 or above and not attending school) who have secondary or tertiary education each period. It is used to proxy the human capital input to the production process, and its construction is a little more problematic. Values come from census data, so it is not available on an annual basis over any period and we have had to interpolate this data in order to make it usable in our econometrics. This is far from ideal, however the decision is defensible. Firstly, an examination of the actual data points confirms that they appear to follow a linear trend; making linear interpolation most appropriate. Secondly, as these data do not exist anywhere, interpolation is our only option if we are to include a measure of human capital in our models, and it is deemed better to include estimated data than to exclude the series altogether. Again, owing to data limitations, our tests involving these two variables are limited to the time period 1972-2009 (38 observations).

For Tunisia we also include the variables *employment* and *education* – although they have a slightly different interpretation due to inconsistencies in data collection across the two countries. Unfortunately, in the earlier years both variables have had to be interpolated in order for the data to be usable in the models. Again this is far from ideal, however the more

recent periods, where the data are actually available on an annual basis, verify that the trend for both series is approximately linear. *Employment* is a count of the active labour force in each year – a very similar statistic to that used in the Mauritian case – and is compiled from online and hardcopy reports obtained from the Tunisian Institute of Statistics (INS). *Education* is directly related to employment in this case, as it measures the percentage of the active labour force with secondary or tertiary education. This is slightly different to the Mauritian measure, and more accurately proxies the true human capital input to the production process since the sample includes only those who are presently employed. Data for this series is compiled from printed reports and special data requests from the INS.

4.1.1 Disaggregated Tunisian Data

In addition to the aggregate data discussed above, we also include disaggregated Tunisian export data for two supplementary tests. This data also comes from the INS, however as it is not available in digital form it had to be physically located and then entered manually based on hardcopy INS reports from Tunis. The INS summarises goods exports according to fifteen key classifications, and these were combined with a series on international tourism receipts in order to construct five different export series. Each of these is detailed below.

Tourism exports is the entry “tourism” in the balance of payments. This includes any tourism related spending by foreign residents during the period – such as flights, accommodation and meals.

Manufactured exports includes five INS goods exports categories: textiles; fertiliser; inorganic chemicals; hides, leather, articles of leather and shoes; and machinery and electrical equipment.¹⁸

¹⁸ Officially these are: textiles; engrais (superphosphates); produits chimiques inorganiques; peaux, cuir, ouvrages en cuir et chassures; and machines et appareils electriques.

Food exports includes six INS goods export categories: olive oil; fruit, dried fruit, citrus fruits and melons; sugars and sugar confectionary; fish, crustaceans and molluscs; vegetables living plants and flowers; and drinks, alcohol and vinegars.¹⁹

Petrol and mineral exports includes just three INS goods export categories: petrol and derived products; phosphates and other minerals; and lead.²⁰

Other exports includes all other goods exports, and any other service exports which are not considered tourism. This series is constructed by subtracting the above four series from the aggregate export series in the IFS database discussed earlier.

Each of these series is then transformed into approximately real (2005) values using the same Tunisian deflator series discussed above. As the collated data is relatively extensive, we are able to include these disaggregated series for the period 1968-2008 (41 observations in total). *Figure 4.1* below gives an idea of how important each of these export sectors were over the period:

¹⁹ Officially these are: huile d'olives; fruits, fruits secs, agrumes et melons; sucres et sucreries; poissons, crustaces et mollusques; legumes, plantes potageres plants vivantes et fleurs; and boissons, alcool et vinaigres.

²⁰ Officially these are: petrol et derives; phosphates et autres mineraux; and plomb.

Figure 4.1 *The relative importance of Tunisian export sectors (proportion of total exports)*

It is apparent that these four export categories (excluding *other*) account for over 70% of total goods and services exports over most of the period. Notably, food and petrol and mineral exports declined in importance, international tourism remained relatively constant, and manufactured exports became substantially more important over the period. Having detailed the data to be used in the empirical tests, we will now outline the testing methods in detail.

4.2 Methodology

As the literature review highlights, the fragility of typical tests for export-led growth make it easy to manufacture any desired Granger-causality results by simply adjusting the assumptions to suit. Changing assumptions such as the dimensions of the model, the variables which are included or the form that those variables take – just to name a few – can lead to entirely different Granger-causality outcomes. To prevent this, we firstly pre-determine the testing

procedure based on what seems to be the most appropriate methods for the task at hand. This is an important step in ensuring that results are not manufactured to fit a desired outcome, and are instead genuinely the outcome of the most suitable approach. The previous chapters have demonstrated that we expect the data to find that exports have had a significant impact on economic growth in both Mauritius and Tunisia, but letting the data speak for itself is important in shaping our understanding of the true mechanisms behind each country's growth. Secondly, we do not rely solely on one test – incorporating just one set of assumptions and methods – to determine the results. This is a common mistake in much of the literature, as it leads to conclusions that are potentially fragile, not transparent, and difficult to base concrete conclusions on. In order to overcome this we undertake an array of tests for each country, varying a number of the key underlying assumptions and aspects of the tests. Although it is not practical to alter *every* aspect of the tests, the variation of certain characteristics provides a greater understanding of the sensitivity of Granger-causality results to testing methods. Final conclusions will not be based on one test alone; they will take into account the overall picture that this range of tests – each with their own shortcomings – portrays. The result is more transparent and, hopefully, reliable results. All estimation is undertaken using the econometric programme *Eviews 6*.

In order to model the relationship between our variables, we make use of the vector autoregression (VAR). This is common in the literature, and has the advantage of allowing each variable to have a simultaneous impact on the other variables in the system. This approach was pioneered by Sims (1980), who argued that the VAR method avoided the often unnecessary complications of an underlying structural model and the unreasonable restrictions that such models require for identification. The basic VAR model allows for the inclusion of any number of variables, which are regressed on a pre-determined number of lags of each variable in the system. The general VAR in matrix form is as follows:

$$Y_t = A + \sum_{i=1}^p B_i Y_{t-i} + \varepsilon_t$$

Where: Y_t is a $k \times 1$ random vector (containing k variables)
 A is a $k \times 1$ vector of constant terms
 B_i is a $k \times k$ matrix of coefficients
 ε_t is a $k \times 1$ vector of white noise error terms
 p is the order of the VAR (the lag length)

If we expand out this general form and apply it to the simple bivariate case with one lag, our VAR consists of the following balanced system of $k=2$ equations:

$$x_t = \alpha_1 + \beta_{11}x_{t-1} + \beta_{12}y_{t-1} + \varepsilon_{1t} \quad (1)$$

$$y_t = \alpha_2 + \beta_{21}x_{t-1} + \beta_{22}y_{t-1} + \varepsilon_{2t} \quad (2)$$

You can see that in this framework both variables – which we could think of as GDP and exports – are allowed to impact each other simultaneously. If we assume stationarity of the data series, then in this simple form estimation can easily take place using equation-by-equation ordinary least-squares (OLS).

4.2.1 Lag length selection

A natural question arises – what is the appropriate order of the VAR (i.e. how many lags should be included) in order to most accurately model the true relationship between the variables? This is a very important aspect of such tests, and authors such as Thornton and Batten (1985) have argued that because the order of the true VAR is unknown, it is usually possible to obtain entirely contrasting Granger-causality results by altering the order of the estimated VAR. They assert that in order to legitimise the resulting Granger-causality findings the choice of lag length needs to be justifiably identified, rather than exogenously determined or chosen in an *ad hoc* manner. Many studies do make the decision in an arbitrary fashion, but there are a number of different information criteria that can be employed in order to base the choice of lag-length on empirical foundations. The most common among these include three of those introduced

earlier: the Akaike Information Criterion (AIC), the Schwartz Information Criterion (SC) and the Hannan-Quinn Information Criterion (HQ), each of which use the log-likelihood functions of the model at each possible lag-length but apply different weights in the bias/efficiency trade-off. Unfortunately this weighting is subjective, and there is no consensus as to which criterion performs best at choosing the correct lag length. Liew (2004) performs a Monte Carlo simulation and finds that the AIC generally performs best in small samples of 30 or 60, while in larger samples the HQ performs better. Ultimately though, as Ivanov & Kilian (2005) assert, researchers will have to choose a lag length and take a stand on the plausibility of their results. In light of this, we decide the appropriate lag length of each model based on reports of *all three* information criterion, giving slightly more emphasis to the AIC as our sample sizes are relatively small. This is as scientific as it is possible to be given the aforementioned difficulties.

4.2.2 Stationarity

As already noted, inference based on coefficient estimates from a VAR model are only meaningful if the order of integration of each of the series has been properly accounted for. In the unchecked presence of variables containing unit roots (denoted $I(1)$ variables) or higher order integration the standard asymptotic distributions of the estimates are no longer valid for straightforward testing. For this reason, it is crucial that each of the series included in the VAR model are examined for stationarity using an appropriate pre-test. The standard tests used in the literature are the ADF test of Dickey and Fuller (1979) and the test of Phillips and Perron (1988). The Phillips-Perron test is mainly used where heteroskedasticity or autocorrelation are believed to be present, but considerable evidence suggests that this test performs poorly compared to the ADF test in finite samples (Davidson & MacKinnon, 2004, p.623), so we use the ADF test as our primary method for all stationarity checks and resort to the Phillips-Perron only when the ADF strikes difficulties.

The ADF test regresses a variable on its own lagged value, testing the coefficient on the lagged term to determine whether it could be equal to one. It does this in a roundabout way,

transforming the model such that the first difference of the variable is regressed on the level of its lagged value, and the coefficient on the lagged value is equal to *zero* in the case of a unit root. Intercept and time-trend terms, as well as an indefinite number of differenced lags, are included as necessary so that the error term becomes a white noise process. A general form of the ADF test with a quadratic time-trend is as follows:

$$\Delta x_t = \alpha_0 + \alpha_1 t + \alpha_2 t^2 + \beta_1 x_{t-1} + (\beta_2 \Delta x_{t-1} + \beta_3 \Delta x_{t-2} + \dots) + \varepsilon_t \quad (3)$$

Where: Additional trend terms may be added as necessary
 Additional differenced lags may be added as necessary

The coefficient β_1 is equal to $(\theta - 1)$, where θ is the coefficient on the lagged variable in a simple autoregression. Therefore, a test of $\beta_1 = 0$ is equivalent to a test of $\theta = 1$. Dickey and Fuller (1979) demonstrate that the coefficients of the ADF tests do not follow the standard t-distribution and must be compared to critical values from an appropriate distribution. Estimates of this distribution are available, and Eviews 6 is able to calculate p-values based on simulated critical values. As with VARs, the choice of how many lags to include is important for the test results to be valid. Again, rather than rely on an arbitrary lag choice we use an information criterion to determine the appropriate order of the equation. In this case the SC is used, as this is the default criterion used by Eviews 6.

As most of our included series are indeed non-stationary, we have to adjust our VAR model in order to take account of this. The literature review highlighted two main approaches to doing this: using the framework of the VECM, or conducting tests within an augmented-VAR. The VECM makes explicit provision for any long-run relationships between the variables and keeps the addition of lagged terms to a minimum, which makes it an efficient approach for testing causal relationships. However, in larger systems (involving more variables) identification issues can arise if the model is not estimated using a two-step method. The augmented-VAR does not strike such difficulties, although it is less efficient than the VECM. So while most papers rely on

one or other of these approaches, we use both frameworks where possible. This is another important dimension in helping us evaluate the robustness of the results.

4.2.3 Vector Error Correction Models (VECMs)

A common approach to correcting for the presence of unit roots in the data series – particularly in earlier studies – has been to include the variables in first-differences and run a differenced-VAR (VARD) model. This exploits the property that $I(1)$ variables are stationary (or $I(0)$) in their first differences, but in many cases it is not appropriate as it does not allow for any long-run relationship that may exist between the variables. Engle and Granger (1987) showed that when two or more variables are integrated of order 1 there may exist a linear combination of them that is stationary. This linear combination is known as a *cointegrating equation*, and may be interpreted as a long-run relationship between the variables that has implications on their short-run movements. Referring to what Engle and Granger call *Granger Representation Theorem*,²¹ they show that the cointegrating equation can be incorporated into a meaningful model – the VECM. We will now outline the process that we follow in constructing VECMs for this empirical study.

After determining that at least two variables are integrated of order 1, we test for cointegrating relationships – where there may be more than one in a multivariate setting – using the method described by Johansen (1991). This involves estimating the coefficient matrix of a rearranged but unrestricted VAR model and then examining the rank of the matrix. According to the Granger Representation Theorem, the rank of the coefficient matrix is equal to the number of cointegrating relations present in the system. We make the standard assumption of a linear deterministic trend in the data and an intercept but no trend in the cointegrating equation and choose the lag length according to the criteria discussed previously. We use two tests to determine the significance of any cointegrating relationship(s) – the trace test and the maximum eigenvalue test – both of which are derived from the eigenvalues of the coefficient

²¹ This is based on the work of Granger (1981)

matrix. These two tests can cause conflicting results, and where this occurs we have to make a judgement as to the likely number of relations based on what is theoretically feasible. Cointegrating relations are not uniquely identified without some arbitrary form of normalisation, so in the bivariate case we restrict the coefficient on GDP to unity. The default approach in EViews is to estimate such models using a two-step approach; first estimating the cointegrating relation(s) by least squares and then estimating the VECM equations one by one with the cointegrating relations predetermined. However, this does not allow us to test for Granger-causality in our desired manner, so in order to be able to test all the coefficients in the system together we conduct an iterative maximum likelihood procedure without pre-fitting the cointegrating relations (it can easily be demonstrated that this provides identical coefficient estimates for the relevant parameters to the two-step approach). In the bivariate case with evidence for one cointegrating relation and a lag length of two in levels, we therefore estimate the following VECM:

$$\Delta x_t = \alpha_1 + \delta_1(x_{t-1} - \theta y_{t-1}) + \beta_{11}\Delta x_{t-1} + \beta_{12}\Delta y_{t-1} + \varepsilon_{1t} \quad (4)$$

$$\Delta y_t = \alpha_2 + \delta_2(x_{t-1} - \theta y_{t-1}) + \beta_{21}\Delta x_{t-1} + \beta_{22}\Delta y_{t-1} + \varepsilon_{2t} \quad (5)$$

Where the intercept terms are actually composite terms comprising both the standard intercepts and the intercepts from the respective cointegration terms. In the trivariate case – the largest case to which we apply this model – there are a number of possible forms depending on the number of cointegrating relations and the normalisations chosen, but it is important to note that the results are unaffected by the choice of normalisation. The iterative procedure used to estimate these VECM systems is inherently fragile to initial parameter values and can take a few attempts before they accurately match the correct values found in the two-step procedure. We will discuss how Granger-causality is tested for in these models after first introducing the augmented-VAR approach in more detail.

4.2.4 Augmented-VAR Models

Unfortunately, in larger systems we strike difficulties in the application of VEC models, which could not be identified using the simultaneous maximum-likelihood procedure discussed above. In order to successfully conduct Granger-causality tests in these larger systems including labour and education – as well as supplement the results of the bivariate and trivariate VECMs – we make use of the well-known augmented-VAR approach of Toda and Yamamoto (1995) and Dolado & Lütkepohl (1996).

Although Toda and Yamamoto put forward their methodology as a way of avoiding pre-test biases associated with tests like the ADF, realistically this approach still begins with tests for the order of integration of each of our data series, which we conduct in the standard fashion using the ADF test. Following the use of the previously discussed information criterion to determine the true lag length of the balanced VAR model made up of these variables, the augmented-VAR (or *augmented lags*) approach then requires estimation of a $VAR(p+q)$ model; where p is the true order of the VAR and q is the highest order of integration in the data series. This amounts to intentionally over-fitting the VAR. A requirement for the success of this method is that q does not exceed p . In a simple bivariate system with a true lag length of 2 and a maximum order of integration of 1, this involves estimation of the following levels model:

$$x_t = \alpha_1 + \beta_{11}x_{t-1} + \beta_{12}x_{t-2} + \beta_{13}x_{t-3} + \beta_{14}y_{t-1} + \beta_{15}y_{t-2} + \beta_{16}y_{t-3} + \varepsilon_1 \quad (6)$$

$$y_t = \alpha_2 + \beta_{21}x_{t-1} + \beta_{22}x_{t-2} + \beta_{23}x_{t-3} + \beta_{24}y_{t-1} + \beta_{25}y_{t-2} + \beta_{26}y_{t-3} + \varepsilon_2 \quad (7)$$

Which can be estimated on an equation-by-equation basis using simple OLS estimation. This is easily extended to multivariate models, where we include an additional equation for each extra variable and all variables are included as regressors for $p+q$ lags in each equation.

Toda and Yamamoto show that the Wald test for joint significance of the lagged coefficient terms is valid in this model – even in the presence of integrated data series and cointegration –

as long as the order of integration of the process doesn't exceed the true lag length of the VAR. They show that the asymptotic distribution of the Wald test statistic follows the standard chi-square properties within this augmented framework. However, it is important to note that both the addition of redundant lag terms and the exclusion of any explicit cointegrating relations serve to reduce the efficiency – and therefore power – of these tests. Toda and Yamamoto note that because of this they should be used in conjunction with VECM tests where possible, but Dolado and Lütkepohl find that the loss in power is small when the true order p is large and the number of included variables is relatively small.

4.2.5 Testing for Granger-causality

We have already talked about the concept behind Granger-causality – which determines something more akin to predictability than causality, albeit possibly the best we can do statistically – and have discussed the extensive use of Granger-causality in the literature on exports and growth. We now turn to the specific ways in which we test for Granger-causality in the models just described.

Rather than testing for Granger-causality, what we really examine is Granger *non*-causality. In order to do this we employ formal tests of restrictions, rather than other slightly less common approaches involving impulse response functions or forecast error variance decompositions. This involves testing the significance of coefficients of appropriate lagged terms of one variable on another variable – determining, for example, the ability of previous values of *exports* to statistically explain the value of *GDP* in the following period. This is not undertaken in a uniform way across the literature – particularly where VEC models are concerned – because decisions have to be made around which lagged terms should be tested. As Toda and Phillips (1994) make clear; in the VECM case, significance of the coefficient on the cointegrating relation (δ_1 and δ_2 in equation 4) implies long-run Granger-causality in the sense that the

‘endogenous’²² variable is adjusting in line with the longer-term disequilibrium between it and the other variables in the system. But similarly, significance of the coefficients on the lags of the other variables (just β_{12} in equation 4) implies short-run Granger-causality in the sense that the ‘endogenous’ variable is responding to previous values of the other variables. In order to reconcile these two approaches – and in line with discussions in Giles and Williams (2000b) and Ghali (2000) – we test for both long and short-run Granger-causality concurrently by testing the significance of *all* coefficients on the lags of the supposed causal variable. This is tantamount to a test for the complete exclusion of one variable in the equation for another. For example, in the VECM model depicted by equations 4 and 5 above, we would test for Granger non-causality by the following exclusions under the null hypothesis:

$$H_0: \delta_1 \theta = 0, \beta_{12} = 0 \quad \text{To test the non-causality of } y \text{ on } x, \text{ and:}$$

$$H_0: \delta_2 = 0, \beta_{21} = 0 \quad \text{To test the non-causality of } x \text{ on } y$$

This is tested using the aforementioned Wald test statistic, which is another common approach to take. This effectively tests how close the estimates of the unrestricted model come to satisfying the restrictions under the null hypothesis,²³ and does so by comparing maximum likelihood estimates of the restricted and unrestricted models – assuming independently and identically normally distributed errors. For either linear or non-linear restrictions the Wald statistic can then be compared to the chi-square distribution with degrees of freedom equal to the number of restrictions imposed (2 in both of the above null hypotheses). Since the null implies Granger *non*-causality, rejection of the null is interpreted as evidence for causality in the Granger sense.

²² By ‘endogenous’ what we mean is the variable on the left-hand side of the particular equation. In VAR terms it would not be appropriate to think of it as endogenous in the common meaning of the word.

²³ For details of the specific mathematical calculation involved, see: Quantitative Micro Software (2007, p.145).

Testing for Granger non-causality is even simpler in the augmented lags model, as it only ever comprises a number of linear restrictions. The fundamental thing to remember with the augmented model is that the additional q lags should be excluded from any formal coefficient tests; they have been included in the system of equations purely to allow the coefficients to follow the standard asymptotics, and are in themselves not meaningful. Using equations 6 and 7 as our example, and remembering that the third lag represents the additional lagged term, our null hypotheses of Granger non-causality are:

$$H_0: \beta_{14} = 0, \beta_{15} = 0 \quad \text{To test the non-causality of } y \text{ on } x, \text{ and:}$$

$$H_0: \beta_{21} = 0, \beta_{22} = 0 \quad \text{To test the non-causality of } x \text{ on } y$$

These restrictions are again tested using the Wald test statistic. In the case of tests which contain more variables than just GDP and exports, we also examine the other causal relationships in the system only in order to determine whether there may be indirect effects on GDP or exports through the other variables. As discussing these findings can be quite lengthy – particularly in the larger models – we only present these results where they are consequential to our final conclusions.

4.2.6 Model Selection

A major contribution of this study is the variety of assumptions and methodologies involved in the econometric tests – which provides a far greater insight into the true relationship between exports and growth in Mauritius and Tunisia. The examination of robustness involved in varying the framework of the models has been a common omission in most ELG literature, and to date all ELG papers on these two countries have focussed around just one key model with one set of assumptions. The neoclassical model of the production function serves as a loose basis for the inclusion of our variables, so it warrants a brief introduction here. The neoclassical model depicts output as a non-linear function of a number of variables: capital and labour in its most basic form, but exports and human capital have also been put forward as likely

determinants. A very simple neoclassical production function including all five of these variables would appear something like this²⁴:

$$GDP_t = A_t L_t^\alpha K_t^\beta H_t^\gamma X_t^\delta \varepsilon_t \quad (8)$$

Where:

- L represents the labour input
- K represents the physical capital input
- H represents the human capital input
- X represents some measure of exports
- A is a technology or productivity term
- ε represents unexpected shocks to the system
- $\alpha, \beta, \gamma, \delta$ are the respective elasticity terms

In natural-logged terms, therefore, this neoclassical production function is:

$$\ln(GDP_t) = \ln A_t + \alpha \ln(L_t) + \beta \ln(K_t) + \gamma \ln(H_t) + \delta \ln(X_t) + \ln \varepsilon_t \quad (9)$$

Which is clearly linear in terms, and allows for far simpler estimation. Although this is not a great mathematical depiction of economic growth – falling into the category of exogenous growth models – its popularity has continued because it captures much of what growth experts believe to be the key determinants to economic growth. We don't base our tests on this model, however it helps inform the decision of which variables could justifiably be included.

As a starting point, our first set of tests are based on bivariate data: using real GDP and real aggregate exports. As described in the data section these are annual values from 1961 to 2008 and 2009 (for Tunisia and Mauritius, respectively), and we include them both in their natural-logged form. As a general rule, including the variables in their natural logs implies that we

²⁴ See Barro and Sala-i-Martin (2004) for a background discussion of this type of model.

believe there to be a non-linear relationship between the variables in question and – as the literature review demonstrated – this is a common approach. It is also in line with the neoclassical-style production function that we have just introduced. This bivariate approach is applied to both countries using the VECM methodology initially, and then the augmented-lags model; so there are four regressions in total (two for each country).

We then move on to a set of tests based on trivariate data – including GFCF as a third variable. The basis for this is that capital is an obvious input into the production function, as machinery and infrastructure is vital for the production process (including the production not only of physical goods but also services to a large degree). Along with labour, capital is one of the two fundamental inputs in the most basic neoclassical production function model. Unlike the labour input, however, its inclusion as a control variable is relatively easy for this study given that for both countries GFCF data is available for the full time period. We apply this trivariate approach to both countries – again using the VECM methodology initially and then reinforcing it with the augmented lags model. This produces another four regressions (two for each country).

Finally, we move on to a set of larger – five-variable – models; adding both employment and education to the trivariate dataset as control variables. This is intended to capture the effects of the other major input to the production process: labour. As described earlier, employment is a measure of the total labour force at work in each country and education is included in an attempt to account for the productiveness of these employees. This is not usually included in such studies, but certainly warrants inclusion given the widespread consensus that labour is a (if not *the*) major contributor to total output. Unfortunately, due to the limited availability of this data, the test could only be applied to the shorter 1972-2009 period for Mauritius (38 observations, rather than the full 49) and the 1966-2008 period for Tunisia (43 observations, rather than the full 48). As noted, we were not able to apply the VECM framework to this five-variable model, as the estimation approach necessary for our particular Granger-causality tests leads to identification issues that are not reconcilable. An increased number of coefficients and

cointegration relations puts too much demand on our (smaller) sample size. Instead, we rely solely on the augmented-lags approach for these tests.

So the contribution of this study is to provide a wide array of tests, varying the timeframe, model framework, and the variables that are included. This involves ten tests in total – five for each country. To reinforce these robustness checks even further, we undertake each of these ten tests again, this time assuming a linear – rather than log-linear – relationship between the variables. Because we have no strong conviction that the relationship is non-linear, a linear relationship could also be feasible and this is still in-line with some of the literature. This leads to ten additional tests with the variables included in their unlogged levels (doubling the number of tests).

Finally – for reasons that will become clear once the results are presented – we then undertake one last pair of tests for Tunisia which includes GDP, GFCF (as a control) and the five *disaggregated* export sectors introduced in the previous section. This attempts to determine the specific impact of key export sectors and to provide deeper understanding of the relationship between exports and output growth in Tunisia. The seven-variable test is estimated using the augmented-lags model and is applied to both the logged and unlogged cases – adding an additional two tests. Overall therefore, we conduct a total of 22 key tests of the export-led growth hypothesis – 10 for Mauritius and 12 for Tunisia – and a smaller number of additional robustness checks. *Table 4.1* below provides an overview of these 22 key regressions.

Table 4.1 Summary of all 22 ELG Tests***Mauritius***

	Included Variables	Transformations	Range	Methodology
1	2: GDP, Exports	Logged	1961-2009 (49)	VECM
2	2: GDP, Exports	Logged	1961-2009 (49)	Augmented Lags
3	2: GDP, Exports	Unlogged	1961-2009 (49)	VECM
4	2: GDP, Exports	Unlogged	1961-2009 (49)	Augmented Lags
5	3: GDP, Exports, GFCF	Logged	1961-2009 (49)	VECM
6	3: GDP, Exports, GFCF	Logged	1961-2009 (49)	Augmented Lags
7	3: GDP, Exports, GFCF	Unlogged	1961-2009 (49)	VECM
8	3: GDP, Exports, GFCF	Unlogged	1961-2009 (49)	Augmented Lags
9	5: GDP, Exports, GFCF, Labour, Employ	Logged	1972-2009 (38)	Augmented Lags
10	5: GDP, Exports, GFCF, Labour, Employ	Unlogged	1972-2009 (38)	Augmented Lags

Tunisia

	Included Variables	Transformations	Range	Methodology
1	2: GDP, Exports	Logged	1961-2008 (48)	VECM
2	2: GDP, Exports	Logged	1961-2008 (48)	Augmented Lags
3	2: GDP, Exports	Unlogged	1961-2008 (48)	VECM
4	2: GDP, Exports	Unlogged	1961-2008 (48)	Augmented Lags
5	3: GDP, Exports, GFCF	Logged	1961-2008 (48)	VECM
6	3: GDP, Exports, GFCF	Logged	1961-2008 (48)	Augmented Lags
7	3: GDP, Exports, GFCF	Unlogged	1961-2008 (48)	VECM
8	3: GDP, Exports, GFCF	Unlogged	1961-2008 (48)	Augmented Lags
9	5: GDP, Exports, GFCF, Labour, Employ	Logged	1966-2008 (43)	Augmented Lags
10	5: GDP, Exports, GFCF, Labour, Employ	Unlogged	1966-2008 (43)	Augmented Lags
11	7: GDP, GFCF, Exports (x5)	Logged	1968-2008 (41)	Augmented Lags
12	7: GDP, GFCF, Exports (x5)	Unlogged	1968-2008 (41)	Augmented Lags

The next chapter will present the results of these tests and provide some preliminary interpretations.

Chapter 5: Results

5.1 Results

Following the econometric methodology described in the previous chapter, we now present the results of our twenty-two econometric tests. We will present the results step-by-step, starting with the smaller-order tests and then gradually adding the additional explanatory variables as discussed in the previous chapter. The focus is on the relationship between exports and output growth, but where appropriate there is some mention of other causality results in the larger models.

5.1.1 Bivariate Tests

We start with our bivariate tests. Testing the order of integration of the natural-logged bivariate data for Mauritius, we find that both *GDP* and *exports* are $I(1)$ and tests for cointegration suggest a significant cointegrating relationship. All three information criteria estimate that the true order of the VAR is three, which means that we include two lag lengths in our VECM. Granger causality tests of this VECM indicate that *exports* Granger-cause *GDP* at a 95% confidence level, but that *GDP* does not Granger-cause *exports* (where we consider anything less than 90% to be insignificant given the small size of the sample). We interpret this as evidence for export-led growth. Tests on the corresponding augmented-VAR indicate that *exports* Granger-causes *GDP* at a 99.99% level, but that *GDP* also Granger-causes *exports* at a 99% level. This is evidence for a bi-directional relationship between the two variables, although it provides stronger support for ELG than GLE.

For the analogous unlogged tests, we find that *GDP* and *exports* are still both $I(1)$ and that again there is evidence of a significant cointegrating relationship. Both the SC and HQ information criteria suggest the true order of the VAR is now two, which means that we include one lag in our VECM. Granger causality tests indicate that *exports* Granger-cause *GDP* at a 99.99%

confidence level, but that *GDP* does not Granger-cause *exports*. Again this is strong evidence for export-led growth. Tests on the augmented-VAR confirm this, finding that *exports* Granger-cause *GDP* at a marginally lower 99.9% level and that there is no reverse causality. *Table 5.1* below summarises the findings of these four bivariate tests for Mauritius.

Table 5.1 Bivariate ELG Tests for Mauritius: GDP, Exports; 1961-2009

Transformation	Order of integration	VAR order	Model	Granger-causality result
Logged	GDP: 1 Exports: 1	3	VEC	ELG (95%)
			AL	BDC (99%)
Unlogged	GDP: 1 Exports: 1	2	VEC	ELG (99.99%)
			AL	ELG (99.9%)

Key: ELG = export-led growth; GLE = growth-led exports; BDC = bi-directional causality; NC = no causality.

Moving on to the bivariate tests for Tunisia, we find that the natural-logged series of *exports* is integrated of order one, but the natural-logged series of *GDP* is stationary. This rules out the existence of a cointegrating relationship between the two variables, so the VEC model cannot be used and we instead rely solely on the augmented-VAR approach. Information criteria suggest that the true order of the VAR is one, so we fit a VAR of order two, in line with the augmented-VAR technique. Granger causality tests indicate that there is no Granger-causality between *GDP* and *exports*.

However, in the corresponding unlogged tests we find that both *GDP* and *exports* are $I(1)$, and that there exists a significant cointegrating relation between them – so a VECM can now be applied. Information criterion suggest the true order of this VAR to be two. Granger causality tests find that *exports* Granger-cause *GDP* at the 90% level, while *GDP* Granger-causes *exports* at the 95% level – indicating support for a bi-directional relationship but stronger evidence for GLE than ELG. The augmented lags approach also finds evidence for bi-directional causality at the 90% level, but in this case there is stronger evidence for ELG than GLE (the p-values of the chi-squared statistics are 0.057 and 0.092, respectively). *Table 5.2* below summarises the findings of these four bivariate tests for Tunisia.

Table 5.2 Bivariate ELG Tests for Tunisia: GDP, Exports; 1961-2008

Transformation	Order of integration	VAR order	Model	Granger-causality result
Logged	GDP: 0 Exports: 1	1	VEC	N/A
			AL	NC
Unlogged	GDP: 1 Exports: 1	2	VEC	BDC (90%)
			AL	BDC (90%)

Overall, therefore, the bivariate tests find strong evidence for ELG in Mauritius over the period, but much weaker evidence for Tunisia, where we find some inconclusive evidence for BDC between exports and growth.

5.1.2 Trivariate Tests

Next we undertake an analogous set of tests, starting again with Mauritius and this time including *GFCF* as the first of our control variables. We have already determined that our logged series of *GDP* and *exports* are $I(1)$ over this time period, but the ADF test finds that logged *GFCF* is stationary. In this trivariate model the true order of the VAR again appears to be three according to our information criteria. We find strong evidence of one cointegrating relationship in this system but, interestingly, Granger causality tests now find no significant causal relations between any of the three variables. The augmented-lags approach, however, finds a completely different set of causal relationships. There is strong evidence for Granger-causality from *exports* to *GDP* (a 99% confidence level), and weak evidence for Granger-causality from *GDP* to *exports* (90% level), which is technically BDC but again favours an ELG relationship.

The analogous unlogged tests find that *GFCF* is $I(1)$ along with *GDP* and *exports*. The order of the VAR is estimated to be two, and there is evidence of one significant cointegrating relationship. Interestingly, this test supports its logged counterpart in finding no evidence of

any causal relationships within the three-variable system. The augmented-lags approach again contradicts these findings, estimating that *exports* Granger-causes *GDP* at a 99% confidence level and that there is no reciprocal causality. This is strong evidence for export-led growth. Interestingly, *exports* also Granger-causes *GFCF* at a 90% level. *Table 5.3* below summarises the findings of these four trivariate tests for Mauritius.

Table 5.3 Trivariate ELG Tests for Mauritius: GDP, Exports, GFCF; 1961-2009

Transformation	Order of integration	VAR order	Model	Granger-causality result ^a
Logged	GDP: 1 Exports: 1 GFCF: 0	3	VEC	NC
			AL	BDC (90%)
Unlogged	GDP: 1 Exports: 1 GFCF: 1	2	VEC	NC
			AL	ELG (99%)

^a For the bivariate relationship between exports and GDP.

The same trivariate tests are repeated for Tunisia, beginning with the logged regressions. In this instance *GFCF* is $I(1)$ so, although *GDP* is stationary, searching for a cointegrating relation is now appropriate. The true lag-order of the VAR is estimated to be two, and we find strong evidence of one cointegrating relationship. Based on this, we find no evidence of any causal relationship between *GDP* and *exports*, although there is significant evidence for Granger-causality from both *GDP* and *exports* to *GFCF*. The augmented-lags approach confirms this result, not rejecting either of the Granger non-causality hypotheses between *GDP* and *exports*. The only significant finding in this case is Granger-causality from *exports* to *GFCF*.

In the equivalent unlogged tests, we find that *GFCF* is $I(1)$ – along with *GDP* and *exports* – and we estimate the true order of the VAR to be two. In this case we find conflicting results from our cointegration tests. The trace test indicates the presence of two cointegrating relations, while the max-eigenvalue test indicates the presence of just one. As either arrangement is feasible in this three-variable system and we have no way of knowing which test is correct, we allow just one cointegrating relation and then check the robustness of the results to this

assumption by comparing them to the findings of a VECM with two cointegration relations. Tests of the first VECM indicate no Granger-causality between any of the variables, and this result is confirmed by the VECM with two cointegrating relations. The second robustness check – the augmented-VAR – also confirms the absence of any significant Granger-causality relationships between these three variables in Tunisia. *Table 5.4* below summarises the findings of these four trivariate tests for Tunisia.

Table 5.4 Trivariate ELG Tests for Tunisia: GDP, Exports, GFCF; 1961-2008

Transformation	Order of integration	VAR order	Model	Granger-causality result
Logged	GDP: 0 Exports: 1 GFCF: 1	2	VEC	NC
			AL	NC
Unlogged	GDP: 1 Exports: 1 GFCF: 1	2	VEC	NC
			AL	NC

On the whole, including just *GFCF* as an additional explanatory variable significantly reduces the incidence of significant Granger-causality findings. The evidence is mixed for Mauritius – some of it supports an ELG hypothesis – but for Tunisia the results clearly give no support to either ELG or GLE over this period.

5.1.3 Five-variable Tests

We then move on to our five variable tests, and include employment (*employ*) and education (*educ*) as two additional regressors alongside *GDP*, *exports* and *GFCF*. As discussed in the methodology section, identification issues now mean that we have to rely on the augmented-VAR for our tests. It should also be highlighted that including these additional control variables necessitates a reduction in the time-periods examined, and as a result we need to re-test each of the five variables for stationarity.

We begin again with the natural-logged test for Mauritius, which covers the period 1972-2009. In this case each of *GDP*, *exports*, *employ* and *educ* are found to be $I(1)$, while *GFCF* is

stationary. The true VAR is estimated to contain two lags of each variable, so once we include the augmented lag necessary for standard asymptotics to apply we are required to estimate an 80-coefficient system of five equations. Within this system there are twenty possible bilateral Granger-causality relationships to test, so we present only the ones relevant to *GDP* or *exports*. Significant Granger-causality results are found from *exports* to *GDP* (at the 95% level), from *exports* to *GFCF* (90%) and from *exports* to *educ* (90%). No significant Granger-causality relationship exists from *GDP* to *exports* in this case, so this is reasonably strong evidence for ELG.

In our unlogged five-variable test for Mauritius, we find that each of *GDP*, *exports*, *GFCF* and *employ* are $I(1)$, but the new series *educ* is $I(2)$, so our highest order of integration is now two. Combined with an estimated true VAR order of two, this means estimation of a four-lag augmented-VAR, with a combined total of 105 coefficients to estimate (made possible only because each of the system's five equations are estimated sequentially and independently). Within this enormous system, we find evidence that *exports* Granger-causes *GDP* at a 95% confidence level, but that *GDP* simultaneously Granger-causes *exports* at a 95% level. This is reasonably strong evidence for bi-directional causality between *exports* and *GDP*. In addition, *educ* Granger-causes *GDP* and *exports* at 90% and 99.9% confidence levels, respectively. As a further robustness check to this, however, we assume instead that *educ* is only $I(1)$ – given that we were forced to interpolate the underlying data and that this may be interfering with the stationarity tests. In this instance we find no significant causal relationships, although we are 0.23% away from concluding ELG at the 90% confidence level. *Table 5.5* below summarises the findings of the two main five-variable tests for Mauritius.

Table 5.5 Five-variable ELG Tests for Mauritius: 1972-2009

Transformation	Order of integration	VAR order	Model	Granger-causality result
Logged	GDP: 1 Employ: 1 Exports: 1 Educ: 1 GFCF: 0	2	AL	ELG (95%)
Unlogged	GDP: 1 Employ: 1 Exports: 1 Educ: 2 GFCF: 1	2	AL	BDC (95%)

We also need to re-examine all five of the Tunisian variables for stationarity, given the reduced time period (1966-2008). In our logged five-variable model the ADF test finds that *GDP*, *exports* and *GFCF* are all $I(1)$, while *educ* is $I(2)$ and *employ* is stationary. Information criteria suggest that the true order of the VAR is now one. Unfortunately, because the highest order of integration exceeds the order of the VAR (i.e. $q > p$) we cannot proceed with the test under the current assumptions. We re-examine *educ* using the Phillips-Perron test and find that with a quadratic trend the series is now $I(1)$, and this allows application of the augmented lags model. Estimating this 55-coefficient VAR(2) model, we find no significant Granger-causal relationships between *exports* and *GDP*. The only significant causality result is from *exports* to *GFCF* at the 95% confidence level.

In the equivalent unlogged tests, we find that each of *GDP*, *exports*, *GFCF* and *educ* are $I(1)$, while *employ* is now $I(2)$. The consensus among information criteria is that the true order of the VAR is now two, so we allow for four lags and estimate a larger 105-coefficient model. The results support the logged five-variable test: there is no evidence for the existence of any Granger-causality between *exports* and *GDP*. *Educ* is found to Granger-cause *GDP* and *employ* (both at a 95% level), and *GFCF* is found to Granger-cause *educ* at a 90% confidence level). Again, we re-estimated this result, this time treating the true order of integration of *employ* as one (assuming an error as a result of the interpolation). These results confirm that there is no evidence for any significant causal relationships between the variables of interest. Table 5.6 below summarises the findings of the two main five-variable tests for Tunisia.

Table 5.6 Five-variable ELG Tests for Tunisia: 1966-2008

Transformation	Order of integration	VAR order	Model	Granger-causality result
Logged	GDP: 1 Employ: 0 Exports: 1 Educ: 2 GFCF: 1	1	AL	NC
Unlogged	GDP: 1 Employ: 2 Exports: 1 Educ: 1 GFCF: 1	2	AL	NC

Overall, the five variable tests provide support for the smaller-order tests. There is evidence for ELG in Mauritius, and no evidence for any causal relationships between *exports* and *GDP* in Tunisia.

5.1.4 Disaggregate Tests for Tunisia

Given the overwhelming lack of evidence for any causal relationships between aggregate *exports* and *GDP* in Tunisia, we explore this deeper by undertaking an examination of the impacts of *disaggregated* export sectors on *GDP*. This is in an effort to identify whether there are specific sectors that may have had an impact on growth, but whose effects are concealed by the aggregate data. In order to do this, we utilise the five disaggregated export sectors introduced in the previous chapter: international tourism receipts (*tourism*), manufactured goods (*manuf*), food products (*food*), petroleum products (*petrol*) and other exports (*other*; including both goods and services). We include these alongside *GFCF* and *GDP* but not *employ* or *educ* as the latter two series are not of comparable quality and put considerable identification restrictions on our model. This covers the period 1968-2008.

As always, we start with the test containing natural-logged variables. The ADF test indicates that *GDP*, *GFCF*, *manuf* and *petrol* are all $I(1)$, while *tourism*, *food* and *other* are all stationary. The order of the VAR is determined to be one, so we fit a seven-equation model with two lags of each variable (105 coefficients in total). In this case, there are no significant Granger-

causality results between *GDP* and any of the five disaggregated export sectors. Nor are there any significant causality results between *GFCF* and any of the variables.

We then move on to the un-logged regression. In this case, we find that *GDP*, *GFCF*, *food*, *petrol* and *other* are all $I(1)$, *manuf* is $I(2)$ and *tourism* is stationary. The true order of the VAR is estimated to be one, so the likely inclusion of an $I(2)$ variable requires the estimation of a seven-equation model containing three lags of each variable. This would mean estimation of an enormous 154-coefficient model, but unfortunately because the highest order of integration exceeds the order of the VAR (i.e. $q > p$) we cannot proceed. The Phillips-Perron test with a quadratic trend term suggests that the true order of *manuf* is actually one, so we assume that this is the case and estimate our seven-equation model with just two lags of each variable. Confirming the logged result, we find no evidence of Granger-causality between *exports* and *GDP*. The only significant causality result is from *other* to *GFCF* (95% level). Table 5.7 below summarises the findings of the two main five-variable tests for Tunisia.

Table 5.7 Seven-variable ELG Tests for Tunisia: 1968-2008

Transformation	Order of integration	VAR order	Model	Granger-causality result
Logged	GDP: 1 Food: 0 GFCF: 1 Petrol: 1 Tourism: 0 Other: 0 Manuf: 1	1	AL	NC
Unlogged	GDP: 1 Food: 1 GFCF: 1 Petrol: 1 Tourism: 0 Other: 1 Manuf: 1 (2)	1	AL	NC

So a more in-depth examination of the interaction between *GDP* and various export sectors in Tunisia indicates that the absence of any causal relationship holds even at the sectoral level. This can only be taken as indicative, given that we were unable to support this with evidence from a VEC framework, or to include the two additional control variables.

5.2 General Interpretation and Cross-Country Comparison

Here we provide an overview of the general results of these 22 empirical tests. Overall, the results for each country show remarkable consistency, indicating that the outcomes we have obtained demonstrate a good degree of robustness. It is interesting to note that since a minority of tests provide results that conflict with the rest, it is clearly possible to manufacture a different outcome based on alterations to the number of variables, transformation or model structure. This demonstrates the importance of the presenting a broad array of results – as we have done here – in order to get a more robust sense of the underlying relationships. We present each country in turn but keep discussion to a basic interpretation of the empirics only; an economic interpretation is saved for the final chapter.

5.2.1 Mauritius

Table 5.8 below provides an overview of the ten tests we conducted for Mauritius (as discussed in detail above).

Table 5.8 Summary of ELG results for Mauritius

Number of variables	Included variables	Period	Transformation	Model	Granger-causality result
2	GDP, exports	1961-2009 (49 obs.)	Natural logged	VEC	ELG (95%)
				AL	BDC (99%)
			Unlogged	VEC	ELG (99.99%)
				AL	ELG (99.9%)
3	GDP, exports, GFCF	1961-2009 (49 obs.)	Natural logged	VEC	NC
				AL	BDC (90%)
			Unlogged	VEC	NC
				AL	ELG (99%)
5	GDP, exports, GFCF, employ, educ	1972-2009 (38 obs.)	Natural logged	AL	ELG (95%)
			Unlogged	AL	BDC (95%)

Overall, the ten tests provide clear evidence for the export-led growth hypothesis in Mauritius. Exactly half of the tests find Granger-causality from *exports* to *GDP* without any reciprocal causality, and these are all at least reasonably strong – ranging from 95% to 99.99% significance. Of the five remaining tests, only two of them find no evidence for causality from *exports* to growth – the two trivariate VEC tests (logged and unlogged). The other three tests all find a significant Granger-causal relationship both ways between *GDP* and *exports*. Of these, however, the two and three variable tests find much stronger evidence for causality from *exports* to *GDP* (99.99% and 99%, respectively), than from *GDP* to *exports* (99% and 90%, respectively), and the robustness check of the final result is very close to finding ELG at the 90% level. So overall, seven or eight of the ten tests find evidence in support of the ELG hypothesis in Mauritius.

There does not appear to be any strong tendency for the unlogged tests to find ELG more often than the natural-logged tests, although the augmented-lag models appear to find ELG more often than the VECMs. As we cannot judge the different tests according to which we deem to be most accurate (there are tradeoffs around the number of included variables versus the number of observations and quality of the data, for example) we are unable to improve our understanding by giving greater credence to any of the tests. Overall, therefore, there is only a very weak or non-existent case for no causality, bi-directional causality or GLE in these results, but *we find very strong evidence for ELG in Mauritius from 1961-2009*. This in line with Durbarry (2004), who finds a long-run relationship between exports and growth through a significant cointegrating vector. It is not strongly aligned with Mukungu (2008), who applies the augmented-VAR methodology and finds evidence that there is a bi-directional relationship.

5.2.2 Tunisia

Table 5.9 below provides an overview of the twelve tests we conducted for Tunisia (as detailed in the previous section).

Table 5.9 Summary of ELG results for Tunisia

Number of variables	Included variables	Period	Transformation	Model	Granger-causality result
2	GDP, exports	1961-2008 (48 obs.)	Natural logged	VEC	N/A
				AL	NC
			Unlogged	VEC	BDC (90%)
				AL	BDC (90%)
3	GDP, exports, GFCF	1961-2008 (48 obs.)	Natural logged	VEC	NC
				AL	NC
			Unlogged	VEC	NC
				AL	NC
5	GDP, exports, GFCF, employ, educ	1966-2008 (43 obs.)	Natural logged	AL	NC
			Unlogged	AL	NC
7	GDP, GFCF, exports (tourism, manuf, food, petrol, other)	1968-2008 (41 obs.)	Natural logged	AL	NC
			Unlogged	AL	NC

In terms of robustness, the results for Tunisia are even more congruous than those for Mauritius. The result they come to, however, couldn't be more different. Nine of the eleven complete tests find no evidence for any Granger-causality between *exports* and *GDP*, and both of the remaining two find only weak causality between them. The weak significance of the two isolated bi-directional causality results does not provide any considerable challenge to the overwhelming conclusion that *there appears to have been no observable causal relationship between exports and GDP in Tunisia over the period 1961-2008*. This is in line with Ghali's (2000) short-term Granger-causality findings but not with his long-run findings, which estimated a bi-directional relationship. Nor is it in line with Hachicha's (2003) conclusion that ELG was taking place from 1963-1993. This may be due to methodological or time-period differences, but because these papers provide no sensitivity analysis the true reason for the disagreement is unclear. Our results are partly in line with Cortés-Jiménez et al. (2011), in that we find no significant impact of the tourism sector on growth. Unlike them, however, we do

not find evidence for GLT. We have not tested their finding of a significant short-run TKIG dynamic.

Overall then, our broad range of testing methods and assumptions have found evidence for ELG in Mauritius but no significant causal relationship between *exports* and *GDP* in Tunisia over the same period. We will discuss the possible reasons for this finding and the applications that arise from it in the next – and final – chapter.

Chapter 6: Conclusions and Applications

In chapter 2 we explored the current literature relating to the economic growth and development of Mauritius and Tunisia, consolidating the various arguments to see whether any key messages were apparent. In chapter 3 we then examined the two countries in more detail, presenting a timeline of relevant economic, social and political happenings since independence, examining some of the key characteristics of each country in more detail, and then making a direct comparison of the two. Chapters 4 and 5 then presented the empirical contribution of this paper: a comprehensive econometric examination of the causal relationships between exports and GDP. In this chapter we will bring together the key findings of these three pieces of analysis and then make some applications, concluding with a short discussion of possible avenues for future research.

6.1 What Can We Conclude?

6.1.1 *Mauritius*

We begin with a discussion of Mauritius. The literature review revealed a strong consensus that exports were a (if not *the*) key driver of growth in the Mauritian economy, and this notion certainly seemed to have some weight as we looked in more detail at the growth strategies pursued by successive Mauritian governments. It was not surprising, therefore, that our statistical analysis provided overwhelming evidence for the presence of a one-way (Granger) causal relationship leading from exports to GDP. Both of the bivariate VEC models found evidence for a significant long-run relationship between exports and GDP, and variations in export performance seem to provide a good explanation for subsequent variations in GDP in the significant majority of our models. Given that the volume of Mauritius' exports over the years was relatively small compared to many of the East-Asian tiger economies, this phenomenon cannot be explained by export volume alone. We looked at a number of ways in which exports might contribute to GDP beyond their own direct (accounting) contribution, and

in the case of Mauritius we found that two particular explanations stood out. The first is the notion of idea gaps and positive externalities attributable to foreign investment. The unique combination of generous quotas under the MFA and the establishment of a heavily textile-focussed EPZ meant that FDI for textile manufacturing had a particularly knowledge- and technology-imparting quality. The second is that through a transformation of the export sector the government was able to bring about an economy-wide structural transformation, positioning Mauritius to have a comparative advantage in a series of high value-added sectors: from sugar to manufacturing, tourism, offshore banking and ICT. Mauritius was also in a position for increased export production to soak up a large pool of surplus labour, and there is some evidence that increased capacity to import capital goods was another mechanism by which exports contributed to growth, but we have not tested this notion here. Other factors such as enhanced competition and economies of scale may also have contributed to the effect of exports on output growth, but these mechanisms do not receive much attention in the literature. Sawkut et al. (2009) may have calculated that the costs of the EPZ experiment outweighed the benefits, but this is certainly not the conclusion we come to here.

Although it is not possible to determine from the econometric analysis, the discussion also highlighted the importance of social policies in the growth process. High rents earned in the sugar sector were channelled into a strong social welfare system – including free healthcare and education – which improved equity among the population, strengthened social cohesion and provided the skilled workforce necessitated by the economic transition. While it was not the focus of our empirical analysis, we did find some peripheral evidence in one model that education caused both GDP and exports in the Granger sense. We don't know that these findings were robust, but it may still be indicative of the importance of educational reforms. Most evidence suggests, however, that overall this social development took less of a central role in the economic growth process – supporting, rather than leading. Another vital supporting role was played by the strong institutional environment, which promoted consistency in development despite continual changes to the ruling government. There is certainly reason to believe that Mauritius 'got lucky' in many ways, but the government was

able to take advantage of the opportunities presented to it in such a way as to bring about a strongly export-led growth, the gains from which were protected by this strong institutional framework. The conclusion must be, therefore, that exports were central to growth in Mauritius over the period. However they cannot be credited with all the success: export strategies carried Mauritius to success, but they themselves were propped up and supported by these other important factors. There is some evidence to support the idea that GDP growth also led to increases in the export sector – a notion which seems to have some merit – but the overall relationship was certainly dominated by exports leading growth.

6.1.2 *Tunisia*

In the case of Tunisia, a review of the literature revealed less emphasis on exports than it did for Mauritius. Exports were certainly not disregarded, but overall they were presented as one important aspect in an array of different factors that contributed to the country's rapid income growth. This made it less obvious what to expect from our econometric analysis. The fact that we found almost negligible evidence for any causal relationships was in many ways in-line with the idea that exports were part of a package of growth-contributors and in themselves may not have led growth in the Granger-causal sense. This is strengthened by the fact that there was no significant evidence that GDP was leading exports, which is not out of line with the notion that exports were just a product of greater output and a constant marginal propensity to export. Even though our examination of the different periods of Tunisian development highlighted the importance of exports in the government's development strategy only after the end of the socialist period, our tests of this narrower range of years still found no evidence for export-led growth. Nor did we find evidence in any of the disaggregated export sectors we examined, which suggests that our findings are reasonably robust. The literature and our own qualitative analysis reveals that exports were still important, however. It appears that spillovers from international investment contributed to growth, imports of capital goods helped to transplant improved production techniques from abroad and the government seemed to promote certain export industries as part of a wider strategy to diversify the economy away from more traditional industries and in to new high value-added sectors.

Other factors that had important direct effects on economic growth seem to have found their origins in Tunisia's consistently high public expenditure. Government infrastructure investments facilitated productivity and efficiency improvements in the economy – as well as promoting priority sectors – and nurtured a particularly attractive business environment. Moreover, high government expenditure into social policy – including health, welfare and education – deepened the pool of skilled labour, enlarged the domestic market and brought a largely economically-dormant female population into productive employment. We find anecdotal evidence in one of our models that education was causing both GDP and employment in the Granger sense. These findings are not robust – and the country's experience undoubtedly calls the education-employment relationship into question – but they certainly point to the importance of improvements to the educational system.

As in Mauritius, the institutional environment seems to have played a key supporting role in all this. The strong political will to modernise and develop has received a lot of attention and is held in higher esteem even than the country's institutional framework. The popular notion that authoritarianism was necessary for driving forward such an ambitious growth strategy may have been overplayed, however, given that the detrimental effects of this dictatorship are only recently coming to light. Tunisia benefitted from high oil production during some periods in particular, and its textile exports were bolstered by the MFA, but exogenous factors did not do enough to claim responsibility for such remarkable growth. Overall, these non-export factors seem to have been crucial, although we were unable to properly test this claim in our econometric analysis. The conclusion seems to be, therefore, that exports were an important part of the rapid economic growth of Tunisia over the period, but only as one aspect of a wider strategy pursued by the government in which other factors were at least equally as important as exports. The team of factors we have highlighted together drove forward consistently strong growth in the economy and made sure that this growth was widely distributed to all Tunisians.

6.1.3 A comparison

Despite very similar growth rates since their respective independencies, it has become apparent that there were quite different underlying growth processes taking place in these two countries. Exports were important in both, but took a central and leading role in Mauritius, while in Tunisia they were part of a wider package of reforms aimed at stimulating growth and development. This is reflected in the EPZ policies of the two countries: Tunisia has some country-wide export-endorsing policies but only two dedicated export zones – one in Bizerte and one in Zarzis – while Mauritius has effectively turned its entire island into an EPZ. It seems that both countries attained significant benefits from the transplantation of foreign technologies, skills and knowledge brought about by increased foreign influence as a result of these trade policies. Moreover, the governments of both nations promoted priority export sectors in order to lead the country through a structural transformation, moving from a reliance on agriculture to drive growth in the manufacturing sector and then move into services (both fortunate enough to be attractive tourist destinations). According to authors such as Herman and Montroll (1972), this dynamic structural transformation is a common occurrence as countries develop, but the way in which Mauritius and Tunisia pushed this forward by use of export strategies is somewhat less common.

Both countries invested significant resources into social policies, and the subsequent rise in human development undoubtedly played a role in their successes. In Tunisia this was more central to the development strategy, which may well have been due to a greater potential for marginal gains in Tunisia. Lower initial levels of life expectancy, education, general health and participation of women meant that investments in this area had greater opportunity to drive growth. Thus, social expenditure played more of a central role in Tunisian growth and development, but more of a supporting role in Mauritius'. Infrastructure investment was also important in both countries, although again arguably played a more central role in Tunisian development. Investment by the Mauritian government was perhaps more strategic – aimed at promoting the government's priorities – while Tunisian investment was overly expansive and unrestrained for many years. Accompanied by much lower private savings rates, this made

Tunisian public investment key in providing a strong capital base for economic expansion. The institutional environment played a fundamental supporting role in both countries, which is intriguing given that the governments stood as polar opposites. That Tunisia was able to achieve as rapid and consistent economic growth as Mauritius has been deemed evidence that democracy and political freedom are not necessary in order for such success to occur. The recent country-wide protests that led to the overthrow of Ben Ali's government challenge this assumption and raise a number of other questions. Real per capita GDP growth was roughly the same in both countries, but did this translate to equal growth in living standards? Drawing on the distinction we noted in chapter four, did this rise in incomes actually equate to higher growth in living standards in Mauritius, where freedoms – rather than authoritarian controls – were promoted? Given the narrower scope of this thesis, however, the answer to this is best left for another study.

Overall, it seems that if export-led growth is the desired method for achieving growth, Mauritius stands as a better model than Tunisia. Exports certainly seem to have Granger-caused GDP in Mauritius, and this empirical evidence complements the qualitative evidence we have also presented here. Mauritius is a prime example of export-led growth, but even then we have demonstrated the importance of the wider context. If, however, the goal is not export-led growth but growth in general, the answer is less clear. Tunisia demonstrates that exports can be an important part of the growth process even when they are not found to have led growth. Other factors can play a more or less central role, depending on the prevailing conditions in the countries themselves, but it seems that strong political will and a good institutional environment are important in either case.

6.2 Applications

What can this tell us about the replicability of the growth strategies of these two countries – particularly their export strategies? The first thing we would make clear is that this study

provides evidence that there is unlikely to be a *one-size-fits-all* method of achieving sustained growth. The promotion of exports in itself cannot be credited with all the success of these countries, because the wider economic environment played a deciding role in whether or not export policies were successful at bringing about growth. Exports took a more central role in Mauritius – hence our finding that they caused GDP growth in the Granger sense – but this was supported by public promotion of health, education and welfare. The Tunisian government’s efforts acknowledged that exports could be useful, but that they also needed to prioritise social development on a similar (or even larger) scale. The underlying conditions seem to have been what determined the level of prominence given to the export strategies in each country. Moreover, the literature review highlighted the questionable replicability of the EPZ policy pursued by Mauritius in particular. So the replicability of similar export policies is restricted by the prevailing environment.

Similarly, the ability to repeat the approaches of Mauritius and Tunisia may be limited by timing. Mauritius was able to kick-start rapid export growth through enormous sugar rents brought about by the high sugar prices it secured. Both the Mauritian and Tunisian textile export sectors were bolstered by their generous quotas under the MFA. With such generous trading agreements being scaled back globally, this particular ship may have sailed, as it were. Various developing country-centred trading agreements (such as AGOA) have been established in recent years, but it is unclear whether these will provide a favourable enough trading environment for other countries to so successfully follow the agriculture-manufacturing-services route that Mauritius and Tunisia did.

One thing that these two African success stories do highlight is that countries with poor initial conditions need not experience a “poverty trap”. Neither Mauritius nor Tunisia had particularly favourable conditions for growth upon independence, yet both were able to spark economic growth and channel newfound gains into further productive endeavours. The difference may be, of course, that both countries did have strong political will and visionary leadership upon independence and worked hard to develop a culture of strong institutions. Although we cannot

observe the alternate environment in these countries without this strong institutional framework, qualitative evidence certainly suggests that in its absence macroeconomic instability, corruption, or a poor business environment would have limited the opportunities for export success. Strong institutions, a trusted government and a stable economic environment may be key prerequisites for the success of export-focussed strategies and, more crucially, economic growth. Unfortunately, these foundations are missing from many of the poorest countries in Africa (and elsewhere) and in such cases the establishment of these foundational elements is likely to be a far more imperative initial focus.

Overall, therefore, this study presents an important contribution to the literature on African economic growth and development and on export-led growth. This constitutes the first in-depth comparison of these two very different countries and demonstrates that their remarkably similar economic growth experiences actually reflect quite different underlying growth processes. Our econometric analysis comprises the first such comprehensive and comparable test of these two countries, and suggests that in fact exports played a far more central role in Mauritius than they did in Tunisia.

6.3 Future Research

Before concluding, it is worthwhile drawing attention to some promising avenues for further research. Although making a solid contribution to our understanding of this specific area, this study naturally could not cover all that we would have liked it to. Nowhere was this more evident than in the econometric analysis. The methodology chapter made it strikingly apparent that to test for export-led growth by including every possible permutation would comprise an unwieldy number of regressions. However, there are some particular additions that we would suggest are worth undertaking. If the data can be found, it would be worth replicating some of these tests using quarterly or monthly data, rather than the annual data we have used here. To our knowledge, these datasets are not available for either country over the period we are

interested in, but if one is satisfied to look at a smaller (more recent) time period then this could provide an interesting robustness check to our results. As noted earlier, however, this would raise a number of new issues around seasonality. Low observation counts prevented us from examining separate time periods in this study, but given the discussion on how the importance of exports varied across different periods in both countries, this could be a valuable upshot from the use of quarterly or monthly data.

Moreover, it would be interesting to undertake an examination of the effects of disaggregated export sectors in Mauritius, as we did for Tunisia. Having found a strong Granger-causal relationship between aggregate exports and GDP we found it unnecessary to devote time to a disaggregated study here, but to do so would shed light on the relative impact that different export sectors had on growth. This would help us to better understand which export sectors were worth promoting, and could even be combined with a study of different periods to see if this impact was dynamic – i.e. whether the impact of manufacturing was eventually surpassed by that of tourism, and so on. This would also provide a meaningful comparison to existing disaggregate studies such as Durberry (2004).

A further promising approach would be to make a comparison of both of these countries with another – still impoverished – country. Focussing on the current conditions in that country, one could compare them with the conditions in Mauritius and Tunisia at their respective independencies and explore the ability of the still impoverished country to replicate their development experiences and achieve substantial economic growth. This would be a good complement to the current study. Moving away from a focus on export-policies and into supporting policies, another complementary approach would be to delve further into the underlying reasons why these two countries developed such strong institutional environments. We touched on this earlier, but the importance of institutions in both countries and the stark contrasts between their political experiences mean that an understanding of how this came about would be valuable. It could provide a significant insight for countries whose institutional environments may currently be detrimental (or outright prohibitive) to economic growth.

Finally, given the currently tumultuous political environment in Tunisia it would be interesting to undertake a retrospective study of the underlying causes of economic growth of Tunisia in, say, ten to fifteen years time. Once the 'dust has settled' and a better understanding of the true political and social environment in Tunisia under the Ben Ali (and even Bourguiba) regimes has come to light, we may be have a better understanding of the true impacts of the country's institutions and the true role played by authoritarianism. Coupled with further examination of the importance of exports to the growth process in future years, this would build on the story we have told here.

Overall, this study has shown that Mauritius and Tunisia provide an interesting and insightful comparison. These two very different countries demonstrate that perpetual poverty and stagnation of incomes need not be the status quo for the countries of Africa, but that sustained and equitable economic growth is in fact attainable. Whether it be through a central focus on export policies as in Mauritius, or a developmental strategy including export policies as part of a package involving other social policies as in Tunisia, growth is possible. The wider context is certainly a crucial determining factor in the success of such policies, but the poor initial conditions in both of these countries demonstrate that strong visionary leadership has the potential to bring about great social and economic advancements – even in a continent as afflicted by poverty as Africa.

Appendices

Appendix I: List of Abbreviations and Acronyms

ADB	African Development Bank
ADF	Augmented Dickey-Fuller (Test; for stationarity in data series)
AGOA	African Growth and Opportunity Act (between US and SSA, from 2000)
AIC	Akaike Information Criterion (for selecting lag length in VARs)
BCT	Banque Centrale De Tunisie (The Central Bank of Tunisia)
BDC	Bi-directional Causality
BoI	Board of Investment (Mauritius)
BOM	Bank of Mauritius (central)
COMESA	Common Market for Eastern and Southern Africa
EAP	Eradication of Absolute Poverty (programme, Mauritius)
ECM	Error Correction Model (Johansen, 1991; see also VECM)
EEC	European Economic Community (became the EU in 1992)
ELG	Export-Led Growth
ELGH	Export-Led Growth Hypothesis
EPZ	Export Processing Zone
EU	European Union (formerly the EEC)
FDI	Foreign Direct Investment
FTA	Free Trade Area/Free Trade Agreement
GFCF	Gross Fixed Capital Formation
GLE	Growth-Led Exports (hypothesis)
IFS	International Financial Statistics (database, of the IMF)
IMF	International Monetary Fund
INS	National Institute of Statistics (Tunisia)
LDCs	Least Developed Countries
MDG	Millennium Development Goal
MEDIA	Mauritius Export Development and Investment Authority (now MIDA)
MENA	Middle East and North Africa
MFA	Multi-Fibre Agreement (or Multi-Fibre Arrangement, ended 1 January 2005)
MIDA	Mauritius Industrial Development Authority (MEDIA pre-2000)
NC	No Causality (used here in the Granger sense)
OECD	Organisation for Economic Co-operation and Development
OIC	Indian Ocean Commission
PPP	Purchasing Power Parity
SADC	Southern African Development Community (established 1992, FTA since 2008)
SAP	Structural Adjustment Programme (of the IMF)
TFP	Total Factor Productivity
UNU-WIDER	United Nations University World Institute for Development Economics Research
VAR	Vector Autoregression

VARD	Vector Autoregression with Differencing
VAT	Value-Added Tax
VEC	Vector Error Correction
VECM	Vector Error Correction Model (Johansen, 1991; see also ECM)
WEF	World Economic Forum
WTO	World Trade Organisation

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