ESSAYS ON FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH

By

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The candidate confirms that the work submitted is his own and that the appropriate credit has been given where reference has been made to the work of others.

Dedication

To my Father

Declaration

This is to certify that this dissertation is the result of an original investigation. The material has not been used in the submission of work for any other qualification. Full acknowledgement has been given to all sources used.

Signed:

Binam Raj Ghimire (Student)

Signed:

Dr. Gianluigi Giorgioni (Supervisor)

Abstract

Economists hold different views about the relationship between the development of financial institutions (banks and stock markets) and economic growth. A growing body of recent empirical analyses has shown a positive relationship between the development of banks and economic growth in the long term, accompanied by a negative relationship in the short term. In the case of the development of the stock market, the findings suggest a positive relationship, both long and short term.

This thesis reinvestigates the above short and long term relationships between banks, markets and economic growth, by expanding the sample period and countries overcoming the selection biasness of much empirical work in this field, which uses a similar sample period and countries with better functioning financial institutions. In addition, this thesis uses a majority of variables preferred by literature, and data is tested for accuracy with existing works before carrying out estimations using multiple methods.

The results of the various estimation techniques show a negative relationship of banks' development, in both the short and long term. In regards to stock markets, the sign of the relationship depends on the estimation techniques and variables used. In assessing the link, the thesis also investigates the role of banks in developed and developing stock markets. In addition, the thesis discusses various facts about internal, bank and equity finances. These facts show, that a large number of developing countries depend on internal finance, as opposed to the recommendation of the empirical works, which promotes the use of external finance, and its importance for growth.

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1. CHAPTER: INTRODUCTION

"Hey Jude don't make it bad
Take a sad song and make it better"

- From the song by the Beatles *A Day in the Life*.

1.1 The Thesis

This thesis investigates the relationship between economic growth and financial development. Economists have studied the topic for a long time now and due to its importance for policy implications, there is a large body of literature in this area, including contributions by the World Bank.

Early literature (Bagehot, 1873, Schumpeter, 1912, Gurley and Shaw, 1955, Goldsmith, 1969, McKinnon, 1973) emphasises the positive role finance plays for growth. However, some economists consider the relationship as either unimportant (Robinson, 1952, Stern, 1989) or over stressed (Lucas, 1988).

In recent works, some studies have found consensus over a long term positive relationship (King and Levine, 1993a, Beck et al. 2000b&c, Rousseau and Wachtel, 2002, Beck and Levine, 2004, Loayza and Rancière, 2006) between finance and growth, but a negative relationship for the short term (Beck and Levine, 2004, Loayza and Rancière, 2006). The findings that promote a positive relationship have been accompanied by various qualifications (Levine, 2005) and debates in the relationship (Driffill, 2003, Favara, 2003, Trew, 2006). Moreover, most of the studies confine financial development to banks' development, ignoring the impact of stock markets' influence on growth. Some recent studies, that have included both banks and stock markets in their analysis, have found a positive effect of markets, but an unfavourable effect for banks (Atje and Jovanovic, 1993, Beck and Levine, 2004, Shen and Lee, 2006, Saci et al., 2009). This contradicts the findings that banks and markets complement each other (Boyd and Smith,

1996, Demirgüç-Kunt and Levine, 1996, Garcia and Liu, 1999, Li, 2007), and that both are important for economic growth (Levine and Zervos, 1998, Levin et al., 2002).

This thesis will 1) contribute to understanding the long term and short term effects of financial development upon economic growth 2) investigate the complex relationship between financial system and economic growth 3) explore the nature of the relationship between stock markets and banks, and 4) investigate any other possible form of finance (such as internal source) important in the finance and growth nexus.

1.2 Theoretical links between Financial Development and Economic Growth

Schumpeter (1912) argued that services provided by financial institutions are necessary for technological innovation and economic development. After Schumpeter (1912), many works have used models in which financial developments reduce information and transaction costs, and lead to better allocation of the resources, which enhances growth (Bencivenga and Smith, 1991, King and Levine, 1993a, Bencivenga et al., 1995).

Levine (1997) describes information and transaction costs as two major market frictions, motivating the emergence of financial markets and institutions. Similar to Schumpeter (1912), Levine (1997) indicates that mobilising savings, allocating resources, exerting corporate control, facilitating risk management, and easing trading of goods, services and contracts are the five primary functions of the financial system (p. 691).

According to Levine (1997), the various financial functions affect capital accumulation and technological innovation that are important channels to growth.

McKinnon (1973) and Shaw (1973) stated that financial liberalisation enhances financial deepening, which increases the use of financial intermediation by savers and investors, allowing for a more efficient flow of resources among people and institutions. This ultimately improves efficiency of investment, by transferring capital from less productive to more productive sectors.

Demirgüç-Kunt and Maksimovic (1998) showed that firms in countries with better functioning banks grew faster than would have been predicted by their individual firm characteristics. Rajan and Zingales (1998) also support this linkage, as they found that industries that rely on external finance prosper more in countries with better developed financial markets. Sussman (1993) and Harrison et al. (1999) developed models where financial intermediaries facilitate the flow of resources from savers to investors in the presence of informational asymmetries with positive growth effects. Beck (2003), Nihal and Wang (2008) show that financial development enhances international trade, which is again important for growth. Figure 1.1 explains the market frictions eased by financial development. The figure shows various functions of banks and markets positively effecting innovation, technology and the increase in production promoting growth.

Figure 1:1 Market frictions eased by financial development as a channel to economic growth.

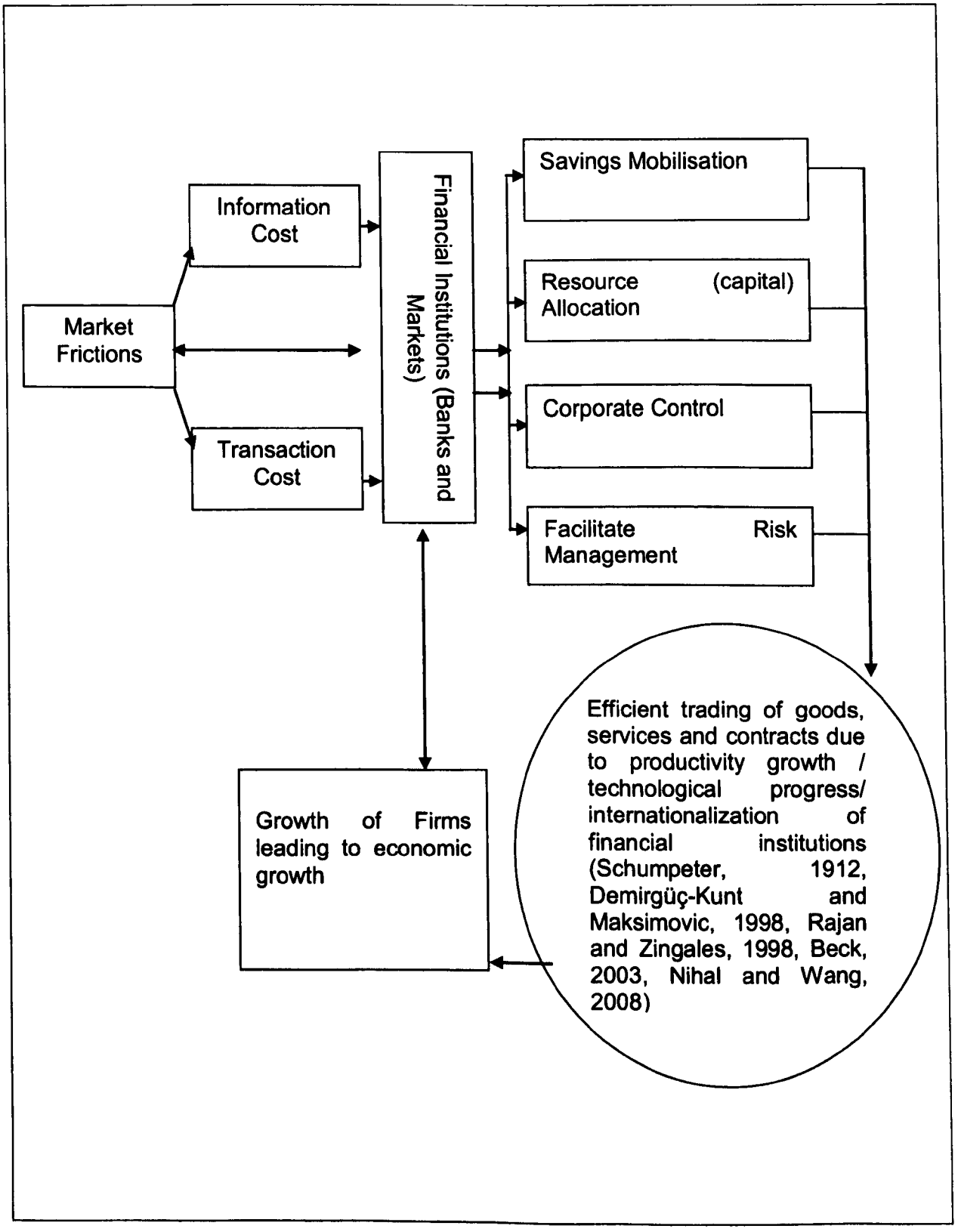


TABLE 1.1 HAS BEEN REMOVED AT THE REQUEST OF THE AWARDING UNIVERSITY.

1.3 Motivation

"Growth can spare people en masse from poverty and drudgery."

- Nobel Laureate, Michael Spence, Commission on Growth and Development (COGAD, 2008)

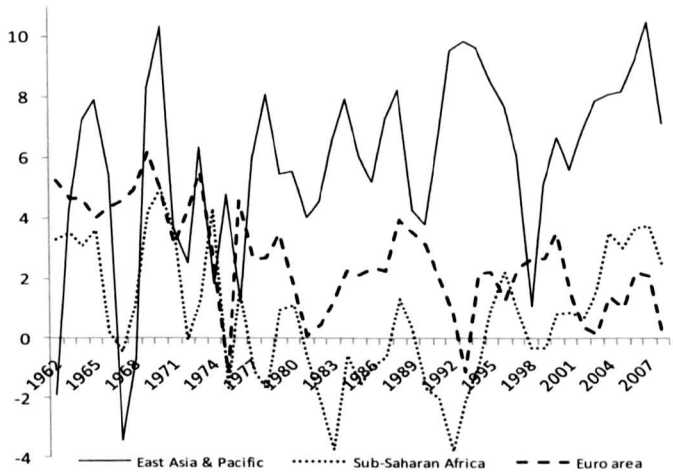
The core motivation of conducting this research is the importance of economic growth for the well being of mankind. Economic growth improves the general conditions of well-being for mankind, and is vital for every economy. Baier et al. (2003) present various data and facts of modern economic growth where significant improvement over infant survival, life expectancy, education, and living standards can be noted, on a global scale. Table 1.1 shows changes in the quality of life at two different points in time in the United States.

Table 1.1 Quality of Life in America in 1850 and 2000.

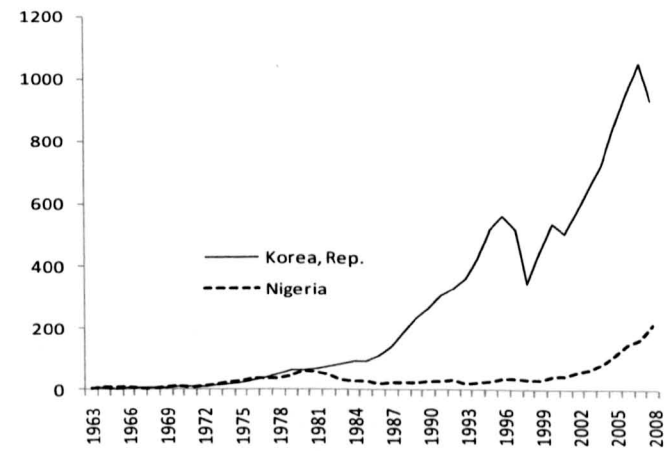
However, there exists a wide level of variation of growth rate in different economies. For example, East Asia and the Pacific, Europe and Sub-Saharan African countries have recorded large variations in their level of economic growth. The first chart in Figure 1.2 shows growth variation among

these economies. The variation has continued even among countries that had similar rates of economic growth a few decades ago. South Korea and Nigeria are good examples of this. The second chart in Figure 1.2 shows the current GDP of the two countries in US Dollars. As can be seen in the chart, the current GDP of South Korea in 2008 (US Dollars 929 Billion) is almost four times higher than Nigeria, which, was same for both countries in 1980 at about US Dollars 64 Billion. Some countries could not continue to be classed as developed in the world. Argentina, for example, was among the most developed countries in 1900. Currently however, it is only classed as a developing country (Campos et al., 2008). It is also worrying that many countries in the world have severe growth problems even now. According to a report by United Nations Conference on Trade and Development (UNCTAD, 2008 p. 85), *"The incidence of poverty and deprivation remains very high, and most LDCs are off track to meet the MDGs"*. The third chart in Figure 1.2 presents GDP per capita globally. The trend line shows smaller but declining movement.

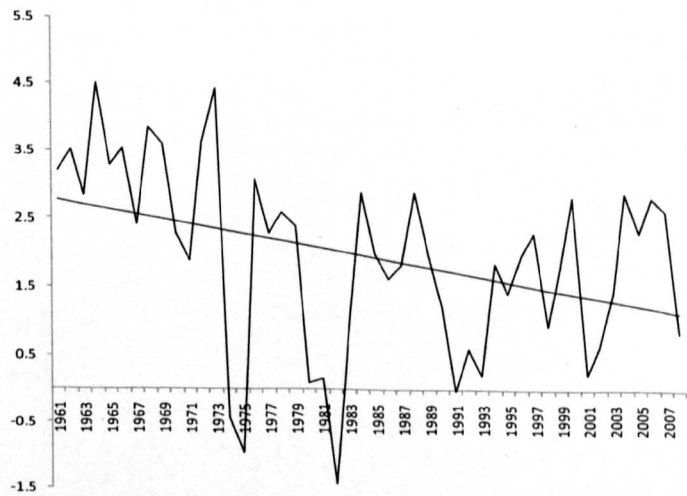
Figure 1:2 Economic growth in various economies and global growth since 1960s



GDP per capita growth in East Asia and Pacific, Europe and Sub-Saharan African countries (annual %).



South Korea and Nigeria GDP Current US $ (in Billion)



World Economic Growth using GDP per capita (annual %)

Data source: The World Bank

Is finance important for growth?

The Conference on Growth and Development (COGAD, 2008) has identified five common determinants of 13 high-growth economies (Botswana, Brazil, China, Hong Kong, China, Indonesia, Japan, the Republic of Korea, Malaysia, Malta, Oman, Singapore, Taiwan, China, and Thailand), which have been able to grow at more than 7 percent for periods of more than 25 years since World War II. One of the important ingredients for the successes of the economies as identified in the report (p. 21) is a "high rate of savings and investments."

The thesis is inspired to study two major financial institutions channeling savings and investments, namely banks and stock markets, and their relationship with economic growth.

An investigation into the relationship between financial development (bank and stock market related) and economic growth is considered important. On the one hand, these institutions are regarded as important channels to growth, but on the other hand, financial institutions have also brought problems in the economy that have had devastating consequences for growth. For example, financial institution facilitates borrowing for investment, which is important for productivity and therefore growth. However, financial institutions have also led to crises in the economy, such as the Great Depression of 1929, the Asian Financial Crisis in 1997 and the recent credit crunch of 2007-08, to name a few, that caused a dip in the global economic growth.

Specifically, the thesis is motivated to rethink the link between financial system development and economic growth, mainly due to the following limitations in the existing literature.

1. There is no unanimity regarding the relationship between financial development and economic growth.

2. Empirical works that have found a positive relationship between financial development and economic growth, base their analysis on long term effects. In the short-term (higher frequency), the findings have remained negative.

3. Studies have ignored the finance and growth relationship for poor countries in the world.

4. In many empirical works on finance and growth, financial development is limited to the development of banks ignoring the role of stock markets. Within recent papers that have included stock markets, the data consists of similar time periods and countries in their samples.

5. Some studies have shown banks and exchanges to complement each other. However, the nature of the relationship and the complementary role in developed and less developed exchanges could be totally different, which needs further research.

6. Empirical works on finance and growth relationships have overlooked the role of internal finance.

1.4 Objectives

Deepening the understanding of the relationship between finance and growth is the key objective of carrying out the research. In particular, this research aims to find answers to the questions:

1. Does a better financial system have any connection with sustained and long term economic growth?

2. What is the relationship between financial development and economic growth in countries at different levels of economic achievements?

3. What other factors could be important in finance that promotes the growth of an economy?

Addressing the above questions is fascinating and important as they have various economic policy implications. The research aims to meet the following specific objectives.

1. To review the body of literature relating to the area of financial system development and economic growth.

2. To refine and create a new, broader and more up-to-date database to examine the short and long term relationships between financial system development (both banks and exchange) and economic growth.

3. To examine the relationship between financial system development and economic growth in the context of countries where economic growth is more important.

4. To study the relationship between banks and markets in developed and developing exchanges, by establishing some new and prominent variables.

5. To investigate the impact of internal finance on economic growth.

6. To contribute to the existing literature.

1.5 Contents

The thesis is organised as follows:

Chapter 1 provides a basic introduction to the thesis, including motivation, objectives and contribution to the knowledge.

Chapter 2 reviews important studies relevant to the finance and growth nexus. It is divided into four parts. The first part reviews works that favour the relationship between finance and growth. In the second part, the review presents those works that are either against this relationship or includes qualifications into the relationship. The third section is about works that have included both banks and markets in their analysis. Finally, the fourth section summaries the main issues of the review.

Chapter 3 explores the date of establishment of the first bank and exchange in LDCs and provides some insights into the evolution of financial

development in those regions. The findings are particularly helpful in constructing a large set of data for LDCs required for the empirical works.

Chapter 4 describes the data and the variables used in analysing the link between financial development and economic growth.

Chapter 5 explains various estimation techniques as methodology to empirical investigations.

Chapter 6 provides the results of the empirical works and discusses them. It carries out tests for both the short and long term, applying different estimation techniques and by including and excluding some variables or countries to be consistent with the literature, and also to confirm on the results obtained.

Chapter 7 makes a closer examination of the relationship between markets and banks in a sample of some developed and less developed exchanges. In the investigation, it also uses new data developed by this thesis.

Chapter 8 provides some important facts about the sources of finance in developing countries and makes empirical investigation into the role of internal, bank and equity finance.

Recommendations and conclusions are made available in Chapter 9.

1.6 Contribution to Knowledge

This thesis advances the knowledge in understanding the relationship between financial system development and economic growth in several

ways. The thesis uses a more comprehensive and updated dataset and includes most of the relevant variables identified and preferred by the literature. Some new data has also been developed, and is used for empirical investigation in chapter seven. Chapter eight presents some interesting facts on the sources of finance in developing countries, which contradicts the recommendations of the literature. Moreover, the thesis uses recent and most relevant methodologies suitable to the empirical work.

While some findings go hand in hand with the existing literature, justifying the accuracy of data used and the appropriateness of the methodologies applied, the thesis has also found new and interesting results calling for further investigation in the related area.

The following empirical papers have been developed as part of the PhD research.

1. Puzzles in Financial Development and Economic Growth (Presented at the annual ESDS International Conference, December 2008 and published as conference proceedings. The paper is available in the conference proceeding 2008 section of the ESDS International website at http://www.esds.ac.uk/international/news/confproc.asp. (Being prepared for submission to a suitable journal).

2. Banks in Developed and Developing exchanges: An Empirical Analysis using New Variables. (Being prepared for submission to a suitable journal).

3. Finance and growth: Stylized Facts on the Role of Internal, Bank and Equity Finances. (Being prepared for submission to a suitable journal).

1.7 Notes and Key Words

This thesis has used a large number of websites for chapters three, seven and eight. The thesis has therefore kept the references for websites separately at the end of the study.

Some of the frequently used words are as follows:

Banks, Markets/ Stock Markets/ Exchange, Growth/ Economic Growth, GMM (Generalised Methods of Moments), LDCs (Least Developed Countries), OLS (Ordinary Least Squares), Panel Data and TSLS (Two Stage Least Squares).

2. CHAPTER: REVIEW OF LITERATURE

"Having read the book
I would love to turn you on"

- From the song by the Beatles *A Day in the Life.*

2.1 Introduction

This chapter aims to review and critically analyse various studies dealing with the relationship between financial development and economic growth. The chapter is divided into four sections. Section 2.2 reviews studies that have found evidence in favour of a positive finance and growth relationship. The section also evaluates the theoretical (positive) link between finance and growth by identifying the important functions of finance explained in various studies. Section 2.3 reviews works that are against the relationship or have found mixed results on the link between financial development and economic growth. As mentioned in the first chapter, one of the objectives of this thesis is to empirically investigate the relationship between financial development involving both banks and markets, and economic growth. In order to study similar works in this area, section 2.4 reviews papers that have included both these institutions in the empirical analysis. The section also provides information regarding the nature and size of the sample used, methodology adopted and major findings of the studies, which are very relevant for the empirical investigation aimed by this thesis. Finally, the main findings relevant to the study are presented in section 2.5.

First, it is interesting to note that research about large financial institutions, such as banks and stock markets, is not very old when compared to the dates they were established. The first bank dates back to the 12th century when the institution "Bank of Venice" was established (Hildreth, 1837). But in the survey of related literature, discussion on the role of financial institutions can be found only in the late 19th century (Bagehot, 1873). Likewise, the first

trading of shares took place to finance a shipping company in Amsterdam by the Amsterdam Stock Exchange four centuries ago (Euronext NYSE: http://www.euronext.com), creating the first stock exchange in the world. However, the empirical research on cross country growth relationships, involving banks and the stock market, was first carried out recently by Atje and Jovanovic (1993). Nevertheless, it is important to note that the current body of literature in this area, which is large and ever increasing, has been inspired by those few early works (Bagehot, 1873, Schumpeter, 1912, Gurley and Shaw, 1955, Goldsmith, 1969, McKinnon, 1973), and no research has gone without acknowledging the gap of knowledge addressed by early economists and their contributions in the area.

2.2 Studies favouring Finance and Growth relationships

"The industrial revolution therefore had to wait for the financial revolution"

- Bencivenga et al. (1966) cited in Levine (1997)

In the quote above, Levine (1997) explains that the products manufactured during the first decade of the industrial revolution in Great Britain were invented much earlier. Many of these existing inventions required large capital commitments. Therefore, technological innovation alone was not sufficient to bring the industrial revolution.

Early empirical works have suggested a positive impact of financial development over economic growth (Gurley and Shaw, 1955, Goldsmith, 1969, McKinnon, 1973, Shaw, 1973). King and Levine (1993a) provide evidence for this link by finding robust correlation between financial

development and the future rates of economic growth, physical capital accumulation, and improvements in economic efficiency. Several other works have found a positive relationship between financial development and growth (Greenwood and Jovanovic, 1990, Demirgüç-Kunt and Levine, 1996, Rajan and Zingales, 1998, Beck et al. 2000b&c Rousseau and Wachtel, 2000). Many of these studies have also explained various functions of banks and markets that are important for economic growth. In this section, studies that suggested a positive relationship between financial development and economic growth in line with various functions of finance (similar to figure 1.2, chapter 1) have been reviewed.

2.2.1 Mobilisation of Savings and allocation of Capital

Gurley and Shaw (1955, 1960 & 1967) stressed the importance of financial intermediation in channeling savings to investment. Accumulation of savings for investment is one of the primary functions of both banks and markets. According to Levine (1997, p. 699), "*Financial systems that are more effective at pooling the savings of individuals can profoundly affect economic development.*"

Financial development should enhance better capital allocation that helps to increase productivity. This can be achieved by better information, and efficiency in finance. Banks analyse information about several aspects of a firm such as the expertise of the management, security arrangement and the feasibility of business. With the right information, banks are better placed to fund more promising businesses and in effect make a more efficient allocation of capital (Greenwood and Jovanovic, 1990). Likewise, stock

markets generate information about the quality of potential investments (Rousseau and Wachtel, 2000) and thereby make effective allocation of capital. The agents of stock markets are involved in researching the firms to disseminate information which in effect promotes better information and capital allocation. Rajan and Zingales (1998) found that industries that rely on external finance prosper more in countries with better developed financial markets i.e. the resource allocation is better where finance is strong. In addition, the financial system produces information ex ante about possible investments (Levine,2005), which can help agents to better allocate resources.

2.2.2 Corporate Control and Risk Management

Corporate control is affected by how providers of the capital (banks and markets) can influence and monitor the firms (users of the capital). Banks can impose several conditions to firms for the use of funds. Similarly, shareholders can exercise effective corporate governance by voting on crucial issues like mergers, liquidations, and changes in business strategies Levine (2005).

Financial institutions can facilitate trading, hedging, diversifying and pooling of risk (Levine, 1997 & 2005). The author discusses how financial institutions minimise liquidity and idiosyncratic risks.

Good projects require capital for the long term but savers do not like to lose control of their capital for a long time. The financial system augments the liquidity of long term investments, which ensures investment in the high-

return projects (Levine, 1997, p. 692). Levine (1997, p. 692) illustrates the importance of the financial system by citing Sir John Hicks (1969) who argued that the capital market improvements that mitigated liquidity risk were a primary cause of the industrial revolution in England.

Idiosyncratic risks (risk that is not correlated to the overall market risk, such as firm specific risk) can be diversified through holding a portfolio of stocks. Financial institutions can facilitate portfolio diversification to increase stability and reduce risk (Solnik, 1974). Some risks that cannot be diversified (the effect of the 1970s oil shock on the US market that caused highly positive correlation with most assets values (Allen and Gale, 1997) at a particular point in time can be diversified across generations (p. 525) by financial institutions as they are perpetual entities.

Rousseau and Wachtel (2000) explain the role of stock market as providers of 1) an exit option, 2) capital inflows, 3) liquidity [Miller (1991) says liquidity is one of the most important functions the stock markets provide] and 4) information on the quality of potential investments. All these are important for control and risk minimisation.

Improved control and reduced risk as reviewed above will ensure better stability, which is important for growth.

2.2.3 Innovation and Technological progress

Schumpeter (1912) has argued that the positive role played by financial institutions is important for technological innovation and economic development.

According to Schumpeter (1912, p. 74):

"The banker..., since all reserve funds and savings today usually flow to him,... stands between those who wish to form new combinations and the possessors of productive means. He is essentially a phenomenon of development...He makes possible the carrying out of new combinations...in the name of the society as it were, to form them."

King and Levine (1993b) emphasize the role of the financial system in choosing the promising entrepreneurs and projects engaged in innovations, thus accelerating productivity. Rousseau and Sylla (2001) argued that innovation and development in finance, provided debt and equity finances to businesses and governments in the United States, as a key to growth and modernization, during the period 1790-1850. The role of financial institutions for innovations (technological) and economic growth has also been studied in several other works (Galetovic, 1996, Balckburn and Hung, 1998, Morales, 2003).

2.2.4 Promotion of International Trade

Internationalisation of financial institutions such as import and export credit facilities, establishments of multinational banks and stock exchanges at international level accelerate economic growth.

Beck (2003) shows that financial development exerts a large causal impact on the level of both exports and the trade balance of manufactured goods.

Nihal and Wang (2008) found increased economic growth rate after the shares of foreign banks were raised. The authors present a model in which foreign banks reduce the cost of borrowing by providing cheaper adequate

funds, and higher quality financial services. In addition, increase in competition with local banks increases the development level of financial markets. In their empirical works, the authors find increased economic growth as shares of foreign banks rise.

2.3 Literature debating Finance and Growth relationships

Finance for growth. Does it Matter?

As discussed in section 2.2 above, a developed financial system should bring efficiency in mobilising savings, allocating funds to investment, and redistributing risk resulting in increased productivity, and consequently the growth of the economy.

In the literature, however, there is a debate as to the role, direction and effect of financial development upon economic growth. Although the literature provides support to the relationship between the financial system and growth ["*The robustness of the cross-sectional relationship between the size of a country's financial sector and its rate of economic growth is by now well established*" (Rousseau and Wachtel (2002, p. 777)], many works have found contrasting results as to the direction or impact of this relationship. In addition, it may be noted that the works that have found a positive link are mostly based on long term effects where average data for the entire period, or average for some years, have been used. For example, King and Levine (1993a) used averaged data for the period 1960-1989, Harris (1997) averaged data over 1980-1991, Beck et al. (2000b&c) use each of the seven 5years interval composing the period 1960-1995, Trabelsi (2002) averaged

for the period 1960-1990, Beck and Levine (2004) averaged data for 5 years, and Loyaza and Rancière (2006) averaged data for the period 1960-2000. Moreover, as discussed in the paragraphs below, various papers have highlighted the ambiguous, and in some cases, negative impact of financial development upon growth.

Early papers on determinants of growth like those by Robinson (1952) and Lucas (1988) deliberately ignored the relationship between the financial system and economic growth. Solow (1956) considered technological progress as the exogenous variable affecting the long term growth but he argued that finance could only affect the equilibrium level of capital stock per worker, not the rate of economic growth.

The issue of causality has also not been resolved in the empirical works i.e. whether finance is a leading indicator or a fundamental cause of growth is not clear. According to Goldsmith (1969, p. 48) "*there is no possibility of establishing with confidence the direction of causal mechanism*". Some good efforts were made by Jung (1986) to explore the issue of causality. However, the author left it to future researchers to confirm his findings of the direction of causality (finance plays a causal role), as he mentioned that the time series data he used was not long enough to derive a more robust conclusion. Driffill (2003) argues that the question of whether finance plays a causal role, or merely follows economic development, remains an open one.

De Gregorio and Guidotti (1995) found positive correlation between financial intermediation and growth in a large cross-country sample. However, they find that the high level of bank credit to GDP ratios in Latin America was in

fact negatively correlated with growth. According to the authors, this was due to inadequate regulation, and deposit insurance causing an unwarranted over-expansion in credit and subsequent banking crises. Similarly, Xu (2000) finds negative effects of financial development on GDP growth and investment for low or lower middle income countries, but positive effects for the high income countries. In their sample of 41 countries, more than 85% of the countries (showing a negative relationship with financial development) are either low or lower middle income countries (p. 340). Deidda and Fattouh (2002) agree with Xu (2000). The authors apply a threshold regression model to King and Levine (1993a) data and find a positive and strong relationship for high income countries, but a negative one for low income ones.

Driffill (2003) argued that apparent effects of financial development on growth may be capturing regional differences. In his view, there is no strong empirical support between financial structure and growth. He even criticised the previous literature for use of small time dimension data.

Favara (2003) shows that there is no clear indication, that finance spurs economic growth. The author uses cross sectional, and panel techniques in his estimations. The result shows a weak finance and growth relationship and for some specification even negative. According to the author, the positive relationship between finance and growth in the literature is based on average statistics which could be difficult to interpret because of heterogeneous finance and growth relationships existing in different countries.

Beck and Levine (2004) found that both financial markets and banks did indeed play a positive and significant role in influencing economic growth, even when selected control variables were added to the model. However, the relationship between banking variables and economic growth became negative when using annual data. In a recent paper, Loayza and Rancière (2006) also discovered this negative relationship of short term (annual data) bank credit and growth.

Trew (2006) in his survey of literature presents a number of qualifications in the finance and growth relationship. Trew (2006) argues on the excessive focus on cross sectional results in various empirical works. The author shows disconnections (p. 487) between applied and theoretical work on the relationship. While Favara (2003) suggests more sophisticated proxies for financial depth, Trew (2006, p. 488) puts forward the need to first understand the relationship of finance and growth when economy is moving towards industrialisation.

2.4 Recent Literature on Finance and Growth relationships involving Banks and Stock Markets

In line with the empirical works proposed by this thesis (chapter 5), this section reviews some important, recent papers on cross country growth regression involving banks and stock markets.

Atje and Jovanovic (1993) used two proxies for financial development namely 1) the ratio of credit extended by private and government banks to GDP (B) and 2) the ratio of annual value of all stock market trades to GDP

(S). The data for S was limited to 40 countries and available only from 1980 onwards. Atje and Jovanovic (1993) found that one percentage point rise in S raises the growth rate by about one twelfth of a percentage point. But this was only true for stock markets as they failed to find a significant effect of banks on subsequent development.

Many papers using cross country analysis of the relationship between financial development and economic growth have been written after the work by Atje and Jovanovic (1993). One such important work with pertinent stylised facts, on the link between stock markets and financial intermediaries development, is by Demirgüç-Kunt and Levine (1996). The authors have provided a wide range of indicators for stock and financial intermediary markets. The financial intermediary institutions have been classified into bank, non-bank, insurance and pension fund companies. To measure the bank's development, the authors have used the total claim of banks to the public divided by GDP. Similarly to measure non-bank, insurance and pension fund companies' development, the authors have used their respective assets divided by GDP. On the side of stock market development, the authors have used stock market capitalization and a number of listed companies to measure the market size. Market liquidity is measured using stock market value traded to GDP.

Demirgüç-Kunt and Levine (1996), using aggregate indices have analysed the relationship between stock market growth and financial intermediaries' development. (Authors have made a number of indices in their statistical work which they aggregate. For example, their index 1 is about the stock

market, where they aggregate the information related to the average of capitalisation, value traded/GDP and turnover). In the context of the large and growing world stock markets, the authors found that emerging stock markets account for a disproportionate share of this growth. They find that richer countries such as Japan, U.K., and U.S.A. have the most developed stock markets. But emerging countries' stock markets like Hong Kong, Korea, Malaysia, Singapore and Thailand are systematically more developed than other developed stock markets like Australia, Canada, France, Netherlands, and Sweden. The empirical results are again very interesting. For example, internationally integrated markets tend to be less volatile, and institutionally developed markets tend to be large and liquid. The authors also found wide cross-country differences for various indicators. For example, the ratio of stock market capitalization to GDP was found to be greater than one in five countries and less than 0.10 in five others. The level of stock market development was highly correlated with the development of banks, non-bank financial institutions, insurance companies, and private pension funds.

The paper by Levine and Zervos (1998) is a very widely cited piece of work on the relationship between financial development and economic growth. It suggests that the initial levels of stock market liquidity and banking development are positively and significantly correlated with future rates of economic growth, productivity growth and capital accumulation. The Link between stock markets, banks and growth runs robustly through productivity growth rather than through physical capital accumulation, the paper finds.

Levine and Zervos (1998) emphasise the importance of liquidity of the market rather than the size.

Zhu et al. (2004) build over the work by Levine and Zervos (1998) and find that stock market liquidity is not statistically significant to explain growth in the presence of outliers. They criticise Levine and Zervos' (1998) methods of identifying the outliers, such as visual inspection of scatter plots of residuals and single row elimination method (Single row method entails estimating the regression once for each observation, each time omitting exactly one observation). They argue that keeping India and Japan as outliers, by Levine and Zervos (1998) without justification, was not appropriate. Zhu et al. (2004) confirmed no relationship between stock market liquidity (measured by stock market turnover) upon growth in Levine and Zervos' (1998) sample of 47 countries after properly controlling for outliers. The work by Levine and Zervos (1998) had also been criticised by Driffill (2003) on the grounds that rapid growth of Asian countries in the work were not due to financial sector development but possibly due to falling transportation costs and economies of agglomeration that took place in those countries during that time (1976-1993).

Garcia and Liu (1999) found that banks and markets act as complements, in their sample of 15 countries, where they had kept stock market capitalisation as their dependent variable. On banks and markets, Levine (2002) empirically assesses the strength of bank based and market based financial systems. The author groups various variables into four categories. Each category is made of commonly used indicators of bank and stock market

developments. They are 1) structure activity: logarithms of value traded/ bank credit. 2) structure size: logarithms of capitalization / bank credit, 3) structure efficiency: logarithms of total value traded ratio, multiplied by bank overhead cost, where overhead implies costs of the banking system relative to the banking system assets and 4) structure aggregate, which is the conglomerate measure of financial structure based on activity, size and efficiency. Similarly, the author uses structure regulatory, which relates to aggregate measure of regulatory restrictions on commercial bank activities. The analysis is cross sectioned with one observation per country. The author uses 48 countries and data from the period 1980-95. The author finds strong association between overall financial development and economic growth. On his law and finance view, the author finds that the legal rights of outside investors, and the efficiency of enforcement of implementing those rights, are robustly linked with long term economic growth. In addition, Levine (2002) demonstrates that the data and empirical analysis is not in favour of any one financial system but both aspects of the financial system (i.e. bank and market) are important.

Beck and Levine (2004) initially constructed a panel with data averaged over five-year intervals, for the period 1986-1998 for 40 countries, and found positive and significant results for both bank credit to GDP and stock market turnover. The result was, however negative, with Generalized Methods of Moment (GMM) difference estimator. The result again became positive and significant with GMM level estimator. The authors also tested the relationship for annual data, and with this, the relationship between financial variables and economic growth broke down (Beck and Levine, 2004, p. 439). They

tentatively suggested that this was due to credit surges, which had also been found to be good predictors of banking crises and subsequent economic slowdowns.

Rioja and Valev (2004) use data from Beck et al. (2000b) in their empirical investigation on finance and growth. The authors used the data for all 74 countries and for the entire period of 1961-1995, as available in Beck et al. (2000b) in their estimation for banks' relationship with growth. However, they could not use the entire set of data to investigate the stock markets' relationship with growth. So they constructed dummies for stock market variables namely stock market value traded and stock market turnover. If the country's stock market variable is larger than the observed median value in the dataset, they assign 1 or otherwise zero. The authors found that in low income countries finance affects growth through capital accumulation. In middle income countries, however, finance promoted productivity. Hence, they conclude that the contribution of financial development in economic growth can only be observed after the economy achieves a certain level of income.

Shen and Lee (2006) investigated the relationship between financial development and real GDP per capita growth in 48 countries. Similar to Atje and Jovanovic (1993), the authors found a positive effect of stock market development on growth, but an unfavorable effect with banks' development. The authors described the relationship between growth and bank development as a weak inverse "U" shape, and concluded that financial development and growth may be in a nonlinear form. Another similar finding

of a negative impact of banks development but positive of stock market is by Saci et al. (2009). The authors estimated the relationship for 30 developing countries, with annual data over the period 1988-2001, applying two-step GMM. Using different measures, methods and variables their results suggest negative performance of banking sector development upon economic growth.

Li (2007) using panel data over the period 1978-1997, finds that development of financial intermediaries and openness to trade are positively associated with the size of equity markets. In addition, development of financial intermediaries was positively associated with the level of activity in equity markets. Moreover, in the sample of 33 countries, Li (2007) finds that Canada, the United States, and Singapore possess the most shareholder-friendly institutional frameworks that foster larger and more active equity markets.

Chakraborty and Ray (2006) take a theoretical approach to investigating the relationship between finance and growth. The authors have made endogenous growth models for optimal investment decisions separately for bank based and market based systems. Although, they could not find one system better than the other from a growth perspective, they found higher levels of investment and per capita GDP in bank based systems. According to the authors, bank based systems allow greater participation in industrial activities, as finance is made available to a large number of entrepreneurs which the authors suggest helps reduce income inequality in the economy.

Deidda and Fattouh (2008) find both banks and stock markets important for growth. The authors first make the model on financial investors who can monitor and screen the entrepreneurs (i.e. bankers) and entrepreneurs who can buy the securities (i.e. markets). The authors then analyze the interaction between bank and market finance, where bankers gather information through monitoring and screening. According to the authors, in such a model if the market is characterized by a disclosure law, such that entrepreneurs wishing to raise market finance can credibly disclose their sources of financing, this might undermine bankers' incentive to screen (even when screening is efficient). The model suggests that the change from a bank-based system to one in which market-finance and bank-finance coexist might have an adverse affect on economic growth.

The empirical findings strengthen the model as they find that at higher levels of stock market development, the role of bank development to long term growth diminishes. In the empirical analysis the authors use Demirgüç-Kunt and Levine's (2001) cross-country data set (above 100 countries for the period 1980-1995). They then modify the standard growth regression to include an interaction between stock market and bank development.

In recent years, the literature on finance and growth relationships has also looked at the relationship at a micro or firm level and found a positive impact of finance on growth. One of the important conclusions of the papers in this field (Demirgüç-Kunt and Maksimovic, 1998, Beck et al., 2001, Beck et al., 2008) is that the firms that have better access to external finance grow faster than others. However, it can be learnt in Hudson (2002) that internal finance

was key to the industrial revolution in England. In a recent study by Guariglia et al. (2010), it is found that a large numbers of Chinese private firms that were unable to use external finance, grew using internal finance and contributed in economic growth. Guariglia et al. (2010), use firm level data of Chinese firms.

2.5 Summary

This section now briefly evaluates the above mentioned papers on financial development and cross country growth relationship.

The papers reviewed above have several similarities and also common weaknesses among each other.

On selection of variables representing banks and stock market developments, some papers have used most of the measures of banks development (Beck et al., 2000b, Beck et al., 2000c, Favara, 2003, Rioja and Valev, 2004, Saci et al., 2009) and stock markets development (Demirgüç-Kunt and Levine, 1996, Levine, 1998, Rousseau and Wachtel, 2000, Rioja and Valev, 2004, Saci et al., 2009) identified in the literature. This is so because different papers have found different variables more conducive although the common purpose has remained to test the relationship with growth. This in itself is surprising and important for investigation.

In cases of variables representing banks development, recent empirical works have mostly used domestic credit to private sector as a percentage of GDP. On stock market related variables, the empirical works use three variables that are 1) stock market capitalisation to GDP, 2) Stock market

value traded to GDP and 3) turnover ratio. Among the three, the latter two are more preferred in the literature to the first. Selection of appropriate variables is important for estimation; hence the thesis will define and discuss them in greater detail in chapter 4 on variables and data.

In terms of findings, some papers have provided evidence that both banks and stock markets are important for growth (Levine and Zervos, 1998, Levine, 2002, Chakraborty and Ray, 2006, Deidda and Fattouh, 2008). In contrast, in many recent works, banks performance has been found to be negative, which is, however, not the case with the stock market (Atje and Jovanovic, 1993, Beck and Levine, 2004, Shen and Lee, 2006, Saci et al., 2009). The thesis has identified this as an important issue to be investigated empirically.

Likewise, some papers (Demirgüç-Kunt and Levine, 1996, Garcia and Liu, 1999, Li, 2007) promote the interdependence between banks and stock market variables. This puts a question on banks and stock markets, and whether they should be kept as independent variables in the empirical works. So, it is important to find better proxies which will explain more on the relationship between banks and stock markets, say for example, a database on the variables representing the development of banks' and non-bank companies' stock market capitalisation separately.

One of the common weaknesses of all the papers as noted in the review above is the limited data. This should be the reason to use similar time dimensions in the literature. For example, many papers discussed above use data over 1980-95 (Garcia and Liu, 1999, Rousseau and Wachtel, 2000,

Levin et al., 2002, Deidda and Fattouh, 2008). In addition, many recent papers have not gone beyond 1998 in choosing their sample. In some papers (Levine, 2002, Favara, 2003, Beck and Levine, 2004, Rioja and Valev, 2004) this may be due to lack of data on Black Market Premiums after 1998. However, the papers do not make any specific estimations, excluding Black Market Premium, in which case it was possible to extend the sample period. On the use of sample period, Driffill (2003) has sharply criticised literature (on positive relationship) on the use of sample periods being short in time; "*It is interesting to note that the empirical studies on question of finance and growth have taken a short time horizon, at least in a calendar time*" (p. 375).

A close scrutiny of the use of data also shows that the papers have mostly covered the same countries and approximately same number of countries in their sample. This can lead to the issue of selection biasness. For example, many papers do not have Least Developed Countries (LDCs) in their sample. Therefore, it would not be unwarranted to claim that research in the area has little to no information so far on the effect of bank and stock market developments for LDCs. This issue has been discussed in some detail in chapter 4.

The limitations of the existing literature identified above (similar sample country and time) should be minimised by enlarging the sample data, through the inclusion of countries that have been ignored so far. This thesis attempts to address this issue by including a large number of LDCs in the

regression for which we explore the history of banks and stock markets in LDCs in the next chapter.

Lastly, the micro-econometric evidences at firm's level have also motivated this thesis to examine the role of internal finance in total finance from growth perspectives.

Appendix table 2.1 A summarises the key detail of some literature reviewed above.

2.6 Appendix

Table 2.1 : Key Details (Authors, Sample, Variables, and Major Findings) of some empirical works relevant to the thesis

#	Author and Year	No. of countries	Time Period	Dependent Variable	Independent Variable*	Major Findings
1	Atje and Jovanovic (1993)	94**	1960-88	GDP per capita growth	Private credit and value traded	Large effect of stock market on subsequent development but not with bank
2	Demirgüç-Kunt, and Levine (1996)	41	1986-93	***	***	Big markets are less volatile, more liquid and less concentrated in few stocks. Internationally integrated markets tend to be less volatile. Institutionally developed markets tend to be large and liquid. Well developed stock markets have well developed bank and non bank financial intermediaries.
3	Levine and Zervos (1998)	47	1976-93	Output growth: real per capita GDP growth, Capital stock growth: real per capita capita stock growth, Productivity growth: output growth - 0.3 x capital stock growth, Savings: savings as a percentage of GDP	Bank credit and turnover	Link between stock markets, banks and growth runs robustly through productivity growth rather than through physical capital accumulation. Simply listing on the stock exchange does not necessarily foster resource allocation. Capitalization is not correlated with growth indicators.
4	Garcia and Liu (1999)	15	1980-95	Market capitalisation	Private credit, liquid liabilities, value traded and turnover	Banks and stock markets are complements.
5	Levine (2002)	48	1980-95	GDP per capita growth	Value traded, bank credit, capitalisation, bank overhead cost	Both banks and stock markets are important. Efficient legal system helps institutions work effectively.
6	Rioja and Valev (2004)	74	1961-95+	GDP per capita growth, capital growth (per capita physical capital stock) and productivity growth (rate of growth of residual)	Bank related: private credit, liquid liabilities and commerical versus central banks assets, Stock market related: Turnover and value traded	Finance is important for growth. However, the impact could be different for economies at different stages of developments. In case of low income countries finance helps in capital accumulation whereas for middle income countries it contributes to productivity.
7	Beck and Levine (2004)	40	1976-98	GDP per capita growth	Bank credit and turnover	Positive and significant results for both bank credit and turnover. However, the results have some conflicting views over the use of various methods and time period (annual and cross section).
8	Zhu et al. (2004)	47	1976-93	GDP per capita growth	Bank credit and turnover	Turnover does not support growth in the presence of outliers.
9	Chakraborty and Ray (2006)++					The authors find higher level of investment and per capita GDP in bank based system. In addition, bank bsed system helps to reduce income inequality. No evidence of one system better than the other.
10	Shen and Lee (2006)	48	1976-2001	GDP per capita growth	Banks related: private credit, liquid liabilities and interest rate spread, Stock market related: capitalisation, value traded and turnover	Bank does not support the relationship but market does.
11	Li (2007)	30	1978–97	GDP per capita growth	Private credit, capitalisation, value traded, and turnover	Development of financial intermediaries and openness to trade are positively associated with the size of equity markets. In addition, development of financial intermediaries are positively associated with the level of activity in equity markets.
12	Deidda and Fattouh (2008)	71	1980-95	GDP per capita growth	Bank credit, turnover	Bank and stock market development are important for growth. Impact of bank's development reduces the higher is the level of stock market development.
13	Saci et al. (2009)	30	1988-01	GDP per capita growth	Commercial to central bank assets, private credit, FDI, M3, capitalisation, value traded, turnover and no. of listed companies	Bank does not support the relationship but market does.

* The control variables used are not mentioned due to limited space but they are discussed in chapter 4, ** Authors include 94 countries for bank related variable but only 40 countries for stock market development indicators.
*** The paper provides facts on different measures of stock market and financial intermediaries' development indicators. The authors have made indices for the variables which they aggregate. Detail available in text of this chapter.
xcx +Data from Beck et al. (2000a) but for stock market, the authors create dummies due to limited data. ++Authors take a theoretical approach and make optimal investment models for decisions in bank and market based systems.

3. CHAPTER: ESTABLISHMENT OF the FIRST BANK, the CENTRAL BANK AND the STOCK MARKET IN LEAST DEVELOPED COUNTRIES

"Oh, I believe in yesterday"

- From the song by the Beatles *Yesterday.*

3.1 Introduction

"*Opening a stock exchange even a small and fairly illiquid one is correlated with higher rates of economic growth, on average*".

- Minier (2009)

In the previous chapter it was noted that the empirical literature has a fair amount of consensus on the positive role played by the stock exchange for economic growth.

Growth is more important in poor regions of the world. If as suggested by the literature, stock markets are an influential for growth, then it is important to know the status of exchanges in those regions. Unfortunately, this thesis could not find any one work that has compiled information about exchanges in the poor regions. To unearth important information about stock markets in the regions, this chapter explores the date of establishment of exchanges in the Least Developed Countries (LDCs). This time consuming exercise could not rely on any single publications (such as the Stock Market Handbook or World Federation of Exchanges) and hence is mainly based on websites of stock exchanges in these countries. In addition, the chapter looks at the dates of establishment of first bank, and central bank because as explained in chapter eight, banks are important institutions for the development of exchanges. Information on the dates of establishment of the first banks and central banks are again mostly from their websites.

If the establishment of exchanges are found to be recent in LDCs, it would mean that growth could have been better had the exchange were established early and hence a support to the existing literature. In addition, on the

literature that has shown banks and the stock exchange to complement each other, if the findings suggest a large gap in the age of establishment of banks and exchange it would mean that these institutions were not able to complement each other for such a time period, and again a setback for growth and further support to empirical literature.

In addition to the above, the findings of the chapter will help to establish a more refined database for LDCs, which will be used in the chapter on empirical relationships between financial development and economic growth. Moreover, this chapter provides historical analysis of the first banks, central banks and stock exchanges of all LDCs (which is not available in literature) in one document and should be efficient and useful for future research in the area.

Section 3.2 discusses the classification criteria of LDCs and provides the current list of LDCs. Section 3.3 summarises the major findings. Table 3.1 provides establishment dates of the institutions for quick and easy reference. The country wise detail of establishment dates for all three institutions and their sources are made available in Appendix 3.1. This list of websites of various exchanges, banks and central banks are made available at the end of this chapter in the form of endnote.

3.2 Least Developed Countries and Classification Criteria

LDCs describe the poorest countries in the world. The committee for development policy of the United Nations and CDP (a subsidiary of the UN Economic and Social Council) uses three criteria to classify a country as

poorly developed. The criteria, as outlined by the committee, are made available inside table 3.1 where the current list of the LDCs is provided on the right.

Table 3.1 Criteria for listing in LDCs and list of LDCs

Criteria	Least Developed Countries
In its latest triennial review of the list of Least Developed Cou ntries (LDCs) in 2006, the Committee for Development Policy used the following three criteria for the identification of the LDCs: ♦ a low-income criterion, based on a three-year average estimate of the gross national income (GNI) per capita (under $745 for inclusion, above $900 for graduation); ♦ a human capital status criterion, involving a composite Human Assets Index (HAI) based on indicators of: (a) nutrition: percentage of population undernourished; (b) health: mortality rate for children aged five years or under; (c) education: the gross secondary school enrolment ratio; and (d) adult literacy rate; and ♦ an economic vulnerability criterion, involving a composite Economic Vulnerability Index (EVI) based on indicators of: (a) population size; (b) remoteness; (c) merchandise export concentration; (d) share of agriculture, forestry and fisheries in gross domestic product; (e) homelessness owing to natural disasters; (f) instability of agricultural production; and (g) instability of exports of goods and services. To be added to the list, a country must satisfy all three criteria. In addition, since the fundamental meaning of the LDC category, i.e. the recognition of structural handicaps, excludes large economies, the population must not exceed 75 million. To become eligible for graduation, a country must reach threshold levels for graduation for at least two of the aforementioned three criteria, or its GNI per capita must exceed at least twice the threshold level, and the likelihood that the level of GNI per capita is sustainable must be deemed high.	1 Afghanistan 2 Angola 3 Bangladesh 4 Benin 5 Bhutan 6 Burkina Faso 7 Burundi 8 Cambodia 9 Central African Republic 10 Chad 11 Comoros 12 Democratic Rep. of the Congo 13 Djibouti 14 Equatorial Guinea 15 Eritrea 16 Ethiopia 17 Gambia 18 Guinea 19 Guinea-Bissau 20 Haiti 21 Kiribati 22 Lao People's Democratic Rep. 23 Lesotho 24 Liberia 25 Madagascar 26 Malawi 27 Maldives 28 Mali 29 Mauritania 30 Mozambique 31 Myanmar 32 Nepal 33 Niger 34 Rwanda 35 Samoa 36 Sao Tome and Principe 37 Senegal 38 Sierra Leone 39 Solomon Islands 40 Somalia 41 Sudan 42 Timor-Leste 43 Togo 44 Tuvalu 45 Uganda 46 United Republic of Tanzania 47 Vanuatu 48 Yemen 49 Zambia
Source: Handbook on the Least Developed Country Category, United Nations (UN, 2008).	

3.3 First Bank, Central Bank and Stock Market in LDCs

Detail information regarding establishment dates of stock exchanges, banks and central banks are made available in Appendix 3.1 for all 49 LDCs. The Appendix section provides information for each country in alphabetical order. However, in the case of some countries, they have common stock exchanges. In such cases, the information is made available in groups. Table 3.2 summarises this information for easy and quick reference.

Note: The date of establishment of the first bank could not be found for few countries. In such cases, the date of establishment of the central bank is kept as the date of establishment of the bank. Considering the fact that central banks are established after the establishment of banks (to regulate the banking systems), it is reasonable to keep the central bank's establishment date before a bank's establishment (i.e. there is no danger of keeping a date prior to the establishment of bank).

Table 3.2: Dates of establishment of First Bank, Central Bank and Stock Exchange in LDCs

#	Countries	Oldest Bank	Date of Estb.	Central Bank	Date of Estb.	First Exchange	Date of Estb.
1	Afghanistan	Bank-e-Millie Afghan	1933	Da Afghanistan Bank	1939	None	N/A
2	Angola	Bancco Nacional Ultramarino (BNU)	1865	National Bank of Angola	1975	None	N/A
3	Bangladesh	Standard Chartered	1905	Bangladesh Bank	1971	Dhaka Stock Exchange	1956
4	Benin						
5	Burkina Faso						
6	Guinea-Bissau						
7	Mali		1962	BCEAO	1962	BRVM	1998
8	Niger						
9	Senegal						
10	Togo						
11	Bhutan	Bank of Bhutan	1968	Royal Monetary Authority of Bhutan	1982	Bhutan Stock Exchange	1993
12	Burundi	Banque De Credit Bujumbura	1922	Banque du Royaume du Burundi	1964	None	N/A
13	Central African Republic						
14	Chad		1970	BEAC	1972	None	N/A
15	Equatorial Guinea						
16	Cambodia		1954	National Bank of Cambodia	1954	None	N/A
17	Comoros		1970	Banque Centrale des Comores	1981	None	N/A
18	Democratic Republic of Congo	Banque Commerciale du Congo	1960	Banque Central du Congo	1964	None	N/A
19	Djibouti		1970	Banque Centrale de Djibouti	1977	None	N/A
20	Ethiopia	Bank of Abysinia	1906	National Bank of Ethiopia	1963	None	N/A
21	Eritrea	Barclays Bank	1950	Bank of Eritrea	1991	None	N/A
22	Gambia	Standard Chartered Gambia	1894	Central Bank of the Gambia	1971	None	N/A
23	Guinea		1960	Banque Centrale de la République de Guinée	1960	None	N/A
24	Haiti	National Bank of Haiti	1880	National Bank of Haiti	1880	None	N/A
25	Kiribati		1970	None	N/A	None	N/A
26	Lao's People Democratic Republic		1968	Bank of the Lao PDR	1968	None	N/A
27	Lesotho		1966	Central Bank of Lesotho	1978	None	N/A
28	Liberia	Liberian Bank for Development & Investment	1965	Central Bank of Liberia	1999	None	N/A
29	Madagascar	Banque-de-Madagascar	1926	Banque-de-Madagascar-et-des-Comores	1973	None	N/A
30	Malawi	African Lake Corporation	1894	Reserve Bank of Malawi	1964	Malawi Stock Exchange	1996
31	Maldives	State Bank of India	1974	Maldives Monetary Authority	1982	Maldives Stock Exchange	2002
32	Mauritania		1970	Central Bank of Mauritania	1973	None	N/A
33	Mozambique		1970	Bank of Mozambique	1975	Maputo Stock Exchange	1990
34	Myanmar		1970	Central Bank of Myanmar	1990	None	N/A
35	Nepal	Nepal Bank Ltd.	1937	Nepal Rastra Bank	1956	Nepal Stock Exchange	1976
36	Rwanda	Banque Commerciale du Rwanda	1963	National bank of Rwanda	1964	None	N/A
37	Samoa	Bank of New Zealand	1915	Central Bank of Samoa	1984	None	N/A
38	Sao-Tome-and-Principe		1970	Banco Central de São Tomé e Príncipe	1975	None	N/A
39	Sierra-Leone	Standard Chartered Sierra Leone	1894	Bank of Sierra Leone	1964	Sierra Leone stock exchange	2009
40	Solomon Island	Commonwealth Bank of Australia	1951	National Bank of the Solomon Islands	1983	None	N/A
41	Somalia	Banca d'Italia	1920	Central Bank of Somalia	1960	None	N/A
42	Sudan	Bank of Khartoum	1913	Central Bank of Sudan	1960	Khartum Stock Exchange	1994
43	Timor-Leste		1970	Banking and Payments Authority	2001	None	N/A
44	Tuvalu		1970	None	N/A	None	N/A
45	Uganda	Standard Chartered Bank Uganda	1912	Bank of Uganda	1966	Uganda Securities Exchange	1997
46	United Republic of Tanzania	Deutsch-Ostafrikanische Bank	1905	Bank of Tanzania	1966	Dar es Salaam Stock Exchange	1996
47	Vanuatu		1970	Reserve Bank of Vanuatu	1980	None	N/A
48	Yemen		1970	Central Bank of Yemen	1971	None	N/A
49	Zambia	Standard Chartered Bank Zambia	1906	Bank of Zambia	1956	Lusaka stock exchange	1993

3.4 Summary

This chapter has extensively searched the establishment dates of the important financial institutions in the poorest regions of the world.

The main findings are as follows:

- Out of 49 LDCs, 31 are still without a stock exchange.
- Three countries do not have a central bank.
- On average, commercial banks were established 28 years (1969-1941) before the establishment of central banks.
- Similarly, the stock exchanges (where they exist - 18 countries) were established after more than 5 decades (55 years: 1994 – 1940) of the establishment of commercial banks and nearly three decades (29 Years: 1994- 1965) after the establishment of central banks.
- On average the stock exchanges in LDCs are established very recently. The arithmetic mean year is 1991 for the countries with an exchange.
- In no countries was the stock exchange established before the establishment of a bank.

It can be noted from the above findings that the development of stock exchanges in LDCs are recent compared to other regions (dates of establishment of stock exchanges in different regions around the world are available in chapter seven). In addition, the findings also suggest that the banks and exchanges in LDCs (where both exist now) could not play complementary roles due to the absence of exchange for over five decades.

This also implies that in 31 countries, the banking system is still not as active as it could be, due to the lack of stock exchanges in those countries.

3.5 Appendix

Appendix 3 A. 1 Detail on establishment dates of Banks, Central Banks and Stock Exchanges in LDCs.

1. Afghanistan

The Afghanistan Banks Association[1] has provided the list of banks in Afghanistan where the establishment dates of the banks are available. State owned Bank-e-Millie Afghan, established in 1933, is the oldest bank in the list of the Association. Pashtany Bank, established in 1954, and Export Promotion Bank, established in 1976, are two other banks that opened after Bank-e-Millie Afghan.

Da Afghanistan Bank is the Central Bank of Afghanistan[2] established in 1939. As of October 2009, the central bank has a list of 17 licensed financial institutions.

There is no stock exchange in Afghanistan.

2. Angola

Bancco Nacional Ultramarino[3] (BNU) established in 1865 is the first banking institution of Angola. The central banking activities, mainly the issue of currency, were being carried out by BNU prior to the operation of the central bank.

The National Bank of Angola[4] is the central bank of the country, which obtained separate status after independence in 1975.

There is no stock exchange in Angola.

3. Bangladesh

After the independence in 1947, Pakistan separated from India and in 1948 the state bank of Pakistan was established as the central bank of Pakistan. The east part of Pakistan was separated as Bangladesh, and in 1971 the Dhaka branch of the state bank of Pakistan was reorganised and opened as the central bank of Bangladesh[5].

The need for a separate stock exchange for East Pakistan was led by the establishment of The East Pakistan Stock Exchange Association Ltd. in 1954. The formal trading however could only start in 1956. In 1964 it was renamed to Dhaka Stock Exchange Ltd[6].

Formerly the Grindlays Bank, the oldest bank of Bangladesh, is now the Standard Chartered Bank[7]. Prior to Grindlays, it was the National Bank of India that opened a branch in Chittagong in 1905.

4. Benin 6. Burkina Faso 19. Guinea-Bissau 28. Mali 33. Niger 37. Senegal and 43. Togo

The Banque Centrale des États de l'Afrique de l'Ouest (BCEAO[8]) is the common central bank of the eight member states which form the West African Monetary Union (WAMU).

The member states are Benin, Burkina Faso, Guinea Bissau, Côte d'Ivoire (Non LDC), Mali, Niger, Senegal and Togo. The Headquarters of BCEAO is located in Dakar, Senegal.

The Central Bank of West African States (BCEAO) is the common central bank of the eight (8) member states, which form the West African Monetary Union. The BCEAO is a public international institution whose headquarters is located in Dakar, Senegal. Besides the sole right of monetary signs issue, which it enjoys throughout the member states of the Union, the Central Bank is responsible for:

- the pooling of the Union foreign exchange reserve
- the management of the monetary policy of WAMU member states
- the keeping of the accounts of the member states of the Treasury
- the definition of the banking law applicable to banks and financial establishments

Source: The Central Bank of West African States (BCEAO)

BCEAO was transformed from the Central Bank of French West Africa and Togo to BCEAO in 1959[9]. Entry into effect of the Treaty establishing WAMU (Creation of the new BCEAO and adoption of its Statutes) took place in 2nd November 1962.

The Bank of Africa (BOA)[10], established in 1982, is working in various countries as the main financial intermediaries. It started in the following countries from the dates given below.

Benin – 1990

Burkina - 1998

Côte d'Ivoire - 1996

Mali - 1982

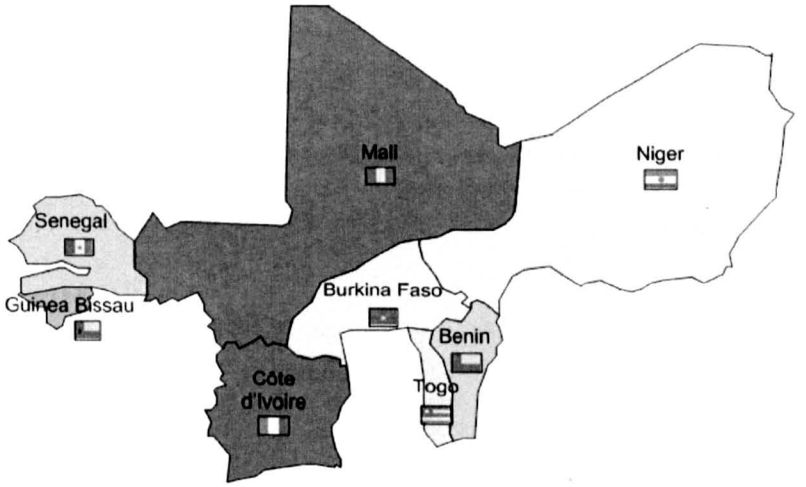
Niger - 1994

Senegal- 2001

Before the establishment of BOA or BCEAO it is learnt that banking operations were carried out mainly by the banks, operated by the country colonising them, and some level of banking activities were in existence even before the colonisation. For simplicity the dates for establishment of the commercial bank was kept the same as that of the central bank, at 1962.

The regional stock exchange for the above countries is Bourse Régionale des Valeurs Mobilières S.A. (BRVM)[11]. It started operation in 1998.

West African Monetary Union (WAMU) Region Countries in Map



Source: Association of African Central Bank[12]

5. Bhutan

The Bank of Bhutan, established in 1968, is the oldest bank in the country. The central bank, opened in 1982, is the Royal Monetary Authority of Bhutan (WB, The World Bank, 2004). There is also a stock exchange in the country named Royal Bhutan Stock Exchange[13] which was established in 1993.

Until the inception of planned development in the early part of the 1960s, the Bhutanese economy was largely un-monetized and the foundation for monetization was first laid with a five year plan in 1960. Thus, the new era of development and Indo-Bhutan economic relationship started in 1960 under the dynamic leadership of Third Druk Gyalpo Jigme Dorji Wangchuk. The first attempt to introduce national currency started in 1968, with the establishment of the Bank of Bhutan in May 1968. The Bank of Bhutan (BOB) incorporated by the Royal Charter of Bank of Bhutan 1968, came into existence on 28/05/1968, with its first office at Phuentsholing.

Source: Bank of Bhutan[14]

7. Burundi

Banque du Royaume du Burundi is the central bank of the country. It was established in 1964.

1909

B.C.B. was originally one of the head offices of the "Banque du Congo Belge" created on January 11th, 1909 on the initiative of the "Overseas Bank ". From 1911 till 1952, the B.C.B. received the privilege to be an "institute of emission".

1922

Following the war 1914-1918, Belgium obtained "Ruanda-Urundi" in protectorate, and so it opened in 1922 the branch of Usumbura (at present Bujumbura), port of the lake Tanganyika and the commercial center of the region. Bujumbura's branch became the "regional head office" until 1959, having under its control the agencies of Astrida (Butare), Uvira, Bukavu, Goma, Kindu and Alberville. The Congo becomes a sovereign state. The Banque du Congo Belge makes contribution to its European activities to the Belgo-Congolaise Bank, established on April 14th, 1960 in Brussels. (Belgolaise since 1965)

1964

It was only on the 25th of July 1964 that the name was modified into "B.C.B". In Europe the name changed to Belgolaise from 1965. In Rwanda, the Bank of Kigali will be constituted only in 1967.

Since 1964, the leaders of the B.C.B has continuously developed the bank as the former Bank of Burundi, which its main activity consists in financing the export of the coffee, the tea, the cotton, the oil, as well as the regional business (the East of Congo).

From 1967, the bank began its extensions towards the outside of the city with the main coffee regions :

- Ngozi : 18 July 1967
- Kayanza : 19 April 1977
- Rumonge : June 1981
- Gitega : 15 Decembre 1983
- Muyinga : February 1988
- Gihofi : July 1988
- Kirundo : 2001

At present the Banque de Crédit de Bujumbura is a member of the group Belgolaise, one of the biggest banking groups completely dedicated in Africa.

Source: Banque De Credit[15]

From the above information the date of establishment of the first commercial bank is kept as 1922 and the central bank as 1964. There is no stock exchange.

8. Cambodia

The central bank, National Bank of Cambodia[16] was established in 1954. The bank was closed in 1975 and re-established in 1979. It is known that commercial banking activities were carried out before the establishment of the central bank. The establishment date of the commercial bank is also kept as 1954 for convenience.

As of October 2009, there is no stock exchange in Cambodia, although Korea exchange is to launch a bourse in the second half of year 2010.

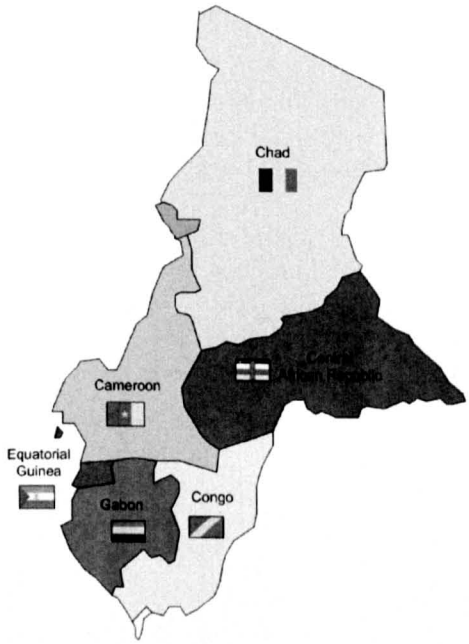
9. Central African Republic 10. Chad 14. Equatorial Guinea

Banque Des Etats de lAfrique Central (BEAC)[17] is the central bank of Cameroon, Central African Republic Chad, Congo Republic, Equatorial Guinea and Gabon. Cameroon, Congo Republic and Gabon are not included in the list of LDCs. BEAC was established in 1972 with Equatorial Guinea entering in 1985.

It is learnt that the countries colonising them (Central African Republic and Chad by French and Equatorial Guinea by Spain), were carrying out some banking activities. Central African Republic and Chad became independent in 1960 and Equatorial Guinea in 1968 respectively.

Considering the above, we keep the date of establishment of commercial banks as 1970 for analysis purposes and convenience. There is no stock exchange in Central African Republic, Chad and Equatorial Guinea.

BEAC Countries in Map.



Source: Association of African Central Bank

11. Comoros

Banque Centrale Des Comores[18] is the central bank. Successor to the national bank of Comoros, the BCC was created on 1st July 1981.The country became independent from France in 1975. Some level of banking activities was present during colonisation. For convenience and analysis purposes the date of establishment of first commercial bank is kept as 1970. There is no stock exchange in Comoros.

12. Democratic Republic of the Congo

The Democratic Republic of the Congowas a Belgium colony and became independent in 1960. Banque Commerciale Du Congo,[19] established in 1909, worked as an issuing institute for four decades.

Banque Central Du Congo is the central bank and was established in 1964.[20] The country does not have a stock exchange.

13. Djibouti

France carried out some level of banking operations in Djibouti during colonisation. Upon independence in 1977, the central bank, Banque Centrale De Djibouti,[21] was established in the same year. For convenience and analysis purpose the date of establishment of the first commercial bank is kept as 1970. There is no stock exchange.

15. Eritrea

Ravinder (2007) comprehensively discusses the development of money and banking in Eritrea. The author describes the presence of banking from the Axumite Kingdom to Italian Colonisation Period (1890-1941), to Banking in the British Administration (1941-52), and in Ethiopian Regime (1952-1991). We will take the time period of the 1950s as the establishment dates of banks, as in the 1950s some modern banking institutions were established in the country (Ravinder 2006), such as Barclays Bank. The Bank of Eritrea is the central bank of the country. The central bank, the national bank of Eritrea[22] was created in 1991. There is no stock exchange in Eritrea.

16. Ethiopia

The Bank of Abysinia[23] is the first bank that was established in 1906. The central bank, the National Bank of Ethiopia,[24] was established in 1963. There is no stock market[25].

17. Gambia

In Gambia there are ten major banks. The Standard chartered bank of Gambia[26] was established in 1894. This is the oldest[27] bank in the country. There is no stock market.

The Central bank of Gambia[28] was established in 1971.

18. Guinea

During colonisation some level of banking operations were carried out by French authority. The country gained its independence from France in 1958 and the Central Bank of the Republic of Guinea[29] (Banque Centrale de la République de Guinée) was established in 1960. There is no stock exchange in the country.

20. Haiti

In view of the following information provided by the central bank of Haiti the date of establishment of the first bank as well as the central bank is kept as 1880.

"On 30 July 1880, the Haitian Minister of Finance, Charles Laforesterie, signed in Paris a contract granting the Corporate Credit Industriel et Commercial concession of the National Bank of Haiti. Under this contract, the new bank had the exclusive ticketing. It could also carry out all banking operations and servicing of cash".
Source: National Bank of Haiti[30]

There is no stock market in Haiti.[31]

21. Kiribati

The Financial system of Kiribati is closely tied to Australia's financial system. Kiribati has no central bank. There are only two banks in Kiribati – The development bank of Kiribati and the Bank of Kiribati. Kiribati uses Australian currency. From October 2001, the Bank of Kiribati Limited (ANZ Kiribati) joined the ANZ Group through

ANZ's purchase of 75% of ANZ Kiribati[32]. It is learnt that the foreign bank, the Bank of New South Wales opened its branch in 1970 in Kiribati.

22. Lao's People Democratic Republic

Bank of Lao PDR[33], the central bank, was established in 1968. The government plans to open Laos's first stock market in 2010.

Stock exchanges in Cambodia and Laos are due to launch in the second half of next year, partly thanks to investment and advice provided by the Korea Exchange (KRX).
Source: International Financial Reviews[34]

23. Lesotho

It is learnt that Britain carried out some banking activities before independence[35] in 1966.

The Central Bank of Lesotho[36] was first established as the Lesotho Monetary Authority in 1978, under the Lesotho Monetary Authority Act of 1978. It started its operations on 2nd January 1980.

24. Liberia

The Liberian Bank for Development and Investment[37] was opened in 1961. The Central Bank of Liberia was established in 1999.

25. Madagascar

Madagascar was a French colony. The first bank was Banque de Madagascar,[38] which was established in 1926, with its head office in Paris. Madagascar became independent in 1962. After a decade of independence in 1973, Madagascar established a central bank.[39]

26. Malawi

The Malawi Stock exchange[40] has been in existence since 1994 but started equity trading in November 1996 when it was first listed as the National Insurance Company Limited.

The African Lakes Corporation (ALC), a trading company, currently known as Mandala, started the first banking operations in Blantyre in August 1894. Other companies, unhappy with ALC handling of banking services, approached an independent bank in South Africa to operate in Blantyre. This suggestion was fortunate, as a decision had already been made by Standard Bank to move further north across the Zambezi River. So, Standard Bank opened its first branch in Blantyre on 29th April 1901. By 1906, deposits at Standard Bank reached GBP25,000. In 1920, the bank had branches in Limbe, Zomba, and Lilongwe.
Source: National Bank of Malawi[41]

As the Central Bank of the Republic of Malawi is committed to achieve price and financial stability, and to contribute towards national economic growth and Development, The Reserve Bank of Malawi was established under an Act of Parliament in July 1964 (caption 44:02) and started its operations in June, 1965 in Blantyre. It replaced a branch of the Federal Bank of Rhodesia and Nyasaland, which was founded to serve as a central bank of the Federation of Rhodesia and Nyasaland. The federation comprised Southern Rhodesia (now Zimbabwe), Northern Rhodesia (now Zambia) and Nyasaland (now Malawi).
Source: Association of African Central Banks[42]

Based on above the oldest bank is African Lake Corporation established in 1894 and central Bank, the Reserve Bank of Malawi in 1964.

27. Maldives

The Maldives Stock Exchange[43] was established on 14th April 2002.

The Maldives Monetary Authority (MMA) was established in 1981. The Bank of Maldives (BML), which was established in 1982, is a partly government owned bank. The other banks are branches of the State Bank of India (SBI) established in 1974, Habib Bank Limited (HBL), established in 1976, Bank of Ceylon (BOC), established in 1981, branch of the Hong Kong Shanghai Banking Corporation (HSBC), established in 2002 and a branch of Mauritius Commercial Bank Ltd (MCB), established in 2008. BML also carries out limited development banking activities.
Source: Maldives Monetary Authority[44]

Some levels of banking were practiced before becoming republic in 1968.

29. Mauritania

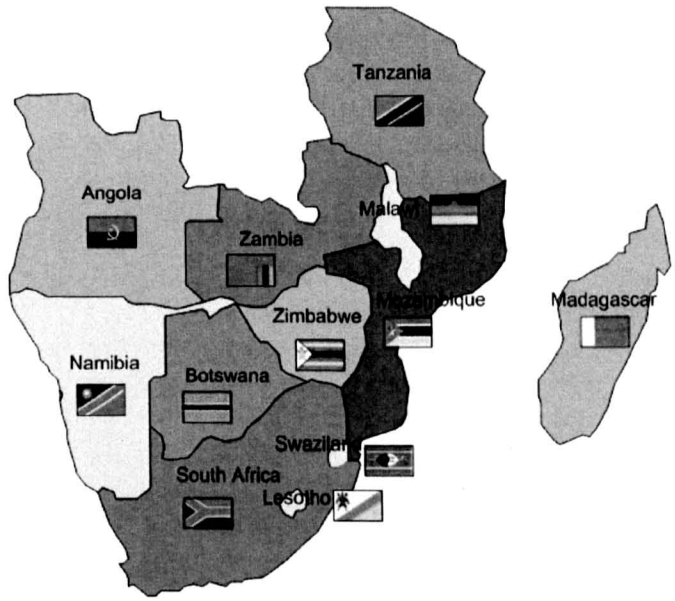
Central Bank of Mauritania[45] was established in 1973.

Some level of commercial banking activities were in existence prior to 1970. There is no stock exchange in the country.[46]

30. Mozambique

The Bank of Mozambique[47] was created on 17th May 1975. Prior to this, it had also functioned as a commercial Bank. Mozambique's first stock exchange is Maputo Stock Exchange.[48]. It began operation in October 1999. The exchange was launched with the support of the Lisbon Stock Exchange and the World Bank.

Southern African region Countries in Map



Source: Association of African Central Bank

Note: Least Developed countries of the South African region are: Angola, Lesotho, Madagascar, Malawi, Mozambique, Tanzania, and Zambia.

31. Myanmar

Myanmar got its independence from Britain in 1948. Although banking practices were in existence during colonisation, the firm date and source could not be identified. The Central Bank of Myanmar Law (1990) empowers the central bank of Myanmar.

In 2007, fifteen private banks are providing domestic banking services across the country through their network of over 180 branches[49].

32. Nepal

The first bank, Nepal Bank Limited,[50] was established in 1937. The central bank, Nepal Rastra Bank,[51] was established in 1956. The stock exchange, Nepal Stock Exchange[52] Ltd., was established in 1976.

34. Rwanda

Out of 11 banks and other financial institutions in the country, the Banque Commerciale Du Rwanda[53] was first licensed in 1963. Banque de Kigali, established in 1966, also celebrated its 40th anniversary recently.

The central bank, the National bank of Rwanda[54] was established in 1964.

35. Samoa

Before independence in 1962, Samoa used the currency issued by the Bank of New Zealand. After independence, the Bank of Western Samoa, a partly owned state bank, started to print the currency. In 1975, Monetary Board of Western Samoa started to take control of printing the currency. In 1984, the central bank act was created and the Central Bank of Samoa[55] was established.

In 1915 the Bank of New Zealand was the first to open a branch in Samoa (Tschoegl, 2003). There is no local stock exchange in Samoa.

There are three commercial banks in Samoa: ANZ Bank (Samoa), Westpac Bank Samoa, and the National Bank of Samoa. The first bank to arrive was the Bank of New Zealand, which established a branch in 1915 in the wake of the New Zealand forces' seizure of the German colony. Then In 1959, BNZ incorporated the Bank of Western Samoa to take over its branch. This was initially a 55-45 joint venture between BNZ and the government, and acted as the bank of note issue from 1960 to 1980. In 1991, ANZ acquired 50% of the Bank of Western Samoa from BNZ and 25% from the Government of Western Samoa. It acquired the remaining 25% in 1995. In 1997, ANZ changed the bank's name to ANZ Bank (Samoa).

Westpac Bank Samoa dates back to 1977 when Pacific Commercial Bank (PCB) opened for business following the acquisition by Westpac for a position in the Pacific Savings and Loan Company (est. 1969), in which BoH had had an ownership interest since 1971.

In 2001, BoH sold its interest in PCB (42.7%) to Westpac, which also owned 42.7%. Westpac gave Samoan investors, who held the remaining 14.6% of PCB, the opportunity to sell their shares at the same price it had paid BoH. Westpac now owns 93.5% of Westpac Bank Samoa, and Samoan companies and individuals own 6.5%.

In 1995, the government helped a consortium of about 50 local investors establish National Bank of Samoa by helping them to purchase the Post Office Savings Bank. The government wanted a locally owned alternative to the Australian banks, which it viewed as focusing on the needs of the wealthier segments of the community. The International Finance Corporation has assisted NBS through its South Pacific Project Facility (SPPF) with a view to making NBS a template for commercial banking projects in other small 16 Pacific island nations. NBS targets SMEs and especially other SPPF-supported companies.

Source: Tschoegl (2003)

36. Sao Tome and Principe

It is learnt that banking operations were carried out by the Portuguese during the colonisation period.

In the country Caixa de Crédito is a government savings and loan institution serving industry, agriculture, and housing. There is also a postal savings bank. Banco Central de São Tomé e Príncipe is the central bank of the country. In the year 1975 it was nationalised, and we have taken this date as the establishment date of the central bank.

.....A year after national independence in 1975, this agency was nationalized as Decree-Law No .16/76, 24 May, and changed its name to the National Bank of St. Tome and Principe "BNSTP", accumulating the functions of the Central Bank and Commercial Bank of Development.

Source: Central Bank of Sao Tome and Principe[56]

38. Sierra Leone

Standard Chartered Sierra Leone is the only international bank in Sierra Leone, and is present since 1894. As no information relating to any other banks opened prior to 1894 found, it is assumed that Standard Chartered is the oldest in the country.

West Africa Currency Board was responsible for the issue of currency in Sierra Leone. Independence was achieved in 1961. On 27th March, 1963, the Bank of

Sierra Leone Act became law and the Bank of Sierra Leone[57] began operation on 4th August, 1964.

Sierra Leone opened stock exchange in July 2007[58]. The name of the exchange is Sierra Leone stock exchange.

39. Solomon Island

The Commonwealth Bank of Australia, established in 1951 (Tschoegl, 2003), is considered the oldest bank in Solomon Islands.

The Central Bank of Solomon Islands (CBSI) was established in February 1983 under the Central Bank of Solomon Islands Act 1976[59].

There are three commercial banks in the Solomon Islands: the National Bank of the Solomon Islands (NBSI), ANZ, and Westpac. The NBSI, now 100% locally owned, has a 42% share of the market, with many clients who are small retailers. In 1981, the Commonwealth Bank of Australia, which had entered in 1951 by establishing a branch, transferred its operations to the National Bank of Solomon Islands, in which it took a 51% share, with the government holding the minority portion. In 1994, the Bank of Hawai (BoH) bought CB's shares; in 2002, BoH withdrew by selling its shares to the government. NBSI is said to be close to insolvency, as political instability has left the economy in tatters. ANZ commenced operations in Honiara in 1966 and Westpac commenced operations there in 1985. In 1988, Westpac also acquired the Solomon Islands Banking Corporation, a subsidiary of HSBC. HSBC had established a branch in 1973.
Source: Tschoegl (2003)

40. Somalia

In 1920 the Banca d'Italia (Central Bank of Italy) was established in Mogadishu in southern Somalia.

1920: The first bank opened in Southern Somalia was the Banca d'Italia (Central Bank of Italy), which established its branch in Mogadishu.
Source: Central Bank of Somalia[60]

The Central Bank of Somalia was established in 1960.

The history of the Central Bank of Somalia began when the United Nation's Trusteeship Administration "A.F.I.S.", established on 8th April, 1950, created a new currency institution regulator "Cassa per la circolazione monetaria della Somalia", with its Head Office in Rome (Italy). During the 1950s, as independence approached, on 6th April, 1959, the Head Quarters had been moved to Mogadishu, taking over all the assets, liabilities, operations of the Banca d'Italia's Mogadishu branch. On 3rd June, 1960, it ceased to exist and its functions have been transferred to the newly established central bank "Somali National Bank".
Source: Central Bank of Somalia

41. Sudan

The Bank of Khartoum[61] is the oldest bank. It was established in 1913 - in the Anglo-Egyptian era. The Central Bank of Sudan[62] was established in 1960.

The stock exchange board was formed in 1992. In 1994, The Transitional National Assembly passed the Khartum Stock Exchange[63] Act and the work of primary stock market started in October 1994.

42. Timor-Leste

Currently three foreign banks have a branch in Dili: Australia's ANZ, Portugal's Banco Nacional Ultramarino and Indonesia's Bank Mandiri. ANZ Timor Leste[64] was established on 31st January 2001. Limited banking operations by foreign banks were present much before 1970.

The Banking and Payments Authority performs the functions of a monetary authority. According to the constitution it will be succeeded by the Central Bank of Timor-Leste. The BPA enjoys legal, operational, administrative, and financial autonomy. It operates with the highest standards of transparency and accountability. History The BPA is a successor to the Central Payments Office (CPO), both of which were created by the UNTAET (United Nations Transitional Administration of East Timor) Administration that administered the country from October 1999 to May 2002. The BPA was created on 30 November 2001 by UNTAET Regulation 2001/30.
Source: Banking and Monetary authority of Timor-Leste[65]

44. Tuvalu

Tuvalu does not have a central bank. The Country uses Australian Dollars (ADB, 2008).

It is learnt that the banking services were available much before 1970.

45. Uganda

Standard Chartered Bank Uganda[66] was the first bank to be established in the country, in August 1912 with one branch, the Kampala main branch. Another bank, Bank of Baroda (Uganda) Ltd.[67] has been operating in Uganda since 1953.

The central bank is Bank of Uganda[68]. It was established in 1966.

Uganda Securities Exchange[69] (USE) was opened in 1997 by the approval of Capital Markets Authority of Uganda. The USE began formal trading operations in January 1998, following the listing of its maiden instrument, the East African Development Bank (EADB) Bond.

46. United Republic of Tanzania

Issue of currency was made by a branch of the German bank during colonisation.

Commercial banking was introduced in the country in 1905, when the Deutsch-Ostafrikanische Bank opened its office in Dar es Salaam. This bank had a concession from the German Government to issue its own notes and coins, which helped the bank to meet the demand for coins in exchange for its notes.
Source: Bank of Tanzania[70]

The Dar es Salaam Stock Exchange[71] (DSE) was incorporated in 1996 as a company limited by guarantee without a share capital. It became operational in April, 1998. Kenya Commercial Bank Limited established in 1970 is the oldest bank registered with the exchange.

The central bank, Bank of Tanzania was established in 1966.

Following the decision to dissolve the EACB and to establish separate Central Banks in Tanzania, Kenya, and Uganda, the Bank of Tanzania Act, 1965, was passed by the National Assembly in December, 1965, and the Bank was opened by the first President of Tanzania Mwalimu Julius K. Nyerere on June 14, 1966.
Source: Bank of Tanzania[72]

47. Vanuatu

The domestic banking system in Vanuatu consists of three foreign owned banks and one state owned bank.

The Reserve Bank of Vanuatu[73] is the Central Bank of the Republic of Vanuatu. Vanuatu achieved its political independence from Great Britain and France on July 30, 1980. In the same year, the parliament approved the Central Bank Act, and the Central Bank of Vanuatu was opened.

During colonisation, banking activities were carried out by the countries colonising Vanuatu. For analysis purposes the year 1970 is taken to be the establishment date of the commercial bank.

There is no stock exchange.

48. Yemen

The information provided in the central bank website reveals that banks were present much before 1971.

The Central Bank of Yemen was established in 1971. When the northern and southern sectors of Yemen reunited on 22 May 1990, the Central Bank of Yemen merged with the Bank of Yemen under the original name of "Central Bank of Yemen".
Source: Central Bank of Yemen[74]

There is no stock exchange in Yemen.

49. Zambia

Standard Chartered Bank Zambia[75] was established in 1906. As the successor of the Central Currency Board, the Bank of Zambia[76] was established in 1956.

Lusaka stock exchange was established in 1993 with the technical cooperation of the International Finance Corporation and the World Bank[77].

4. CHAPTER: VARIABLES AND DATA

"I don't know how you were diverted
you were perverted too
I don't know how you were inverted
no one alerted you"

- From the song by the Beatles *While my guitar gently weeps.*

4.1 Introduction

"Future studies will need to incorporate a more diverse selection of countries to have even a chance of identifying patterns between financial structure and economic development."

- *Levine (1997, p. 720)*

In the second chapter of this thesis, it was found and discussed that many of the empirical works investigating the finance and growth relationship have used similar time dimensions and countries in their empirical analysis. As such, the results obtained may have been affected by self selection biasness although the limited availability of the data does not allow much freedom to deviate substantially among literature. This thesis overcomes this limitation of the existing literature, by expanding significantly the number of countries and sample period required for the empirical work.

In the third chapter, this thesis was able to acquire knowledge on the dates of establishment of banks and stock exchanges in LDCs. This information has helped to incorporate a large number of LDCs in a sample (already larger than those used in literature), which has made the dataset unique and interesting for empirical investigation.

On selection of variables, this chapter follows the path of relevant and recent literature. The discussions, for each of the variables, are made in detail as explanation to some of the important variables was not available in the literature. This has also helped in choosing the most appropriate variables to investigate the link on the relationship.

The remainder of this chapter is organised as follows.

Section 4.2 introduces and explains measures of economic growth, financial development and determinants controlling growth. Section 4.3 describes the data used by the thesis that overcome some of the limitations of the existing empirical works. Section 4.4 confirms the reliability of the data by comparing them to the dataset used by some important papers in the existing literature, and finally, section 4.5 provides additional information as an appendix section to this chapter.

4.2 Variables

This section discusses variables measuring economic growth, bank and stock market development and potential determinants of economic growth.

4.2.1 Measures of Economic Growth

To measure economic growth, this thesis follows the literature and uses real GDP per capita growth rate (hereinafter GROWTH).

This is the annual percentage growth rate of GDP per capita based on constant local currency where GDP per capita is gross domestic product divided by midyear population. As noted in the chapter on the review of literature, GROWTH is used as a dependent variable in most of the relevant literature (see table 2.1 A, Chapter 2).

4.2.2 Measures of Financial Development

In order to measure banks' and stock markets' development, this chapter has identified and explained important indicators separately for the two financial institutions.

4.2.2.1 Variables representing Bank's Development

Discussions on four variables that are used more frequently in literature to measure development of banks are made next.

LIQUID LIABILITIES

LIQUID LIABILITIES is currency plus demand and interest bearing liabilities of banks and non-bank financial intermediaries, divided by GDP. This variable has been used by both early works investigating the link between financial development and economic growth (Goldsmith, 1969, McKinnon, 1973, King and Levine, 1993a), and by recent works (King and Levine 1993a, Beck et al., 2000b&c, Rousseau and Wachtel, 2002, Beck, 2003, Rioja and Valev, 2004, Shen and Lee, 2006), as an important proxy of size of finance.

LIQUID LIABILITIES, also commonly known as M3, is a measure of the overall size of the formal financial system. Theoretically speaking, the size of the financial intermediary should have positive correlation with the provision of financial services. Hence, the expected sign of the coefficient is positive.

Although a popular measure, it has some major shortcomings (King and Levine, 1993a). For instance, LIQUID LIABILITIES may consist of a deposit by one financial intermediary into another. So there might be the problem of double counting. This can lead to exaggerated information related to the size of the finance. According to Beck et al (Beck et al., 2000c, p. 37) *"It may not accurately gauge the effectiveness of the financial sector in ameliorating informational asymmetries and easing transactions costs."*

COMMERCIAL TO CENTRAL BANK

COMMERCIAL TO CENTRAL BANK (King and Levine, 1993a&b, Levine, 1997, Rioja and Valev, 2004) first used in literature by King and Levine (1993a) is the ratio of commercial bank assets divided by commercial and central bank assets.

As this ratio describes the degree to which commercial banks versus the central banks allocate society's savings, an increased ratio shall indicate expansion of the financial sector size (Beck et al., 2000c).

However, it does not account for the effectiveness of banks in researching firms, exerting corporate control, mobilising savings, easing transactions and providing risk management facilities to clients (Beck et al., 2000c). In addition, commercial banks are not the only financial institutions intermediating society's resources (Beck et al., 2007).

PRIVATE CREDIT

This is the ratio of credit issued by bank and non-bank financial institutions to private sector divided by GDP.

PRIVATE CREDIT isolates credit issued to the private sector, i.e. it does not account for credit issued to governments, government agencies, and public enterprises (Beck et al., 2000c). Similarly, it excludes credit issued by the central bank. It is a better measure than gross claims on the private sector divided by GDP used by King and Levine (1993a&b). Because the gross claim also includes credits issued by the monetary authority and government,

but PRIVATE CREDIT includes only credits issued by deposit money banks and other financial intermediaries (Beck et al., 2000c).

PRIVATE CREDIT in the measurement of the finance-growth relationship is the preferred (Beck et al., 2000c) indicator and is used more widely than any other variables (Beck et al. 2000b&c, Edison et al., 2002, Levine, 2002, Favara, 2003, Loayza and Rancière, 2006, Beck et al., 2007, Beck et al., 2008, Saci et al., 2009)

Some papers have used all of the above mentioned three measures of banks development in their empirical works (Beck et al. 2000b&c, Beck, 2003, Rioja and Valev, 2004).

BANK CREDIT

BANK CREDIT includes credit issued by banks to private sector divided by GDP. Unlike PRIVATE CREDIT, this variable does not include credit issued by non bank financial institutions.

Levine and Zervos (1998, p. 542) explain the merit of BANK CREDIT over LIQUID LIABILITIES: *"Bank Credit improves upon traditional financial depth measures of banking development by isolating credit issued by banks, as opposed to credit issued by the central bank or other intermediaries, and by identifying credit to the private sector, as opposed to credit issued to governments."*

Compared to PRIVATE CREDIT fewer empirical works have used BANK CREDIT. Some of the important papers that have used BANK CREDIT while investigating the finance and growth relationship are Demirgüç-Kunt and

Levine (1996), Levine and Zervos (1998), Beck and Levine (2004), Zhu et al., (2004), and Deidda and Fattouh (2008).

Beck and Levine (2004) have mentioned that by reducing the mis-measurement problem of previous studies (by deflating and taking the average of real credit variable and relating it to the real flow variable), BANK CREDIT is a better variable measuring bank's development. However, as noted by the authors themselves (p.428), it does not directly measure the degree to which banks ease information and transaction costs. Similarly, it does not include credits to the private sector by non-deposit money banks.

The four variables measuring banks development mentioned above are common in the empirical works. However, the first two (LIQUID LIABILITIES and COMMERCIAL TO CENTRAL BANKS ASSETS) are less frequently used in the recent literature compared to the later two (PRIVATE CREDIT and BANK CREDIT).

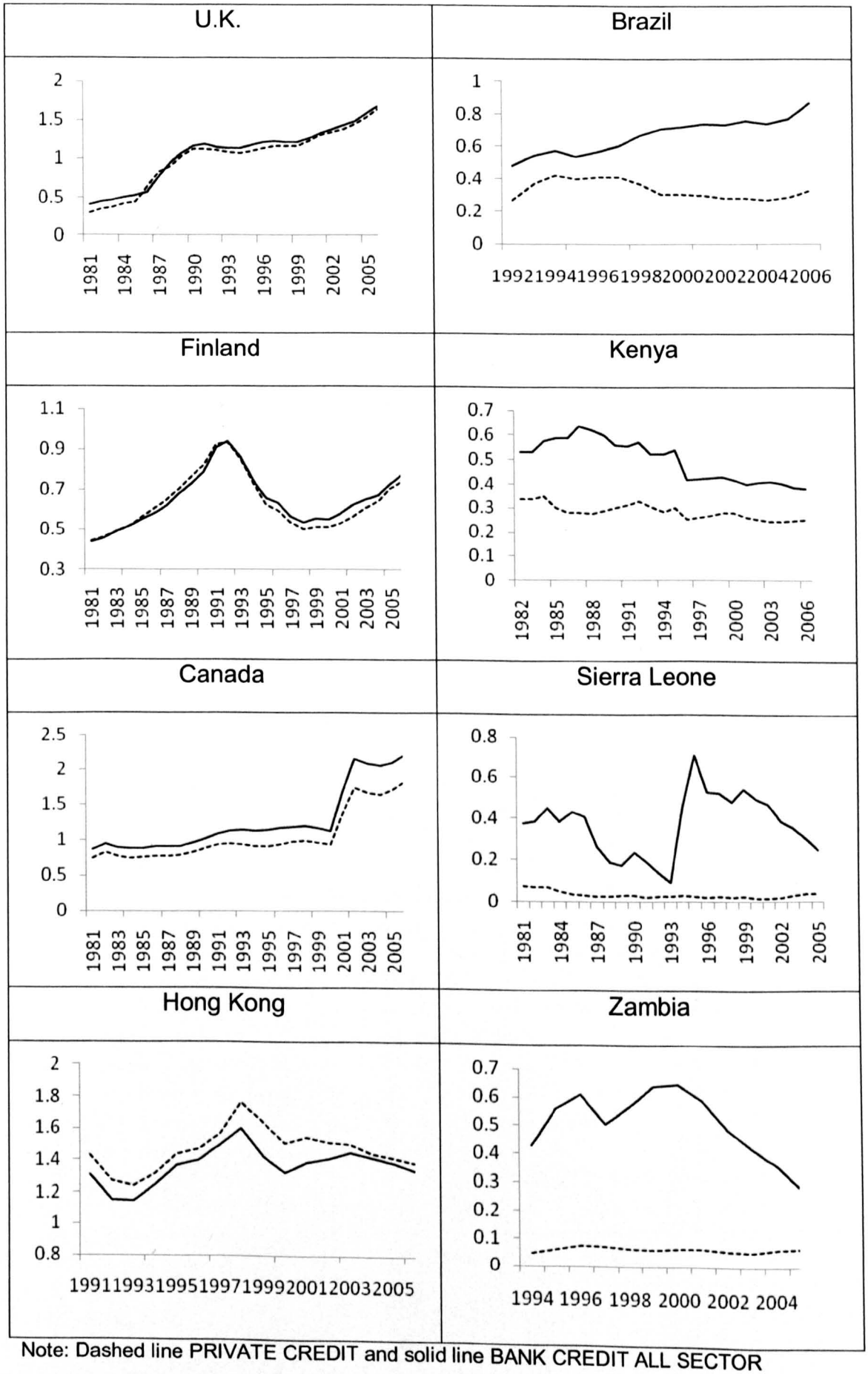
This thesis now defines and explains BANK CREDIT TO ALL SECTORS. This variable has not been used in the empirical work but the data is available in the World Bank source.

BANK CREDIT TO ALL SECTORS

BANK CREDIT TO ALL SECTORS is defined as credit provided by the banking sector to various sectors on a gross basis (excluding credit to central government), divided by GDP. Banking sector includes deposit money banks, monetary authorities, other banking institutions, such as savings, mortgage loan institutions and building and loan associations.

In the finance and growth relationship, the empirical works have not used or discussed BANK CREDIT TO ALL SECTORS; possibly because this variable includes credit to both private and public enterprises and public sector finance may not be efficient (Caprio and Honohan, 2001). This also implies that, theoretically speaking, an estimation using this variable may provide a different set of results as compared to other variables that measure only credit to private sector. This is important (the results should be different) because in many developing countries a large portion of the finance is also made available to public enterprises. In Figure 4.1, the deflated data on PRIVATE CREDIT and BANK CREDIT TO ALL SECTORS are compared for some randomly selected developed and developing countries. It can be seen that the variable BANK CREDIT TO ALL SECTORS is significantly higher in less developed economies. Both the variables are moving in the same direction and are approximately the same in the case of PRIVATE CREDIT for U.K., Finland, Canada and Hong Kong. However, the difference is huge and the movement of the two measures is not in the same direction for Brazil, Kenya, Sierra Leone and Zambia.

Figure 4.1 PRIVATE CREDIT and BANK CREDIT TO ALL SECTORS in some developed and developing countries.



Note: Dashed line PRIVATE CREDIT and solid line BANK CREDIT ALL SECTOR

Based on above discussions, PRIVATE CREDIT is regarded as the preferred variable measuring financial (banks) development and therefore will be used for the main estimation. BANK CREDIT ALL SECTOR will be entered into the estimation separately to see the differences in the result.

4.2.2.2 Variables representing Stock Market's Development

There are three variables representing stock market development used in literature.

CAPITALISATION

CAPITALISATION is stock market capitalisation divided by GDP. It is an indicator of the size of the stock market. Mathematically, CAPITALISATION equals the value of listed domestic shares (market price of share multiplied by number of shares) divided by GDP. The variable is used in many empirical works (Demirgüç-Kunt Levine, 1996, Rajan and Zingales, 1998, Beck et al. 2000c, Rousseau and Wachtel, 2000, Arestis et al., 2001, Shen and Lee, 2006, Saci et al., 2009)

As mentioned by Demirgüç-Kunt and Levine (1996, p. 294) *"In terms of economic significance, the assumption behind stock market capitalisation is that market size is positively correlated with the ability to mobilise capital and diversify risk."* CAPITALISATION is therefore a good indicator of stock market growth and used widely in literature. However, large markets may not necessarily function effectively all the time. Similarly, there may be tax issues that make companies reluctant to be listed on the exchange.

Levine and Zervos (1998) and Beck and Levine (2004) show that CAPITALISATION is not a good predictor of economic growth. Levine and Zervos (1998) explain that simply listing the stock exchange does not necessarily foster resource allocation. The authors show that the ability to trade in securities is more crucial for economic performance (Levine and Zervos, 1998 p.549-550) than the size of the market. Liquidity is more important as it provides a ready exit-option for investors, which can foster more efficient resource allocation and faster growth (Levine, 1991, Bencivenga et al., 1995, Beck and Levine, 2004).

The activity of the stock markets can also be measured by finding the actual transaction taking place in the stock exchange. A Higher or increased number of transactions would mean growth in stock market activities. In addition, increased transactions would mean a more liquid market, which is another key indicator of an efficient stock market. Two indicators are commonly used in the literature to reflect this: VALUE TRADED and TURNOVER, which are discussed next.

VALUE TRADED

It is the ratio of total share value traded on the stock exchange to GDP. Mathematically, it is the product of number of shares traded and the market price of such shares divided by GDP. Therefore, it includes both liquidity and size elements.

In cross country growth regression Atje and Jovanovic (1993) were the first to use VALUE TRADED. Since then it has been used in much literature (see for

example, (Demirgüç-Kunt and Levine, 1996, Levine and Zervos, 1998, Rousseau and Wachtel, 2000, Shen and Lee, 2006, Saci et al., 2009).

As mentioned by Demirgüç-Kunt and Levine (1996, p. 295) *"The total value traded ratio measures the organized trading of equities as a share of national output and therefore should positively reflect liquidity on an economy-wide basis."*

In a study by Rousseau and Wachtel (2000), the paper highlights the importance of trading because a country with substantial equity ownership and little trading may be similar in terms of financial sector development to a country with privately held firms (p.1939). VALUE TRADED emphasizes on liquidity and interacts with market size, and therefore is a better indicator of market performance compared to CAPITALISATION.

Nevertheless, Beck and Levine (2004) argue that VALUE TRADED does not measure the liquidity of the market (it measures trading relative to the size of the economy). Since markets are forward looking, they are expected to anticipate higher economic growth by higher share prices. Beck and Levine (2004) explain that since VALUE TRADED is the product of quantity of share and price, and can rise without an increase in the number of transactions.

TURNOVER

TURNOVER equals the value of the trading of shares on domestic exchanges divided by the total value of listed shares. It indicates the trading volume of the stock market relative to its size. Mathematically, this variable equals the value of total shares traded divided by market capitalisation. In

this sense, it is a complementary measure to CAPITALISATION and VALUE TRADED. So it captures both the element of size and liquidity. It has been used in many empirical works (Demirgüç-Kunt and Levine, 1996, Rousseau and Wachtel, 2000, Beck and Levine, 2004, Shen and Lee, 2006, Saci et al., 2009). It is also a preferred indicator of stock market performance in Beck and Levine (2004) and Saci et al. (2009).

As seen above, incorporating information on CAPITALISATION, VALUE TRADED and TURNOVER are expected to provide a more comprehensive picture of development than the information provided by any single indicator. Hence, the relationship is examined for all three dependent variables discussed above.

Next the control variables are explained.

4.2.2.3 Control Variables

The variables will control the potential determinants of economic growth in the growth regressions. Similar to dependent and independent variables, this thesis follows the literature in the selection of control variables.

GOVERNMENT CONSUMPTION, CAPITAL FORMATION, TRADE OPENNESS, INFLATION, EDUCATION, and INITIAL INCOME are the most commonly used control variables in the empirical works (Rousseau and Wachtel, 2000, Beck and Levine, 2004, Deidda and Fattouh, 2008, Saci et al., 2009). Following La Porta et al. (1997, 1998 and 1999), many papers have also used dummy variables for legal origin as control variables for the

level of financial development (Beck et al., 2000b&c, Levine, 2002, Favara, 2003).

The chapter discusses the variables into some detail in the next paragraphs.

GOVERNMENT CONSUMPTION

This control variable is the ratio of general government consumption expenditure to GDP. It includes all government's current expenditures for purchases of goods and services including compensation of employees.

CAPITAL FORMATION

CAPITAL FORMATION is the ratio of gross capital formation to GDP. Gross capital formation consists of fixed assets (for instance, land improvements, roads, schools, hospitals) and change in the level of net inventories.

TRADE OPENNESS

TRADE OPENNESS is equal to total trade as percentage of GDP. Trade is the sum of exports and imports of goods and services.

INFLATION

INFLATION is equal to the change in consumer price index. The consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres' method that uses base year quantity is generally used to compute the index.

EDUCATION

EDUCATION is one of the most commonly used control variables in growth regression, involving financial development.

This is the ratio of total secondary enrolment, regardless of age, to the population of the age group that officially corresponds to that level of education. The gross enrolment rate in secondary education is taken for total male and female population. Mathematically, it is expressed as a percentage of population in the theoretical age group for secondary education.

However, some empirical works have used average years of schooling (Beck et al., 2000b&c, Edison et al., 2002, Levine, 2002, Favara, 2003, Beck and Levine, 2004, Rioja and Valev, 2004) and not enrollment. Papers that have used average years of schooling again differ from one another in terms of the selection of age criterion. Some literature uses average years of schooling in the population over 25 years (Beck et al., 2000b&c, Beck and Levine, 2004), while others use average years of schooling in the population over 15 years (Favara, 2003).

Many papers keep EDUCATION in their proxies of initial conditions. So, they keep the education data only for the first year of their observation (Levine and Zervos, 1998, Edison et al., 2002, Levin et al., 2002, Shen and Lee, 2006). However, this thesis takes the enrolment ratio (not average years of schooling) for the entire sample period (not for initial period alone).

It is, however, important to note that enrolment may not capture the quality of education offered in different countries. In addition, enrolment in most cases

differs from actual active participation. Many countries have already achieved enrolment rates of 100% over time, in some cases even exceeding 100% due to the enrolment of people outside the theoretical age group (gross basis). Therefore, the variable may not convey useful information.

Nevertheless, to be consistent with previous empirical research and because this variable is an overall indicator of the commitment towards investments in human capital, the variable is included as a control variable in the regression.

EDUCATION has been used as a proxy for human capital investment and is expected to have a positive impact upon growth. The source of the data is UNESCO. Data is downloaded using ED Stats Data Query (Ed Stat is the World Bank Education Project database).

INITIAL INCOME

INITIAL INCOME is the initial GDP per capita. This variable will control the convergence effect. The variable is used in much recent and relevant literature. (Beck et al., 2000b&c, Rousseau and Wachtel, 2000, 2002, Beck and Levine, 2004, Loayza and Rancière, 2006, Shen and Lee, 2006, Saci et a., 2009)

Baumol (1986) found that by regressing the growth of GDP per capita over a certain period of time, in relation to its initial level, the regression coefficient beta had a negative sign, indicating that countries with a lower initial GDP per capita grew more rapidly than countries with a higher initial GDP per capita. This is the so-called beta convergence of the neo-classical approach.

Baumol (1986) tested this using data from Maddison (1982) for the period 1870-1973.

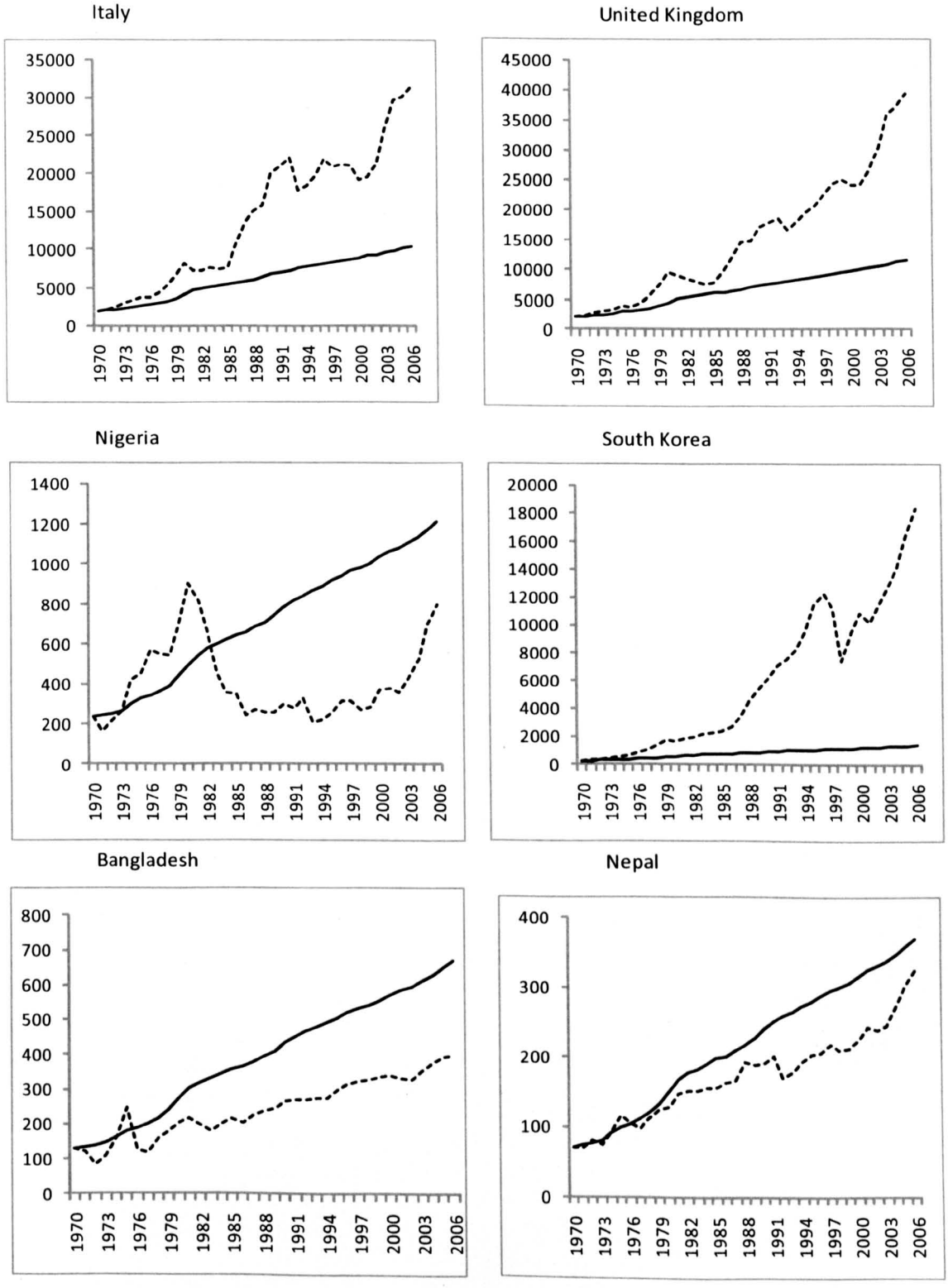
A country with an initial high (low) income and measured by GDP per capita should experience lower (higher) growth rates, since gradual convergence is expected (Rousseau and Wachtel, 2002).

Many papers keep INITIAL INCOME in their proxies of initial conditions (Levine and Zervos, 1998, Edison et al., 2002, Levine, 2002, Shen and Lee, 2006). So, they keep the INITIAL INCOME data only for the start year of their observation. However, this thesis takes a different approach. INITIAL INCOME for every year is calculated and considered in the estimation.

The variable is mathematically defined as the current GDP per capita in US Dollars of the first year cumulatively increased by the US inflation rate i.e. multiplied by 1 + US inflation of each year. By doing so, the value of INITIAL GDP per capita is kept constant in real terms. As this thesis could not find calculation details for INITIAL INCOME in the literature, no direct comparison was possible.

Figure 4.2 shows the INITIAL INCOME and current GDP per capita for some countries. The dashed line represents current GDP per capita and the solid line is for initial GDP per capita. The solid line (GDP per capita increased by inflation) is above the dotted line (actual current GDP per capita). This means that the economy has not grown sufficiently to keep at least the same level of income per capita as in cases of Nigeria, Bangladesh and Nepal.

Figure 4.2 INITIAL INCOME and Current GDP Per Capita for some countries



Note: The dashed line represents current GDP per capita and the solid line is for initial GDP per capita. Figures are in US Dollars. INITIAL INCOME is the current GDP per capita in US Dollars of the first year (1970), cumulatively increased by the US inflation rate.

BLACK MARKET PREMIUM

BLACK MARKET PREMIUM is the difference rate between the black market exchange rate and the official rate. Generally, the black market develops due to a shortage of foreign currency. The excess demand for foreign currency arises due to restrictions on capital outflows by government. People will then pay more than the official rate. Kiguel and O`Connell (1995) have mentioned that a higher BLACK MARKET PREMIUM is suggestive of macroeconomics misalignments.

The data on BLACK MARKET PREMIUMS is made by subtracting official rates from black market rates, and dividing again by the official rate. Data on black market rates is from Bahmani-Oskooee and Tanku (2006). The discontinuity of the World Currency Yearbook publication limits the data on BLACK MARKET PREMIUMS to 1998.

DUMMY VARIABLE FOR LEGAL ORIGIN

The economic consequence of legal origin is important (La Porta et al., 1997, 1998, 1999 & 2008). Finance is based on contracts produced by the legal system. So, the legal system can have significant influence on financial development. La Porta et al. (2008) have provided legal dummy variables for a list of 188 countries (189 in list where West Gaza has no data), which is more than in previous versions of the papers (La Porta et al., 1997, 1998 & 1999), which had fewer numbers of countries (For example, La Porta et al. 1998 had data for 49 countries). The thesis uses the legal variables from La Porta (2008) as dummy variables. The dummies are available for countries with English, French, German, Scandinavian and Socialist legal origin.

4.3 Data

The sample period of some of the important papers commonly cited in related literature and discussed in the second chapter of this thesis are listed in table 4.1.

Table 4.1 Sample Period of some Empirical Works in Finance and Growth

Authors	Sample Period	No. of countries in sample	No. of LDCs in sample
Atje and Jovanovic(1993)	1960-1985	40	0
Demirgüç-Kunt and Levine (1996)	1986-1993	41	0
Levine and Zervos(1998)	1976-1993	47	1
Levine (2002)	1980-1995	48	0
Zhu et al. (2004)	1976-1993	47	1
Rioja and Valev(2004)	1961-1995	74	9
Beck and Levine(2004)	1976-1998	40	1
Shen and Lee(2006)	1976-2001	48	0
Saci et al.(2009)	1988-2001	30	1

Surprisingly, the end periods of data in most empirical works are 1993, 1995 and 1998. Moreover, in the empirical works that have included both stock markets and banks, none of the papers above have done research for more than 48 countries. In addition, none of the works included LDCs in their analysis. (Except few but these works only have one country which is Bangladesh). Although the table shows 9 LDCs in case of Rioja and Valev (2004), the authors have not used the real data but have constructed dummies (The dummy variable equals one if the country's stock market variable is larger than the observed median value in the data set and zero

otherwise). In empirical works by Shen and Lee (2006) the authors have divided the sample into income levels. In the list of 6 low income countries of their sample none of them are LDCs (India, Indonesia, Kenya, Nigeria, Pakistan and Zimbabwe). This raises the question of sample biasness.

This thesis aims to avoid the limitations of the literature above. All possible attempts have been made to include the maximum number of countries and years for a majority of variables identified and used in the literature. This is discussed next.

In the sources (such as The World Bank, the IMF and the UN), annual data for the variables are available from 1960 onwards. In the empirical works of many papers the sample period therefore starts from 1960. But data for the period 1960 to 1969 is very limited for a large number of countries. After careful and repeated scrutiny of the data for the set of variables, 1970 is found to be a good starting period to include a large number of data.

Sources of data for measures of financial development (banks and stock market development variables) are from the updated version of Beck et al. (2000a) and ESDS International. The data defined in Beck et al. (2000a) has been updated on a regular basis and is available in the World Bank website of the financial structure database.

Beck et al. (2000a) in their financial structure dataset has shown a list of 210 countries, which includes Taiwan, Serbia and Montenegro, and also "Serbia and Montenegro" separately.

ESDS International, in its macro database link of the World Bank, also has the same list of countries. However, it does not have Taiwan and includes San Marino. It has Serbia and Montenegro separately. Hence, in ESDS International there is a list of 209 countries.

A scrutiny of the data in the sources reveals that 29 countries have no or very limited data. The names of the countries are provided in the next table. These countries were therefore omitted from any further use.

Table 4.2 List of Countries with limited or no data

#	Countries	#	Countries
1	American Samoa	16	Macao, China
2	Andorra	17	Marshall Islands
3	Aruba	18	Mayotte
4	Bermuda	19	Micronesia, Fed. Sts.
5	Cayman Islands	20	Monaco
6	Channel Islands	21	Netherlands Antilles
7	Cuba	22	New Caledonia
8	Faeroe Islands	23	Northern Mariana Islands
9	French Polynesia	24	Palau
10	Greenland	25	Puerto Rico
11	Guam	26	San Marino
12	Iraq	27	Somalia
13	Isle of Man	28	Virgin Islands (U.S.)
14	Korea, Dem. Rep.	29	West Bank and Gaza
15	Liechtenstein		

This gives us 180 countries in the list (209-29), which includes both developed, developing and LDCs. In the case of LDCs (49 countries), it was learnt in the third chapter that there are no stock exchanges in 31 countries and even in countries where they exist (18 countries) many of them have been established recently.

Among 18 LDCs that have a stock exchange, data for other sets of variables (measure of banks development and growth determinants) in two countries (Bhutan and Maldives) is incomplete. Hence, these countries could not be

kept in the sample of this thesis. However, among other LDCs which do not have a stock exchange (31 countries), 12 countries (Burundi, Central African Republic, Chad, Equatorial Guinea, Ethiopia, Gambia, Haiti, Lesotho, Madgascar, Rwanda and Vanauta) were found to have fair amounts of data required for the investigation.

On the above (countries without a stock exchange), this thesis takes the view that the sources have mistakenly mentioned "data not available" for stock market related variables, for those periods when stock markets in the countries did, in fact, not exist.

Based on the knowledge of the establishment of banks and stock exchanges (from previous chapter) in LDCs, "0" is assigned for stock market related variables where data is unavailable to all those 12 countries without a stock exchange. Construction of data by assigning a "0" value for stock market related variables (where data is not available) has also been made by Levine and Zervos (1998). However, Levine and Zervos (1998) do not use the knowledge of the establishment date of exchange, but simply guess that the value should not be significantly different from "0" with reasoning that in their sample the minimum value and standard deviation were very low for stock market variables (Page 553, the minimum values for Capitalization, Value Traded, and Turnover are 0.01, 0.0002, and 0.006 with standard deviations of 0.43, 0.19, and 0.33, respectively).

In case of LDCs, the above adjustment gives 28 countries (18 with stock exchange, 12 without and 2 omitted) for the empirical analysis involving banks and stock markets.

In the case of non-LDCs (180-49=159 countries), the thesis checked the data in detail and found that only 92 countries could be included in the estimation if all preferred measures of banks, stock markets, and control variables are to be incorporated.

This finally allows 120 (92+28) countries for 37 years (1970 – 2006) to be analysed. This is probably the most comprehensive database available for studying the link between financial development and economic growth. This should be true for both pure cross country growth regression and panel data involving banks and stock markets development.

Table 4.3 summarises the variables explained above, labels used and the sources of data.

Table 4.3 Definition of Variables and Sources of Data

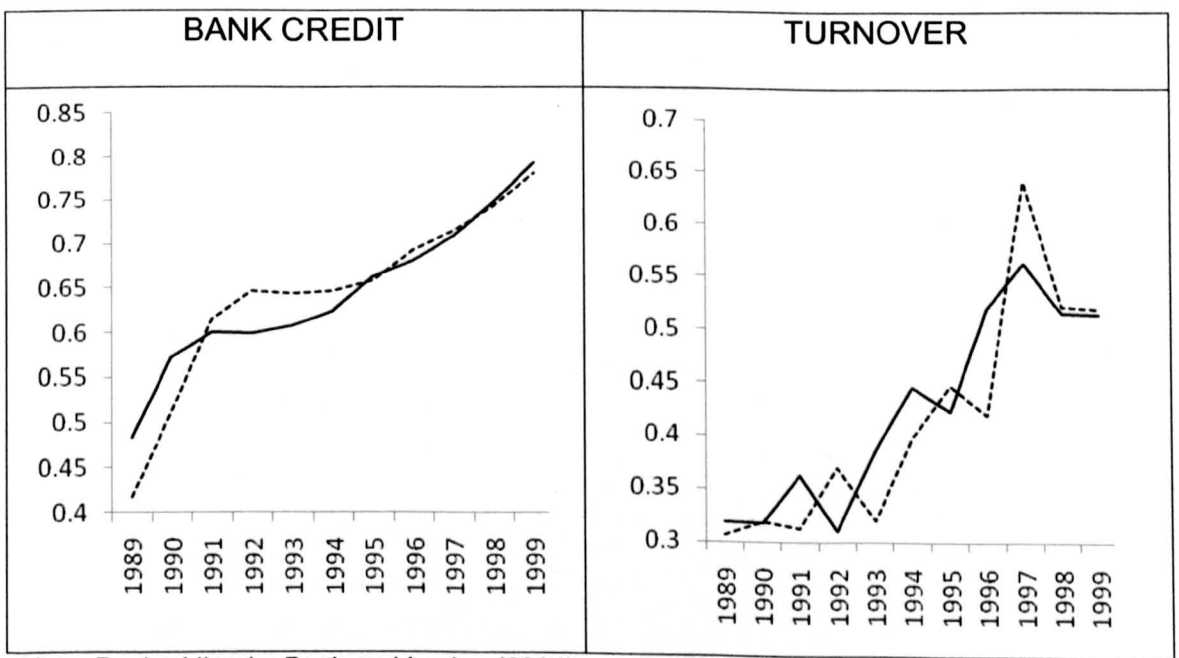
No.	Variables	Definition	Expected Sign	Original Source of Data	Source Data obtained
1	GROWTH	Real GDP per capita growth rate	+	World Bank national accounts data, and OECD National Accounts data files	ESDS International
2	PRIVATE CREDIT	Ratio of private sector credit issued by bank and non bank financial institutions to GDP	+	The World Bank, World Development Indicator	Updated version of Beck et al. (2000), The World Bank Financial Stucture Database
3	CAPITALISATION	Ratio of market price of share multiplied by number of shares divided by GDP	+	The World Bank, World Development Indicator	Updated version of Beck et al. (2000), The World Bank Financial Stucture Database
4	VALUE TRADED	Ratio of product of number of shares traded and the market price of such shares to GDP	+	The World Bank, World Development Indicator	Updated version of Beck et al. (2000), The World Bank Financial Stucture Database
5	TURNOVER	Ratio of value of the trading of shares on domestic exchanges divided by total value of listed shares	+	The World Bank, World Development Indicator	Updated version of Beck et al. (2000), The World Bank Financial Stucture Database
6	GOVERNMENT CONSUMPTION	Ratio of general government consumption expenditure to GDP	-	World Bank national accounts data, and OECD National Accounts data files	ESDS International
7	CAPITAL FORMATION	Ratio of gross capital formation to GDP	+	World Bank national accounts data, and OECD National Accounts data files	ESDS International
8	TRADE OPENNESS	Trade as percentage of GDP	+	World Bank national accounts data, and OECD National Accounts data files	ESDS International
9	INFLATION	Change in consumer price index	-	International Monetary Fund, International Financial Statistics and data files	ESDS International
10	EDUCATION	Total secondary enrolment, regardless of age, to the population of the age group that officially corresponds to that level of education	+	UNESCO	The World Bank, ED Stats Query
11	INITIAL INCOME	The current GDP per capita in US Dollars of the start year cummulatively increased by the US inflation rate	-	Made from current GDP in USD cumulatively increased by the US inflation rate. Data from World Bank national accounts data, and OECD National Accounts data files.	ESDS International
12	BLACK MARKET PREMIUM	The difference rate between black market exchange rate and the official rate	-	Bahmani-Oskooee and Tanku (2006)	Bahmani-Oskooee and Tanku (2006)
13	LEGAL ORIGIN DUMMIES	"1" for true and "0" for false where 1 implies countries following legal system of a particular country		La Porta et al. (2008)	La Porta et al. (2008)

*The Economic and Social Data Service International (ESDS) disseminates and supports both aggregate and survey international datasets for UK FE and HE. The service is jointly run by Mimas at Manchester and the UK Data Archive at Essex – http://esds.ac.uk/international/

4.4 Data Reliability

It was noted in Table 4.2 above, and also in the review of literature for this thesis that many empirical works in the area of finance and growth have used similar variables and sample data but the results are different in many respects. So, it was checked to see if the different works had used the same or different set of data. For example, the data used by Beck et al. (2000a) and the data used by Beck and Levine (2004) for the variables BANK CREDIT and TURNOVER were checked, and it is learnt that there are some discrepancies that are shown in the charts below where Australia was randomly taken for the purpose.

Figure 4.3 BANK CREDIT and TURNOVER for Australia from different sources



Note: Dashed line by Beck and Levine (2004) and Solid line Beck et al. (2000a)

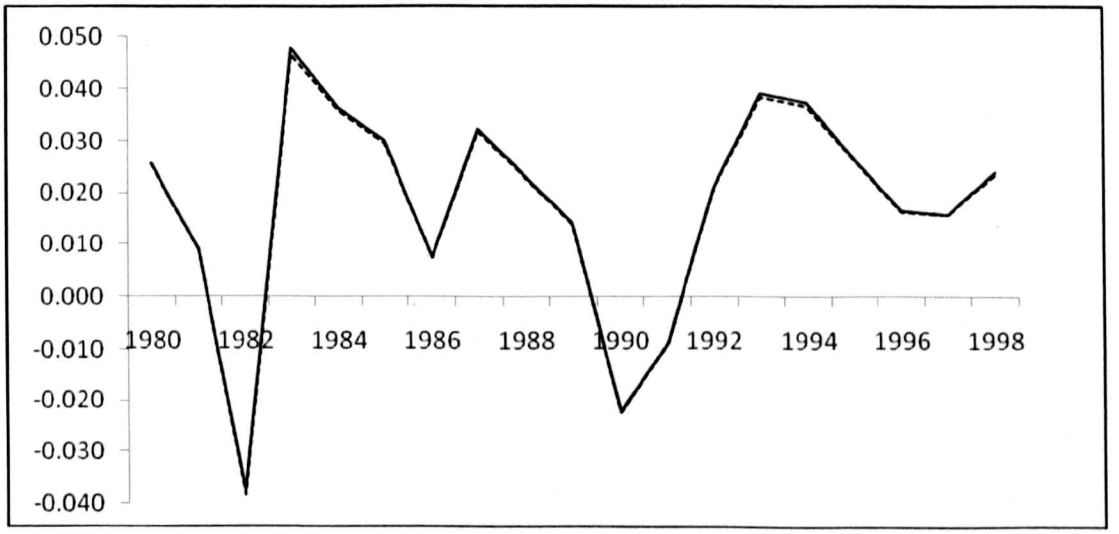
Therefore, it is considered important to confirm the consistency and accuracy of the data before conducting the empirical tests, by cross verifying the dataset collected by this thesis with those used by literature. Data for all

variables (dependent: economic growth, independent: financial development and control: growth determinants) have been randomly tested and explained below.

4.4.1 Data: Economic Growth

Data collected on GROWTH is compared with that of Beck and Levine (2004) and plotted in a line graph for the period 1980 to 1998. Australia is again taken randomly to test the accuracy and consistency of the data.

Figure 4.4 Comparison of Data from different sources on Economic GROWTH



Note: The dashed line represents data on GROWTH from the World Bank, and the solid line is from Beck and Levine (2004).

As can be seen in the chart above, there is no difference in the values of the variable GROWTH in literature (Beck and Levine, 2004) and in the source (the World Bank) of the data that this thesis have used.

4.4.2 Data: Financial Development

On the variables measuring financial development (bank and stock market related variables), this thesis uses deflated data (Favara, 2003 and Beck and

Levine, 2004). Deflating the data is considered important as it reduces the problem of mis-measurement, which was common in past studies of stock markets, banks and growth. Deflated data for the variables PRIVATE CREDIT, MARKET CAPITALISATION, VALUE TRADED, and TURNOVER is used. The formula to deflate each of the variables is explained next.

Following Beck et al. (2000a), Beck and Levine (2004) and Favara (2003), data (except for TURNOVER) is deflated using the following formula. (Notes on Deflating: The variables representing financial developments are measured at the end of the period and GDP is measured over the period. Therefore, the financial development variables are deflated by end-of-period CPI and the GDP flow variables by average CPI. Taking the average of the real credit variable in period t and period t-1 and by relating it to the real flow variable for period t it reduces the problem of mis-measurement (Beck and Levine, 2004).

$$\frac{0.5 \times \left(\frac{F_t}{P_{e,t}} + \frac{F_{t-1}}{P_{e,t-1}}\right)}{\frac{GDP_t}{P_{a,t}}}$$

The above when applied to PRIVATE CREDIT is to be interpreted as follows

F : Domestic credit to private sector total (local currency)
$P_{e,t}$: End of Period Consumer Price Index
$P_{a,t}$: Average Consumer Price Index
GDP : GDP current Local Currency
T : Time

The formula when applied to CAPITALISATION changes as shown next.

F : Stock Market Capitalisation (US Dollars)

GDP : GDP current US Dollars

$P_{e,t}$, $P_{a,t}$, and t same as above

The formula when applied to VALUE TRADED changes as follows.

F : Stock Market Traded Value (US Dollars)

GDP : GDP current US Dollars

$P_{e,t}$, $P_{a,t}$, and t same as above. GDP same as that of CAPITALISATION.

However, in case of TURNOVER based on the explanation about this variable made above, the formula following will be used

$$\frac{\frac{T_t}{P_{a,t}}}{\{(0.5)x[\frac{M_t}{P_{e,t}} + \frac{M_{t-1}}{P_{e,t-1}}]}$$

T : Total Value Traded (in US Dollars)

M : Stock Market Capitalisation (in US Dollars)

Other symbols are the same, as in CAPITALISATION explained above.

Explanation to above is that the variable TURNOVER is the total value of shares traded during the period divided by the average market capitalisation for the period. Average market capitalisation is calculated as the average of the end-of-period values for the current period and the previous period.

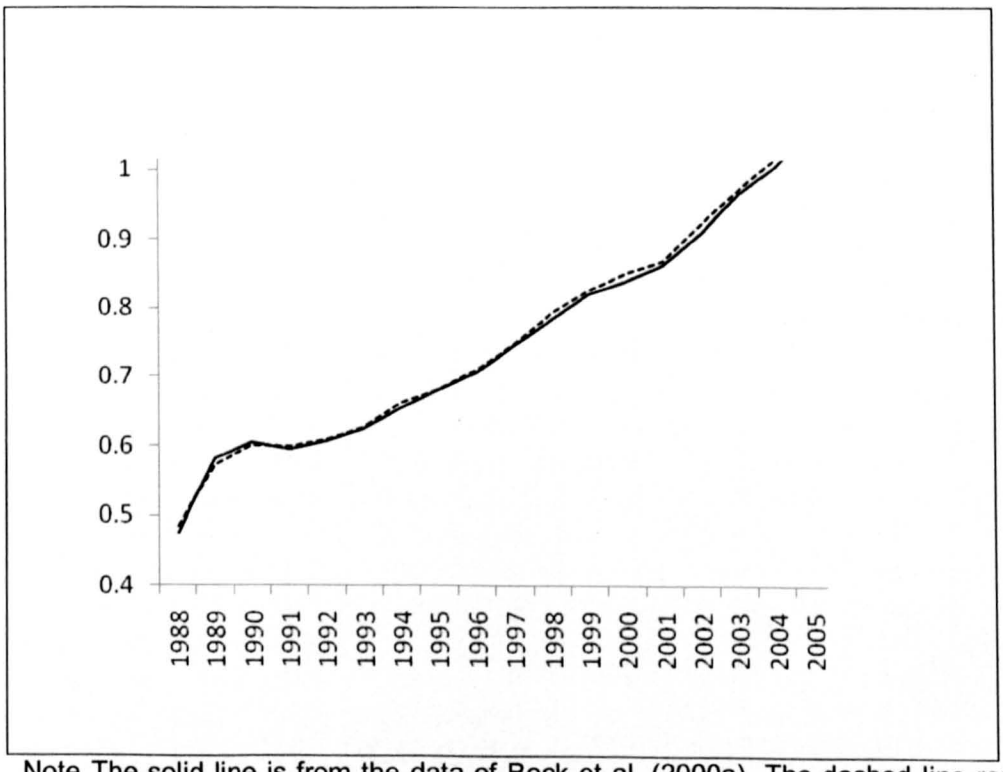
The chapter collected the deflators, namely 1) Average Consumer Price index and 2) End of Period Consumer Price index from IMF World Economic Outlook (IMF, WEO) using the ESDS and deflated the data for all variables

explained above. The deflated data is then compared with deflated data of other sources.

PRIVATE CREDIT

PRIVATE CREDIT is deflated as detailed above. The deflated series of PRIVATE CREDIT is then compared with Domestic Credit by Deposit Money Banks and other Financial Institutions / GDP of the World Bank (Beck et al., 2000a) and plotted in a line graph for Australia over 1989-2006. This is shown in figure 4.4 next.

Figure 4.5 Comparison of Deflated Data on PRIVATE CREDIT for Australia

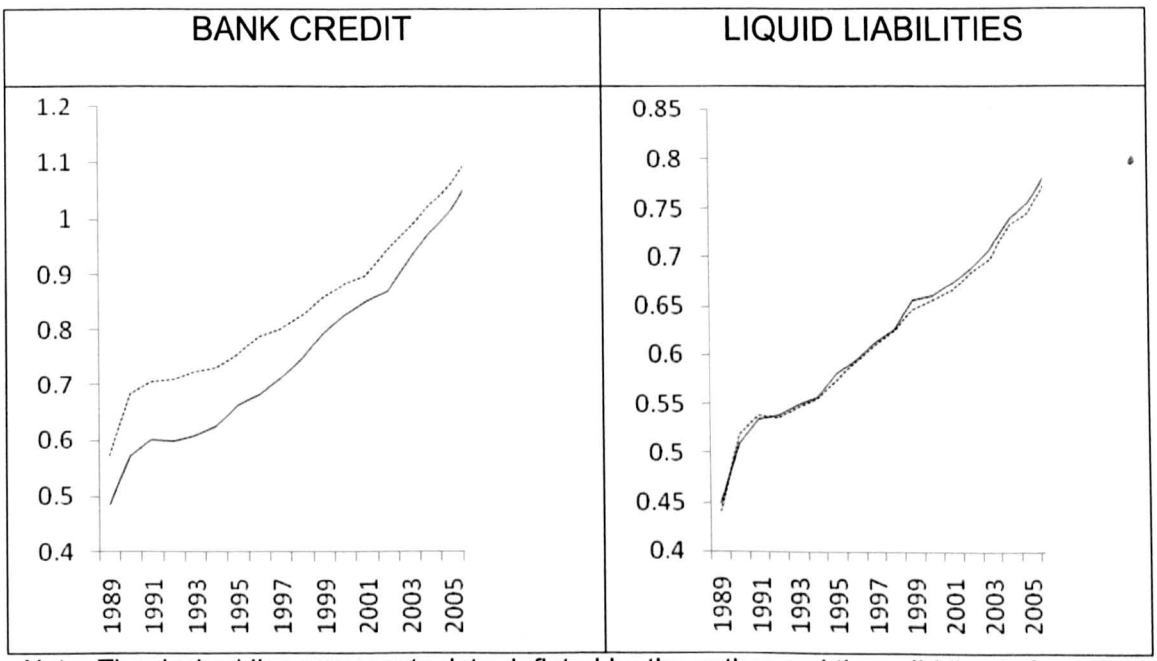


Note The solid line is from the data of Beck et al. (2000a). The dashed line represents the calculated PRIVATE CREDIT. The data source of calculated PRIVATE CREDIT is the World Bank, and the data for deflators have been collected from IMF, WEO.

The above was repeated for another two important variables, measuring banks development, which is frequently used by literature, namely BANK CREDIT and LIQUID LIABILITIES. The line charts related with BANK

CREDIT and LIQUID LIABILITIES made for Australia between1989-2006 are presented in Figure 4.6.

Figure 4.6 Comparison of data on BANK CREDIT and LIQUID LIABILITIES



Note: The dashed line represents data deflated by the author and the solid line is from Beck et al. (2000a)

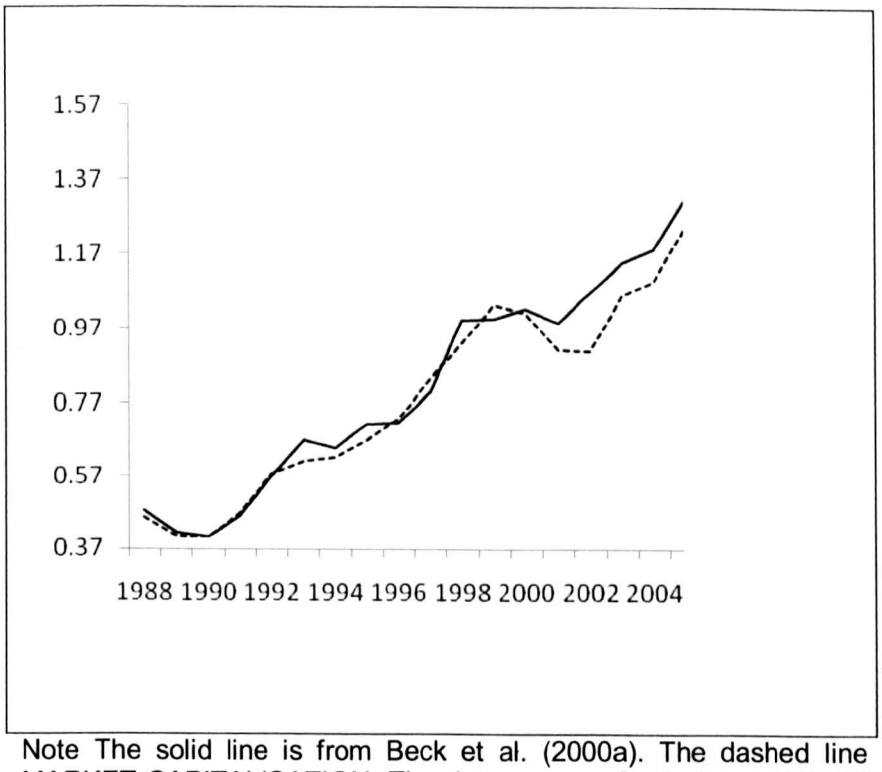
As can be seen, although the data on BANK CREDIT varies by a small number the LIQUID LIABILITIES, calculated using the same deflators, confirms the accuracy of the data with the literature.

Next, data related with stock market development is verified.

MARKET CAPITALISATION

The deflated series of MARKET CAPITALISATION is compared with Beck et al. (2000a) data for Australia over 1989-2006. It is shown in figure 4.7.

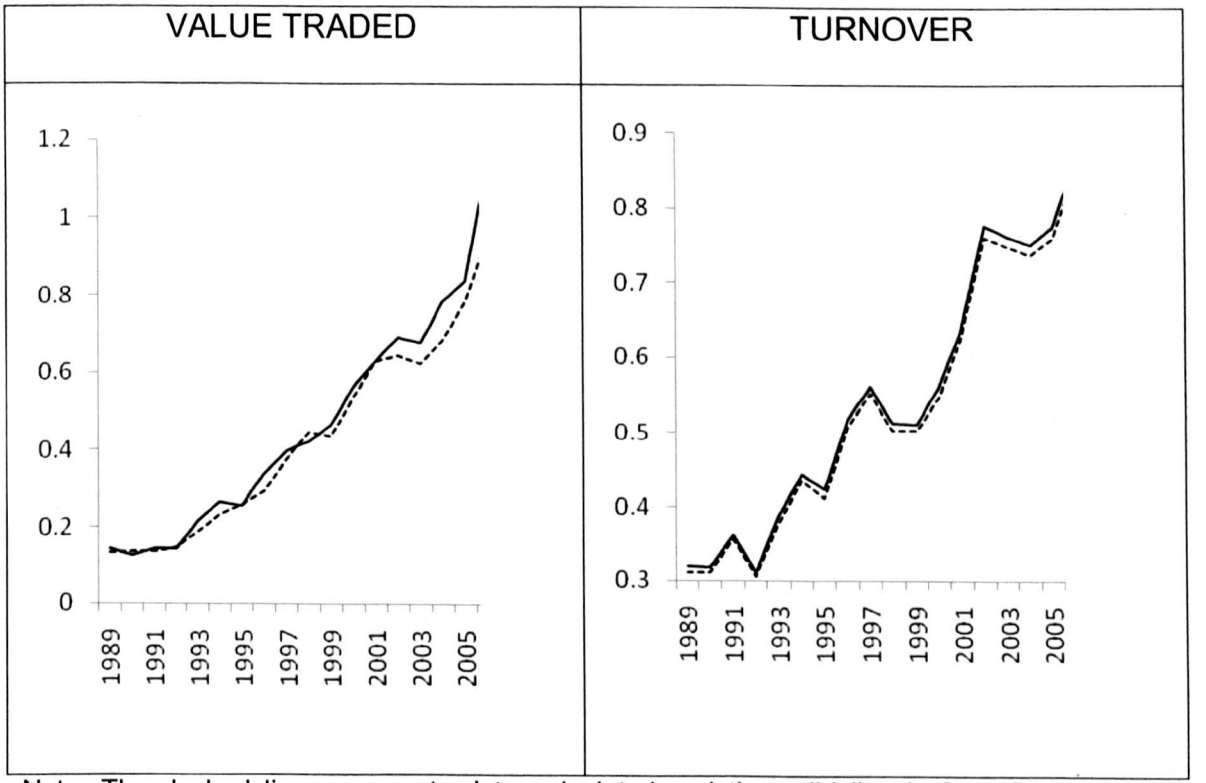
Figure 4.7 Comparison of data on MARKET CAPITALISATION



Note The solid line is from Beck et al. (2000a). The dashed line represents calculated MARKET CAPITALISATION. The data source of calculated MARKET CAPITALISATION is the World Bank, and the data for deflators is from IMF, WEO.

The above is repeated for another two important variables measuring stock markets' development and frequently used by literature, namely VALUE TRADED and TURNOVER, which are provided in figure 4.5. This is again done for Australia for the same sample period.

Figure 4.8 Comparison of data on VALUE TRADED and TURNOVER



Note: The dashed line represents data calculated and the solid line is from Beck et al. (2000a)

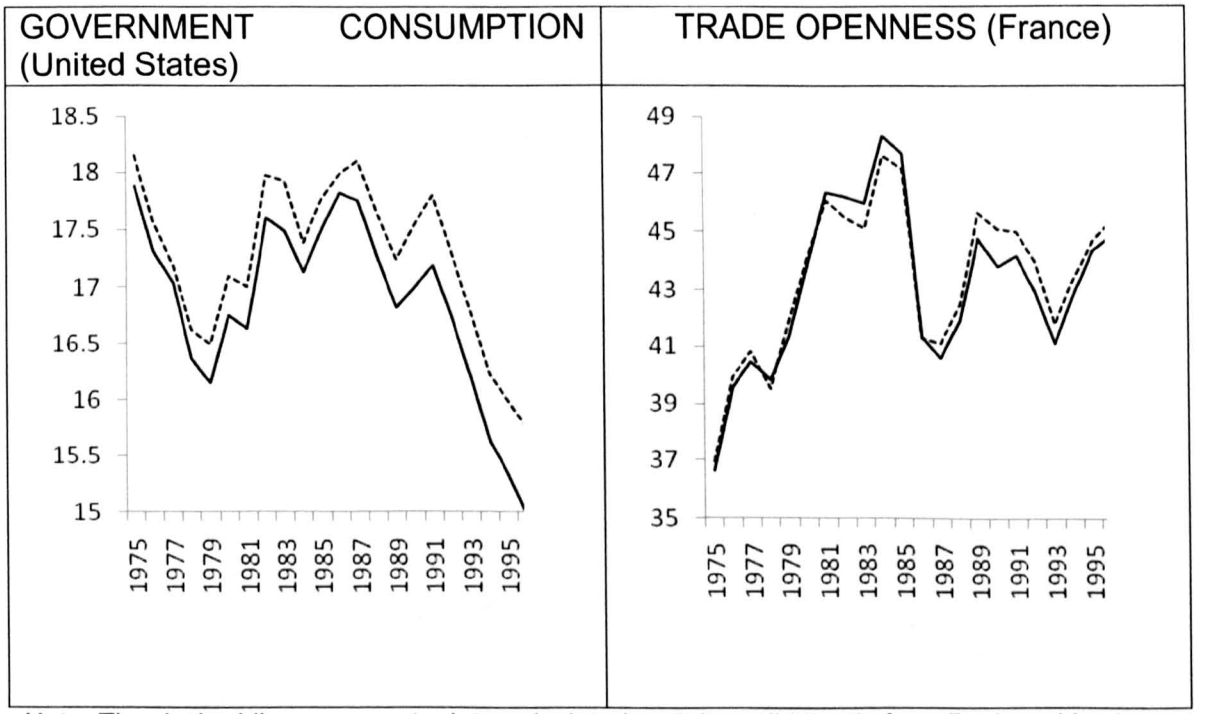
It can be noted from the above that the data used by this thesis is consistent with the literature, which was different in some literature, as shown in figure 4.2 above.

From the above comparison it is clear that the data by Beck et al. (2000a) is similar to one collected and deflated here. With this confirmation this thesis uses the deflated data provided by Beck et al. (2000a). [Although collection and deflation of the data are made, the data is only available since 1980 for the deflators in the source, ESDS. In order to use the data from 1970, this thesis therefore uses the data from Beck et al. (2000a) for all variables representing financial development.

4.4.3 Data Control Variables

Finally to check the accuracy of control variables the thesis provides verification with some randomly selected control measures and countries. The collected data is verified with the data of Beck and Levine (2004) to check the accuracy.

Figure 4.9 Comparison of data related with control variables



Note: The dashed line represents data calculated and the solid line is from Beck and Levine (2004)

As can be noted from the above, the data movement trend, as well as the data up to almost two decimal places, has been found mostly similar to the control variables GOVERNMENT CONSUMPTION and TRADE OPENNESS. The above was the same for other control variables namely INFLATION, and CAPITAL FORMATION.

Data on the control variable INITIAL INCOME has been constructed by the author. Other control variables (EDUCATION, BLACK MARKET PREMIUM and LEGAL ORIGIN DUMMIES) have been downloaded from specific sources and hence not cross checked with literature. For some minor discrepancies in the data, the chapter provides relevant explanation in the appendix section.

4.5 APPENDIX

Appendix 4 A.1: Note on differences on the data

As can be seen from the above, except for some small differences in the data values between theoretically identical series of different databanks, the data used in this thesis is the same as that of other sources and literature. Nevertheless, some explanations for those small differences are made available in this section.

Moreover, comparability issues were discussed at the workshop organised by MIMAS at the University of Manchester. The theme of the workshop was Introduction to ESDS International. It was organised on 11th June 2008 at the University of Manchester, Manchester. Celia Russell was the instructor of the event supported by her colleague Paul Murphy for practice in computer.

Celia during her presentation suggested that the differences in the data are generally due to variation in data collection practices adopted by organisations, such as collection at different dates. As she noted in her slide "Some tips on using the databanks - Tip 1 choose data from the same databank or family of databanks." It reads "Comparability issues remains between data from different databanks, even for series with well-established standards. Theoretically, identical series can have different values in different databanks".

A good method to confirm upon the accuracy, as suggested during the workshop, is to check upon the pattern of the movement of data with the help of a graph. It was further suggested to use the World Bank data for comparison among countries and IMF data for research within a single country.

Appendix 4 A. 2: Correspondence on differences in the value of some data

This is a message from ESDS International-Direct regarding your query: 326629

Hello Binam,

I think there are several reasons why there may be small differences in the data values between theoretically identical series taken from difference databanks. One reason is that there may not be an established international standard for that particular variable. It may also be that one organization uses different methods for compiling the data or estimating missing data.

All the series in the international databanks are country level or regional level series. That means that the data, which probably started life as some kind of survey of, for example, individual people, households or companies, has been averaged, totalled or otherwise derived from the individual level data found in the survey datasets. This processing of the data can also introduce differences between different data providers.

For series with well established standards such as GDP, it is a bit more of a mystery. I asked someone who was involved in compiling US GDP why the differences between reported US GDP from the World Bank and IMF exist. She says it is because GDP is an aggregated indicator i.e. it is made from adding up the contributions of many companies, organizations and people as so it is often backwardly revised upwards. That means, for example, that the data value for US GDP in 2003 is likely to rise a tiny bit over subsequent years as more and more contributions to that year's GDP are reported. So in that case, the differences come about from the IMF using a more recent version of the data that the World Bank.

I also asked Enrico Giovanni, who is head of statistics at the OECD why these discrepancies exist and he says one reason is that organizations may start the reporting years from different months e.g. they may start from Jan 1st or the start of the financial year.

As you mention in your email, although small differences in the absolute values exist, the trends are usually the same. If you come across a key series where difference data providers are reporting different trends, please let me know as this could indicate a genuine problem with the underlying data.

Please can you send any queries you have about the data or ESDS International to the helpdesk, international@esds.ac.uk rather than celia.russell@manchester.ac.uk, as we enter all queries into our helpdesk anyway and it helps us keep a record of the queries that come in. That said, I am going to send you the ppt slides through my email, as it's too big to be attached here!

Good luck with your research,
Celia

On behalf of the ESDS International team
ESDS International
MIMAS,
The University of Manchester
Email: international@esds.ac.uk
URL: http://www.esds.ac.uk/international

-- ORIGINAL MESSAGE --

From: Ghimire, Binam [mailto:B.R.Ghimire@ljmu.ac.uk]
Sent: 23 June 2008 13:11
To: 'celia.russell@manchester.ac.uk'
Subject: some explanations
Importance: High

Dear Celia

At the outset, I would like to thank you for your useful training on ESDS international at Manchester University on the 11th of June.

I am writing to you if you could please explain the discrepancies in the data in different databanks for example IMF and World Bank GDP.

I am comparing the data (after deflating the one in ESDS) with that of some papers authored by affiliates of the World Bank and the World Bank Financial Structure data. There are some differences but in many cases the trend are same.

Thank you for your time and attention.

Regards

Binam Raj Ghimire

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Liverpool John Moores University
98 Mount Pleasant
John Foster Building
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L3 5UZ

5. CHAPTER: METHODOLOGY

"How do you do it?"

- A song by the Beatles.

5.1 Introduction

In the previous chapter, this thesis described the various important variables and data to be used to investigate the relationship between financial development and economic growth. This chapter details the methodological approaches undertaken for the empirical investigation on that data.

The various statistical and empirical methods are now discussed below.

5.2 Descriptive statistics

The nature of the data is first analysed using simple statistical measures of location, dispersion and correlation. The summary statistics, such as mean and standard deviation, has helped to explain the nature of the data the thesis has collected for the empirical work. Similarly, the correlation analysis is carried out to check the association between dependent and explanatory variables and also within various explanatory variables. Descriptive statistics have been made available and discussed for the dependent variable GROWTH and preferred measures of banks and stock market developments, namely PRIVATE CREDIT, CAPITALISATION, VALUE TRADE and TURNOVER.

5.3 Data Framework

This thesis follows the most relevant and recent literature in selecting an appropriate framework of data for estimation.

The nature of data used in this study is wide in terms of cross section (120 countries), but comparatively short in terms of number of periods (37 years).

Panel estimation technique (Arellano, 2003, Baltagi, 1995, Hsiao, 1986, Wooldridge, 1999) embraces both time series and cross sectional elements of data. In addition, it facilitates observations on the same cross section over several time periods. This enables the researcher to study the dynamics of change with short time series and is considered more useful in the study of the behavioural model aimed by this thesis. Some recent research (Luintel et al., 2008) has, however, raised concerns over the limitations of panel and pure cross section frameworks with reasoning that the techniques hide important cross country differences when analyzed in a multi country dataset. Luintel et al. (2008) have raised questions over pooling of the dataset, since in their view various countries in the panel will not be on the balanced growth path. The authors have applied time series technique in their estimation. But it may be noted that very few empirical works have applied time series technique while investigating the link between financial development and economic growth. One of them is Xu (2000). However, the author does not compare time series technique with panel data. In fact, a majority of the literature discussed in this thesis and papers on finance growth relationship, until recently (Beck and Demirgüç-Kunt, 2008, Beck and Levine, 2004, Beck et al., 2000b&c, Favara, 2003, Levine, 2002, Levine and Zervos, 1998, Loayza and Rancière, 2006, Rousseau and Wachtel, 2000, Saci et al., 2009), use panel data estimation. In line with the existing literature and the nature of the data, this thesis uses panel data econometric.

In chapter four, this thesis identified and defined most of the measures of financial development, and determinants of economic growth used by the existing empirical works. As shown in table 4.1 of the chapter, there are

thirteen variables that also include LEGAL ORIGIN DUMMIES for countries adopting British, French, German, Scandinavian, and Socialist legal systems. In the same chapter, the variable CREDIT TO ALL SECTOR was also discussed as another measure of banks' development (the variable is not used by existing empirical works). Hence, all together we have a total of 14 variables. However, data for the variable BLACK MARKET PREMIUM is not available after 1998. So, estimation using BLACK MARKET PREMIUM will only be made to be consistent with the existing works so that the results can be compared (with the existing empirical works that have used the variable). The data is organised in panel structure as shown in table 5.1 (Argentina is taken as an example to illustrate).

The data is organised for all 120 countries for 37 years. If all data was available, theoretically, it could give a balanced panel with 4,477 observations. (120 cross sectional observations times 37 time series observations).

Table 5.1 Organisation of Data in Panel

COUNTRY	YEAR	GROWTH	PRIVATE CREDIT	CAPITALISATION	VALUE TRADED	TURNOVER	GOVERNMENT CONSUMPTION	CAPITAL FORMATION	TRADE OPENNESS	INFLATION	EDUCATION	INITIAL INCOME	BLACK MARKET PREMIUM
Argentina	1970	1.48	..	..	..	..	9.74	24.44	10.34	13.59	44.41	1318.08	0.02
Argentina	1971	3.96	..	..	..	..	10.15	24.11	12.62	34.73	..	1374.17	0.27
Argentina	1972	-0.07	..	..	..	..	9.35	23.89	14.04	58.45	..	1419.60	0.49
Argentina	1973	1.06	..	..	..	..	11.54	20.89	13.32	61.25	..	1507.90	0.27
Argentina	1974	3.76	..	..	..	..	13.15	22.26	13.19	23.47	..	1674.30	0.89
Argentina	1975	-1.65	..	..	..	..	12.59	29.44	11.80	182.93	53.84	1827.20	1.03
Argentina	1976	-3.55	..	..	0.005	..	9.42	30.73	15.10	443.97	..	1932.02	0.30
Argentina	1977	5.32	..	0.007	0.004	0.601	9.02	30.94	16.94	176.00	..	2057.34	-0.15
Argentina	1978	-5.91	..	0.022	0.009	0.386	11.17	27.80	14.32	175.51	..	2214.68	-0.33
Argentina	1979	8.60	..	0.044	0.022	0.500	11.01	25.86	12.84	159.51	..	2464.18	-0.52
Argentina	1980	2.60	..	0.055	0.014	0.259	..	25.26	11.55	100.76	56.22	2797.08	-0.63
Argentina	1981	-7.11	..	0.039	0.006	0.150	..	22.69	14.29	104.48	..	3085.61	-0.34
Argentina	1982	-6.39	..	0.018	0.003	0.151	..	21.75	15.61	164.78	..	3275.71	0.44
Argentina	1983	2.30	..	0.011	0.004	0.330	..	20.89	14.99	343.81	..	3380.94	0.48
Argentina	1984	0.67	..	0.016	0.003	0.215	..	19.96	12.35	626.72	..	3526.90	-0.06
Argentina	1985	-8.96	..	0.018	0.007	0.394	..	17.59	18.01	672.18	70.18	3652.50	0.34
Argentina	1986	6.29	..	0.016	0.003	0.171	..	17.46	14.49	90.10	..	3720.39	0.46
Argentina	1987	1.41	..	0.014	0.002	0.160	4.71	19.55	15.45	131.33	..	3859.56	0.65
Argentina	1988	-3.96	0.13	0.014	0.005	0.335	4.32	18.64	15.74	342.96	..	4014.30	0.47
Argentina	1989	-8.81	0.13	0.041	0.025	0.615	4.49	15.51	19.64	3079.81	..	4208.07	0.68
Argentina	1990	-3.77	0.13	0.027	0.006	0.225	3.14	14.00	14.99	2313.96	71.10	4435.22	0.32
Argentina	1991	11.11	0.10	0.057	0.025	0.447	3.32	14.64	13.75	171.67	72.38	4623.05	0.18
Argentina	1992	10.41	0.13	0.081	0.069	0.843	2.98	16.70	14.73	24.90	70.04	4763.07	0.12
Argentina	1993	4.49	0.17	0.132	0.044	0.331	13.51	19.06	16.22	10.61	69.36	4903.66	0.12
Argentina	1994	4.46	0.18	0.158	0.044	0.280	13.19	19.94	18.12	4.18	69.13	5031.52	0.04
Argentina	1995	-4.07	0.20	0.145	0.018	0.122	13.35	17.94	19.72	3.38	72.69	5172.67	0.00
Argentina	1996	4.24	0.20	0.152	0.016	0.106	12.50	18.08	21.47	0.16	76.80	5324.30	0.00
Argentina	1997	6.83	0.20	0.178	0.088	0.493	12.06	19.37	23.30	0.53	..	5448.76	0.01
Argentina	1998	2.66	0.23	0.176	0.053	0.301	12.49	19.93	23.32	0.92	89.31	5533.34	0.01
Argentina	1999	-4.45	0.25	0.228	0.027	0.121	13.72	18.01	21.32	-1.17	93.85	5654.41	..
Argentina	2000	-1.84	0.24	0.440	0.021	0.048	13.78	16.19	22.40	-0.94	96.65	5845.35	..
Argentina	2001	-5.38	0.23	0.673	0.016	0.023	14.16	14.18	21.74	-1.07	99.32	6010.55	..
Argentina	2002	-11.77	0.18	1.464	0.013	0.009	12.24	11.96	40.49	25.87	99.14	6105.88	..
Argentina	2003	7.80	0.12	0.556	0.038	0.068	11.44	15.14	39.17	13.44	86.42	6244.49	..
Argentina	2004	7.99	0.10	0.281	0.050	0.178	11.13	19.17	43.42	4.42	85.58	6411.67	..
Argentina	2005	8.12	0.10	0.296	0.090	0.303	11.91	21.46	44.26	9.64	84.44	6629.20	..
Argentina	2006	7.39	0.11	0.332	0.021	0.064	12.40	23.50	43.93	10.90	..	6843.06	..

Note: In the table above, DUMMY VARIABLE FOR LEGAL ORIGIN are not included due to limitation of space.

Table 5.2 shows pure cross-sectional data for various variables.

Table 5.2 Pure Cross Sectional Data

#	COUNTRY	GROWTH	PRIVATE CREDIT	CAPITALISATION	VALUE TRADED	TURNOVER	GOVERNMENT CONSUMPTION	CAPITAL FORMATION	TRADE OPENNESS	INFLATION	EDUCATION	INTIAL INCOME
1	Argentina	0.95	0.17	0.19	0.02	0.27	10.27	20.51	19.70	258.86	76.89	1318.08
2	Armenia	4.15	0.08	0.01	0.00	0.07	12.69	22.95	81.73	421.60	86.93	189.21
3	Australia	1.77	0.51	0.73	0.40	0.53	17.89	25.91	34.06	6.23	125.99	3543.23
4	Austria	2.44	0.78	0.15	0.07	0.48	18.21	23.89	73.68	3.71	99.72	2052.28
5	Bahrain	1.13	0.45	0.96	0.05	0.04	20.23	24.36	173.43	4.38	91.88	4172.83
:	:	:	:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:	:	:	:
119	Zambia	-0.98	0.06	0.03	0.00	0.01	19.41	20.81	74.39	55.98	22.89	419.39
120	Zimbabwe	-0.35	0.22	0.38	0.04	0.11	17.28	17.51	57.32	77.62	37.93	362.12

Note: In the case of pure cross sectional analysis the data for BLACK MARKET PREMIUM is only available for 88 countries.

As shown in table 5.2 above, the thesis has a complete set of data (fully balanced) for pure cross-sectional analysis of all 120 countries.

As discussed in the previous chapter, separate estimation has also been conducted, replacing PRIVATE CREDIT with CREDIT TO ALL SECTOR to see the differences in the result. But before any estimation, all data has been

converted into log forms to minimise problems related with outliers, unequal variation and skewness.

5.4 Testing for Stationarity

In the modern economic growth, as shown by Baier et al. (2003), the economy has grown overtime. Various economic indicators have shown an upward trend. On this note, it is important to confirm that the values of the dataset do not depend upon the previous values. If they are dependent, this would violate the very basic assumptions of the regression model. This requires testing for stationarity. The first simulation on stationarity was made by Granger and Newbold (1974). A series is stationary if the mean, variance and covariance remain the same at different lags.

Standard estimation techniques are largely invalid where data is non-stationary. If estimation is made in a non stationary variable it will be nonsense regression (Granger and Newbold, 1974), often known in literature as "spurious" regression (Gujarati, 2003), which is basically a situation where for example, we obtain an apparently significant regression (say with a high R-Square value) even if the regressor and the dependent variable are independent.

Non-stationary follows the random walk model (such as share price today, which is equal to share price yesterday plus a random shock (Gujarati, 2003), which may be Random walk without drift (no constant or intercept) and random walk with drift (with a constant term).

Dickey and Fuller (1979) developed the hypothesis for testing stationarity, which is as follows:

Ho: The series contains a unit root ($\delta = 0$)

H1: The series is stationary ($\delta < 0$)

Table 5.3 Stationarity Tests

Series is a random walk (No Intercept or trend)	Series is random walk with drift (Individual Intercept)	Series is a random walk with drift around a stochastic trend (Intercept and trend)
$\Delta Y_t = \delta Y_{t-1} + u_t$ ... (5.1)	$\Delta Y_t = \beta_1 + \delta Y_{t-1} + u_t$ ... (5.2)	$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + u_t$ ... (5.3)
If Ho rejected : stationary with a zero mean	If Ho rejected : stationary with a non zero mean	If Ho rejected : stationary around a deterministic trend

Accordingly, the test of stationarity is made for all conditions i.e. with constant and intercept, with intercept only and without constant or intercept.

If a series contains a unit root in any two conditions above, it will be a non stationary series.

5.4.1 Testing for Stationarity in Panel

It has been suggested that testing for the stationary or unit root in panel framework is more powerful compared to performing a separate unit root test for each individual time series (Levin and Lin, 1993).

This thesis applies unit root test for the panel data by Levin, Lin and Chu (2002), hereinafter called "LLC". The review of literature on panel unit root tests by Barbieri (2009) compares the advantages and disadvantages of various types of tests in different conditions. As explained by Barbieri (2009), LLC allows stationarity tests for unbalanced panel data. Moreover, Barbieri

(2009) finds that the LLC test is more relevant for a panel of moderate size ($10 < N < 250$ and $25 < T < 250$, where N is the number of individuals i.e. countries in this thesis and T is the number of time series observations).

The LLC test is based on the same equation like ADF test (Dickey and Fuller, 1979). The LLC test consists of estimating the regression equation 5.4.

$$\Delta y_{i,t}=\alpha_i+\delta_{i,t}+\beta_i y_{i,t-1}+\Sigma\, \varphi_{i,j}\Delta y_{i,t-j}+\xi_{i,t} \quad \ldots\ldots\ldots\ldots 5.4$$

Where i = 1,2, ... N cross-section units or series, that are observed over periods t = 1, 2, ..., T.

The t-statistics for β determines whether or not the variable is stationary. So, it is assumed that in (5.4) $\beta_i=\beta$. This will mean a common value of β across all cross-sections. The hypotheses are:

H_0: $\beta = 0$ hence y_{it} there is a unit root

H_1: $\beta < 0$ there is no unit root

If the null hypothesis is y_{it} is I (1) all the cross-sections are non-stationary. The alternative is all individual cross-sections are stationary.

5.5 Estimation Methods

In the literature, Ordinary Least Square (OLS) is carried out as a standard estimation tool and substantiated by another advanced model, such as Generalised Methods of Moment (GMM) to check for the robustness (see for example Beck and Levine, 2004, Saci et al. 2009). This thesis utilises both TSLS and GMM. In addition, it uses two stage least square techniques to see if the results are consistent, or if results are different with different methods. In addition to various journals mentioned hereunder, theoretical knowledge on the techniques is obtained from various text books (Greene 2000, Gujarati 2003, and Ramanathan 1998).

5.5.1 Ordinary Least Squares (OLS)

The technique of estimation was originated by Gauss [German mathematician Carl Friedrich Gauss (1777-1855) contribution to knowledge started in the early seventeenth century] OLS is the most popular method of estimation and has been applied by most of the papers discussed in this thesis, as their exploratory method of estimation. It is important to note that, although advanced forms of estimations have been used in literature the results of advanced methods in many works (Beck and Levine 2004) are more or less similar to that of OLS output. In addition, some papers have only used OLS in their empirical analysis (Levine and Zervos, 1998).

The technicality of the method is based on the population and sample regression function that are presented in equations 5.6 and 5.7 respectively.

$$Y_i=\beta_1+\beta_2 X_i+ u_i \quad \text{.....5.5}$$

$$\widehat{Y_i}=\widehat{\beta_1}+ \widehat{\beta_2}X_i+ \hat{u}_i \quad \text{.....5.6}$$

Where the hat in sample regression equation 5.6 represents estimator, assuming the estimators are correct, the sample regression equation 5.6 may be written as

$$Y_i=\widehat{Y_i}+ \hat{u}_i \quad \text{.....5.7}$$

$$\hat{u}_i=Y_i-\widehat{Y_i} \quad \text{.....5.8}$$

This means the residuals are the difference between the actual and estimated Y values. For a given number of observations, from equation 5.8, the motivation is to determine the sample regression function in such a way that it is as close as possible to the actual Y. This is possible when $\sum\hat{u}_i= \sum (Y_i-\widehat{Y_i})$ is the smallest possible for which coefficients for $\widehat{\beta_1}$ and

$\widehat{\beta_2}$ are required.

The aim is to minimise $\sum\hat{u}_i^2$ which from above is $\sum (Y_i-\widehat{Y_i})^2$ hence giving

$$\sum(Y_i -\widehat{\beta_1} - \widehat{\beta_2} X_i)^2 \quad \text{.....5.9}$$

In equation 5.9, now values of $\widehat{\beta_1}$ and $\widehat{\beta_2}$ .that minimize the function can be derived. To do this, first derivative of function 5.9 with respect to β_1 is taken and set it equal to zero and solve for it which gives the following function.

$$\widehat{\beta_1} = \frac{\sum Y_i - \beta_2 \sum X_i}{n} \quad \text{.....5.10}$$

Similarly, first derivative of 5.9 for $\widehat{\beta_2}$ is taken and by setting it equal to zero and then solving it for $\widehat{\beta_2}$ we get the following equation:

$$\widehat{\beta_2} = \frac{n \sum X_i Y_i - \sum X_i \sum Y_i}{n \sum X_i^2 - (\sum X_i)^2} \quad \text{.....5.11}$$

Using equations 5.10 and 5.11 the values of $\widehat{\beta_1}$ and $\widehat{\beta_2}$ that estimate the true population relationship between X and Y can be derived. If we put the value of $\widehat{\beta_2}$ from 5.11 into 5.10 we may find $\widehat{\beta_1}$ using the formula below.

$$\widehat{\beta_1} = \frac{\sum X_i^2 \sum Y_i - \sum X_i \sum X_i Y_i}{n\sum X_i^2 - (\sum X_i)^2} \quad \text{.....5.12}$$

The simplicity and popularity of OLS have motivated this thesis to use the technique.

5.5.2 Two Stage Least Squares (TSLS)

The technique of estimation was originated by Theil (1953). It is possible that some of the explanatory variables in the estimation are correlated with the residuals. A good example is provided by Gujarati (2003, p. 771), in which he mentions a hybrid of quantity- theory-Keynesian approaches to income determination that income is determined by money supply, investment expenditure, and government expenditure. "*The money supply function postulates that the stock of money is determined on the basis of level of income. Obviously, we have a simultaneous-equation problem.*" If the explanatory variables in the estimation are correlated with the residuals then the OLS will give biased estimates. TSLS employs an IV estimator to achieve consistency. To do this two important requirements are 1) a set of instruments that are not correlated with the disturbances. 2) The instruments

are highly correlated with endogenous variables. Estimation using TSLS is made in two steps, as mentioned below.

First, the reduced form is estimated for all the endogenous variables that appear on the right hand side. Then the estimate of the structural equation is made. In doing so, the predicted endogenous variables, obtained from the first step above, are used as instruments.

While calculating residuals and standard errors the actual values of the endogenous values are used instead of the predicted values.

It is important to test for simultaneity (testing if an endogenous regressor is correlated with the error term) before estimating using TSLS. Like in literature, the Hausman Specification test (Hausman, 1976) can be used to find out the simultaneity related issue. It may be noted that in the absence of simultaneity, OLS outcome can be taken as consistent and efficient as TSLS.

5.5.3 Generalised Methods of Moments (GMM)

As an additional advanced tool of estimation, this thesis follows recent literature (See for example, Beck and Levine, 2004, Rioja and Valev, 2004, Saci et al. 2009) and uses the GMM technique, created by Arellano and Bond (1991).

GMM technique controls unobserved country-specific effects, and overcomes the endogeneity of the explanatory variables by using instruments. The technicality and usefulness of the estimation is discussed next.

Let $y_{i,t}$ be the log of real per capita GDP in a country at time t. The equation of interest is:

$$y_{i,t} - y_{i,t-1} = (\alpha-1)y_{i,t-1} + \beta' X_{i,t} + \eta_i + \varepsilon_{i,t} \quad \text{.....5.13}$$

Where the left hand side variable represents the difference of real GDP per capita between the period t and $t-1$ therefore represents GROWTH. Xrepresents the set of explanatory variables, including measures of bank and market development. η captures the country specific effects and ε is the error term. The subscripts i and t represent country and time period respectively.

Rewriting the equation above, we obtain,

$$y_{i,t} = \alpha y_{i,t-1} + \beta' X_{i,t} + \eta_i + \varepsilon_{i,t} \quad \text{.....5.14}$$

It may be noted that in equation 5.14 the lagged dependent variable, which enters as an independent explanatory variable, is correlated with the country-specific component of the error term. To resolve this problem, as a first step, the GMM procedure involves taking first differences to eliminate the country-specific effect:

$$y_{i,t} - y_{i,t-1} = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta'(X_{i,t} - X_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad \text{.....5.15}$$

As can be noted in the equation above, after differencing there is no country specific effect however the lagged difference in per capita GDP is now correlated with the error term i.e. $\varepsilon_{i,t}-\varepsilon_{i,t-1}$ is correlated with $y_{i,t-1} - y_{i,t-2}$.

To resolve for this, along with the potential endogeneity of the explanatory variables, requires the use of instruments. As proposed by Arellano and Bond (1991), the GMM difference estimator, which uses the lagged levels of the explanatory variables as instruments, can be used in this case. But it may be noted that this is subject to 1) the error term is not serially correlated and 2) there is no correlation between the difference in the explanatory variables and the error term (the explanatory variables are assumed to be uncorrelated with future realisations of the error term), although there may be correlation between the levels of the explanatory variables and the country-specific error term. The moment conditions used to calculate the difference estimator would be

$$E\left[y_{i,t-s}\left(\varepsilon_{i,t}-\varepsilon_{i,t-1}\right)\right]=0 \quad \text{.....5.16}$$

for $s\geq 2;t=3, \ldots T$

$$E\left[X_{i,t-s}\left(\varepsilon_{i,t}-\varepsilon_{i,t-1}\right)\right]=0 \quad \text{.....5.17}$$

for $s\geq 2;t=3, \ldots T$

Based on the above two moment conditions (equation 5.16 and 5.17), Arellano and Bond (1991) proposed a two-step GMM estimator. One-step GMM assumes that residuals are homoskedastic, but provides more efficient (accurate) estimates of the parameters. The two-step GMM utilises estimates of the variance of the residuals from the first step, thereby removing heteroskedasticity in the second step. However, standard errors may now be biased downwards if the sample is small (i.e. they make coefficients significant when they are not). In the two-step approach, first-order autocorrelation might be present, but not the second order. These two step GMM estimators are also known as difference GMM panel estimator.

However, work by Bond et al. (2001) outlines the problem in using the difference estimator. It eliminates the cross country relationship between financial development and economic growth. The reason being the lagged levels of the series provide large instruments for the subsequent differences. The authors suggest using the system GMM estimator (GMM-SYS) to exploit stationarity restrictions. The additional moment conditions for the regression in levels are

$$E\left[(y_{i,t-s} - y_{i,t-s-1})(\eta_i + \varepsilon_{i,t})\right] = 0 \quad \text{.....5.18}$$

for $s=1$

$$E\left[(X_{i,t-s} - X_{i,t-s-1})(\eta_i + \varepsilon_{i,t})\right] = 0 \quad \text{.....5.19}$$

for $s=1$

In brief, in GMM-SYS, both the equation in differences and the equation in levels are estimated (as a system) by instrumenting them, respectively to level variables and differenced variables. It may be noted that the consistency of the GMM estimator depends on the validity of the assumption that the error terms do not exhibit serial correlation and on the validity of the instruments. The literature (Bond, 1991, Arellano and Bover 1995, and Blundell and Bond 1998) suggests the use of the Sargan test of over identifying restriction to test for the validity of the assumption.

Much recent literature on finance and growth nexus use GMM-SYS in their estimation.

5.6 The Estimation

Estimation is done for the long and short term applying the average and annual data respectively.

5.6.1 Long Term Estimation

Long term estimation is basically estimation on average data. A long term analysis of the data can be made by implementing pure cross sectional analysis commonly known as cross section estimation.

Cross sectional estimation for the study of growth among countries was first introduced in Barro (1991). In the area of finance and growth, King and Levine (1993a) enlarged the sample of Goldsmith (1969) and made cross sectional estimation further popular by providing a robust result incorporating four various measures of bank's development. [The four measures were BANK, PRIVATE, DEPTH, and PRIVY. Where, BANK: Bank Credit/ (Bank

Credit +Central Bank Domestic Assets), PRIVATE: Ratio of credit allocation to private business to total domestic credit (excluding credit to banks), DEPTH: Currency + Demand and interest bearing liabilities of banks and non-banks/ GDP) and PRIVY: the ratio of credit to private business to GDP]. Since then, much finance and growth literature has applied cross sectional estimation in its empirical work (Levine and Zervos 1998, Rousseau and Wachtel, 2000, Beck et al. 2000b&c, Beck and Levine, 2004, Loyaza and Rancière 2006, Beck and Demirgüç-Kunt, 2008, Saci et al. 2009 to name a few) and found a strong positive effect of finance upon growth. However, it is important to note that much literature has found that the power of finance weakens when estimation is changed from pure cross section to annual (Favara, 2003, Beck and Levine, 2004, Loyaza and Rancière, 2006, Saci et al., 2009). Some works have argued over the positive results of cross-sectional estimation. Favara (2003) has mentioned that literature supporting finance and growth relationships is based on average effect, which is quite diverse among countries including those with similar levels of economic and financial development. In his study, the strong relationship weakens when INV (Real domestic investment as share of real per capita GDP) is included as a control variable in the regression.

Cross sectional analysis has now become a standard practice possibly also to check the consistency of the results with the literature.

It may be noted that many works use the non-overlapping average data of 3 to 7 years from their sample period and carry out the estimation on such averages in their panel estimation. For example, Beck et al. (2000a&b) make

estimation on non-overlapping five-year periods in their sample 1960-1995. Hence, making an estimation on seven observations per country (1961-1965, 1966-1970, 1971-1975 and 1991-1995). Similarly, in Beck and Levine 2004 data is averaged over five year periods between 1976 and 1998. Thus, the first period covers the years 1976–1980; the second period covers the years 1981–1985, and so on.

But by conducting regression on cross sectional data, averaged over the entire sample period 1970 - 2006 is such that there is one observation per country. This thesis follows Loayza and Rancière (2006) who do not average the data but they estimate both short- and long term effects using a data field composed of a relatively large sample of countries and annual observations. The authors suggest that averaging hides the dynamic relationship between financial intermediation and economic activity.

This thesis applies cross-sectional analysis using data averaged over 1970 - 2006, such that there is one observation per country. The equation for the regression is:

$$GROWTH_i = \beta_1 + \beta_2 BANK_i + \beta_3 STOCKMARKET_i + \beta_4 CONTROL_i + \varepsilon_i$$

...5.20

Where,

GROWTH = Real per capita GDP growth
BANK =Private Credit
STOCKMARKET = Capitalisation, Value traded and Turnover

CONTROL = Control variables (GOVERNMENT CONSUMPTION, CAPITAL FORMATION, TRADE OPENNESS, INFLATION, EDUCATION, INITIAL INCOME,
and BLACK MARKET PREMIUM)
and i represents country.

The data for the variables are converted into natural logarithm to avoid potential nonlinear relationships between economic growth and the assortment of economic indicators (Beck et al. 2000c, p.44).

In the case of cross sectional estimations, this thesis uses the Pooled OLS and TSLS methods.

5.6.2 Short Term Estimation

It has been discovered in some recent literature that the power of finance weakens when estimation is changed from pure cross section to annual (Favara, 2003, Beck and Levine, 2004, Loyaza and Rancière, 2006, Saci et al., 2009).

This thesis applies OLS and 2SLQ methods of estimation in panel framework on annual data for the sample period 1970-2006, to estimate for the short term analysis. In addition, GMM estimation technique is also used to be consistent with the literature. (GMM and Two stage least square produces the same result (Beck et al. 2000c).

The equation for the regression is:

$$GROWTH_{i,t} = \beta_1 + \beta_2 BANK_{i,t} + \beta_3 STOCKMARKET_{i,t} + \beta_4 CONTROL_{i,t} + \varepsilon_{i,t}$$

...5.21

Where,

t is for time and description of all other variables are, as mentioned above, for equation 5.20. In the case of control variables, this thesis also uses BLACK MARKET PREMIUM in some estimation, mainly to be consistent with some literature.

5.7 Panel Data Regression Models

The estimation of panel data regression models can be made by applying the fixed effects, or the random effects models.

The panel estimation basically depends upon the assumption we make on the intercept, the slope coefficients and the error term. Some of the key assumptions and the models are explained below.

5.7.1 The Constant Coefficient Model

In this case all coefficients will be constant across time (t) and cross section (i). This can be used when there is neither significant i or t effect. We can simply pool all the data and run the OLS regression. This is therefore also called pooled regression model.

But it is very much likely that each cross-section unit "i" and each time period "t" might have some unique characteristic. Panel data estimations recommends fixed and random effects model to remove the effects of i and t that are discussed below.

5.7.2 The Fixed Effects Model

This is a situation in which the slope coefficient is constant, but the intercept varies according to the cross sectional unit. This implies that although there are no significant time related effects, there are significant differences among cross sections. So, each cross section will have its own intercept. But the slope is the same. This requires us to use the dummies to estimate the fixed effect. Therefore, this model is also known as the least squares dummy variable model.

Similarly, sometimes time may be important. So, another type of fixed effects model may have intercept that varies according to time.

Sometimes it could be the case that both the cross section and time period have an impact. In such cases, the intercept will vary over country as well as time. This is slope coefficient constant, but the intercept varies over cross sections as well as time.

Again it can be the case that the intercepts and slope coefficients are different for all cross section units i.e. all coefficients vary across cross sections.

5.7.3 Testing for the Fitness of the Model

The statistical significance of the calculated coefficients can be checked to see which of the two models is better. In addition, the Durbin Watson d values (A lower Durbin Watson value can be the result of the specification errors) and R square values can also be examined. We may also make a formal test, Restriction tests, on the fixed effect model.

The Restriction test on fixed effect allows us to check if the fixed effect specification is correct. In fixed effects, dummy variables for each cross section and or time period are added.

A restriction test on the dummies of cross section or time or both is made to see if they were required or not. If the dummy variables should not have been included in the model, then the correct model will be a simple Pooled Least Squares (POLS).

The test is performed on the estimation of the fixed effect by computing the F test statistic as

$$\frac{(R^2_{UR}-R^2_R)/(N-K)}{(1-R^2_{UR})/(NT-N-K)} \approx F(N-1, NT-N-K) \quad \text{.....5.22}$$

Where,

R^2_{UR} = coefficient of determination of the unrestricted equation

R^2_R = coefficient of determination of the restricted equation

N = number of cross-sections

T = time series dimension

The null hypothesis supports simple panel ordinary least square which says the estimates of the coefficients of the dummies are equal to zero.

The alternative hypothesis is that the estimates of the coefficients of the dummies are different from zero. Therefore the dummies need to be included and the fixed effect estimation is an appropriate one.

5.7.4 The Random Effects Model

This is basically using the error term instead of dummy variables. The limitation of the fixed effect model is the loss of the number of degrees of freedom.

In this method, it is assumed that the intercept of an individual unit is a random drawing from a much larger population with a constant mean value. The individual intercept is then expressed as a deviation from this constant mean value.

5.7.5 Hausman Specification Test

This test allows the researcher to check if fixed effect specification is superior to the random effects.

We compute the fixed effects test statistics as

$$\left(\beta^{FE}-\beta^{RE}\right)'\left[\text{var}(\beta^{FE})-\text{var}(\beta^{RE})\right]^{-1}\left(\beta^{FE}-\beta^{RE}\right)\approx\chi^2(k) \quad \text{.....5.23}$$

Where $\left(\beta^{FE}-\beta^{RE}\right)$ is the vector of the difference between the estimates of the coefficients, from both the random and fixed effects specifications and $\text{var}(\beta^{FE})-\text{var}(\beta^{RE})$ is the difference in their variances. The test is distributed as $\chi^2(k)$ with k equal to the number of coefficients of the model.

The null hypothesis is that estimates by random effects are not different from those of fixed effects. Therefore they are consistent and the random effects estimators should be preferred. The alternative hypothesis states that estimates by random effects are different from those of fixed effects. Therefore, they are not consistent and the random effects estimators are not appropriate.

To summarise on the above, in the estimation of the model with panel data, we can regress with POLS, fixed and random effects. Based on the redundant likelihood test (to select the best method between pooled and fixed effects) and the Hausman specification test (to select the best method between fixed and random), selection of the appropriate method can be done.

5.7.6 The Wald Test

The Wald test shows if an independent variable has a statistically significant relationship with a dependent variable. We can perform the test to check the significance of the variables in the equation to see if they are producing meaningful results jointly.

The null hypothesis is H0: θ is 0 and hence the variables are not providing meaningful results. The alternative hypothesis is H0: θ is greater or less than 1, which means the variables are jointly significant and give a meaningful result.

6. CHAPTER: RESULTS AND DISCUSSIONS

"Let me take you down, 'cause I'm going to Strawberry Fields.

- From the song by the Beatles *Strawberry Fields forever.*

6.1 Descriptive statistics

Table on descriptive statistics and correlations for the sample data is presented below.

Table 6.1 Summary Statistics for Sample Data (120 countries over 1970-2006)

	GROWTH	PRIVATE CREDIT	CAPITALISAT-ION	VALUE TRADED	TURNOVER
Descriptive Statistics					
Mean	1.832	0.383	0.293	0.142	0.321
Maximum	13.913	1.466	2.670	1.532	3.681
Minimum*	-2.751	0.036	0.002	0.00003	0.003
Std. Deviation	1.908	0.317	0.410	0.269	0.511
Observations**	120	120	120	120	120
Correlations					
GROWTH	1				
PRIVATE CREDIT	0.249	1			
	0.006				
CAPITALISATION	0.171	0.571	1		
	0.062	*0*			
VALUE TRADED	0.149	0.789	0.803	1	
	0.062	*0*	*0*		
TURNOVER	0.024	0.295	0.176	0.383	1
	0.795	*0.001*	*0.055*	*0*	

Note:
P-Values are reported in italics
*Countries with no stock markets were awarded a value of "0" for CAPITALISATION, VALUE TRADED and TURNOVER (Explanation available in Chapter 4). Therefore, "0" would automatically be the minimum value for all stock market development indicators. For comparison with other studies, however, the minimum values that were available in the original dataset have been displayed in this Table.
** Each observation represents the average value of the data for the sample period.

Table 6.1 shows significant variation in the growth rate among countries. The mean per capita growth rate is 1.832 with standard deviation of 1.908. In the sample, PRIVATE CREDIT is highest for Hong Kong (1.466) and lowest for

Uganda (0.036). CAPITALISATION is again highest for Hong Kong (2.67). VALUE TRADED is highest for Switzerland (1.532), and TURNOVER for Macedonia, FYR (3.681).

In regards to correlation among variables, it may be noted that the only variable which is insignificant is TURNOVER. All others are significant or nearly significant. This is indicative of the complementary role banks and markets play with each other. It can also be noted that GROWTH is more correlated with PRIVATE CREDIT, CAPITALISATION and VALUE TRADED in the sample. In case of stock market variables, the summary statistics differ largely from Beck and Levine (2004). (For example, the TURNOVER of Beck and Levine is significant. It is so because the sample of this thesis consists of 28 LDCs whereas Beck and Levine (2004) has only one LDC (Bangladesh) in their sample. In addition, the sample size of the thesis is very large (120 countries) and consists of more numbers of developing countries than Beck and Levine (2004), which has only 40 countries, which are mostly those in which stock markets are functioning better. The summary statistics of Beck and Levine (2004) is provided in the Appendix Table 6 A.1.

Here, comparisons of statistics between LDCs and non-LDCs have also been made. It shows that while PRIVATE CREDIT for LDCs is only about 13% for the period 1970-2006, it is 48% for other developing and developed countries. This gap is huge in the case of stock market variables. CAPITALISATION and VALUE TRADED of LDCs are just over 0.5% with TURNOVER at 1%. This is comparatively very high for other countries at 38%, 18% and 41% respectively.

6.2 The Stationarity Test

Table 6.2 provides the results of the stationarity test for the selected variables using Levin et al. (2002) for all 120 countries in the sample and for the 92 non LDCs. The results are the same for both 120 and 92 countries. Measures of banks' and stock markets' development namely PRIVATE CREDIT, CAPITALISATION and VALUE TRADED are found to be integrated of order 1 and therefore suffer from the problem of weak stationarity.

In the case of LDCs (28 countries), PRIVATE CREDIT, CAPITALISATION, VALUE TRADED, GOVERNMENT CONSUMPTION, CAPITAL FORMATION and EDUCATION are integrated of order 1. The results are given in Table 6.3.

Based on the test, the weak stationarity variables will be differenced until it becomes stationary, so that only stationary series will enter the estimation.

Table 6.2 Stationarity test using Levin et al. (2002) for all 120 countries and for countries other than LDCs (92 countries)

Variables (In Logs)	120 Countries				92 Countries			
	Intercept & trend	Intercept only	No Intercept & Trend	Order of Integration	Intercept & trend	Intercept only	No Intercept & Trend	Order of Integration
Growth	-21.030	-19.135	-20.340	I(0)	-20.396	-16.547	-16.794	I(0)
	0	*0*	*0*		*0*	*0*	*0*	
Private Credit	2.039	-1.013	-8.828	I(1)	1.771	-0.886	-9.103	I(1)
	0.979	*0.156*	*0*		*0.962*	*0.188*	*0*	
Bank Credit	2.120	-1.873	-9.136	I(0)	1.750	-1.602	-9.358	I(0)
	0.983	*0.031*	*0.000*		*0.960*	*0.055*	*0.000*	
Bank Credit All Sector	3.458	0.044	2.304	I(1)	3.094	-0.575	3.209	I(1)
	1.000	*0.518*	*0.989*		*0.999*	*0.283*	*0.999*	
Liquid Liabilities	2.945	-3.836	-10.570	I(0)	3.867	-3.059	-9.496	I(0)
	0.998	*0.0001*	*0*		*1.000*	*0.0011*	*0*	
Capitalisation	4.785	-4.935	5.478	I(1)	5.068	-4.901	5.595	I(1)
	1	*0*	*1*		*1*	*0*	*1*	
Value Traded	-48.816	3.428	1.431	I(1)	-48.325	3.519	1.500	I(1)
	0	*1.000*	*0.924*		*0*	*0.9998*	*0.9332*	
Turnover	-15.416	-10.130	-3.951	I(0)	-15.125	-10.097	-3.838	I(0)
	0	*0*	*0*		*0*	*0.000*	*0.000*	
Government Consumption	-2.619	-5.306	-5.221	I(0)	-2.497	-5.454	-5.022	I(0)
	0.004	*0*	*0*		*0.006*	*0*	*0*	
Capital Formation	0.916	-2.433	-3.576	I(0)	0.319	-2.730	-3.928	I(0)
	0.820	*0.008*	*0.0002*		*0.625*	*0.003*	*0*	
Trade Openness	-71.881	-84.469	-36.012	I(0)	-286.350	-189.729	-110.814	I(0)
	0	*0*	*0*		*0*	*0*	*0*	
Inflation	-4.485	-2.139	-10.653	I(0)	-3.006	-1.046	-9.404	I(0)
	0	*0.0162*	*0*		*0.0013*	*0.1478*	*0*	
Education	-2.782	-4.196	-12.689	I(0)	-2.502	-5.006	-11.920	I(0)
	0.0027	*0*	*0*		*0.0062*	*0*	*0*	
Initial Income	-16.123	-29.842	7.620	I(0)	-14.174	-26.244	6.741	I(0)
	0	*0*	*1.0000*		*0*	*0*	*1*	
Black Market Premium	-6.363	-4.774	-1.320	I(0)	-6.197	-5.060	-1.168	I(0)
	0	*0.000*	*0.0934*		*0*	*0*	*0.122*	

Note:
As discussed in the previous chapter, the non-stationary series are tested again for stationary after differencing. It is found that all non-stationary series become stationary after first differencing, and therefore their order of integration is 1. The order of integration for each series is available in the last column for both 120 and 92 countries separately.

Table 6.3 Stationarity test using Levin et al. (2002) for 28 LDCs

Variables (In Logs)	Intercept & trend	Intercept only	No Intercept & Trend	Order of Integration
Growth	-6.567	-10.417	-14.292	I(0)
	0	*0*	*0*	
Private Credit	0.404	-0.948	-2.476	I(1)
	0.657	*0.172*	*0.0066*	
Bank Credit	0.648	-0.474	-2.370	I(1)
	0.741	*0.318*	*0.009*	
Bank Credit all sector	1.962	0.611	-2.563	I(1)
	0.975	*0.729*	*0.005*	
Liquid Liabilities	-0.471	-2.277	-4.703	I(0)
	0.319	*0.0114*	*0*	
Capitalisation	0.002	0.022	-0.727	I(1)
	0.5006	*0.5089*	*0.2337*	
Value Traded	0.719	-0.187	-0.591	I(1)
	0.7638	*0.426*	*0.277*	
Turnover	-2.041	-0.257	-1.378	I(0)
	0.0206	*0.3987*	*0.0841*	
Government Consumption	-1.095	-0.648	-1.450	I(1)
	0.137	*0.2586*	*0.0736*	
Capital Formation	1.110	-0.287	0.538	I(1)
	0.867	*0.387*	*0.7047*	
Trade Openness	-7.574	-6.323	-6.400	I(0)
	0	*0*	*0*	
Inflation	-3.941	-3.180	-5.218	I(0)
	0	*0.0007*	*0*	
Education	-0.956	0.340	-7.199	I(1)
	0.1694	*0.6332*	*0*	
Initial Income	-7.684	-14.206	3.622	I(0)
	0	*0*	*0.9999*	
Black Market Premium	-1.757	-2.047	-5.915	I(0)
	0.0394	*0.020*	*0*	

Note:
Like non-LDCs, the non-stationary series of LDCs becomes stationary after first differencing, and therefore their order of integration is 1, which is available in the last column of the Table.

The results of the estimation using different methods outlined in the previous chapter are presented next. The results are discussed for long and short termseparately.

6.3 Long term Estimation

Pooled ordinary least square (POLS) and two stage least square (TSLS) are performed for the long term estimation.

6.3.1 Pooled Ordinary Least Squares Estimation (POLS)

Firstly, the pure cross-sectional estimation is made using pooled ordinary least squares (POLS) technique. The results are different than in existing empirical works.

As discussed in chapter two of this thesis, many empirical works promote a positive relationship between financial development and economic growth for the long term. However, the results shown in Table 6.4 are not in line with these expectations. After estimating, with first differenced variable for I(1) series, the results do not agree with the popular conventional approach of showing a positive relationship between banks development and economic growth. Table 6.4 gives the result of the POLS regression for data averaged over the period 1970 – 2006, with one observation per country for all 120 countries, to capture the long-term relationships.

The dependent variable is GROWTH (log difference of real GDP per capita). Each of the three reported regressions controls for logarithms of all five control variables, namely GOVERNMENT CONSUMPTION, CAPITAL FORMATION, TRADE OPENNESS, INFLATION, EDUCATION and INITIAL INCOME. The regressions include PRIVATE CREDIT and CAPITALISATION, PRIVATE CREDIT and VALUE TRADED, PRIVATE CREDIT and TURNOVER in first, second and third regressions respectively.

The p-values are provided in italics below the coefficient statistics of each variable.

Although, the results of the POLS estimate do not support the findings of the existing literature on the positive relationship of PRIVATE CREDIT upon GROWTH in the long term, the results for the stock market depend on the variable used. The relationship is positive and significant for CAPITALISATION and VALUE TRADED, but negative and significant for the variable usually chosen in the literature, namely TURNOVER. The Wald test provides evidence that the bank and market variables together are significant and have an overall positive impact, apart from the combination of private credit and market turnover, when the overall impact is significant but negative.

Table 6.4 Growth effect with PRIVATE CREDIT and Stock Market, Cross-sectional, all 120 countries

Method: Pooled Least Squares Sample: 1970 2006 (mean of 37 years)			
Regressors	1	2	3
Constant	-0.0356 *0*	-0.0344 *0*	-0.0306 *0*
Private credit (first difference) (domestic credit to private sector - % of GDP)	-0.0739 *0*	-0.0740 *0*	-0.0778 *0*
Capitalisation (first difference) (market capitalization of listed companies - % of GDP)	1.4513 *0.0229*		
Value traded (first difference) (stocks traded, total value - % of GDP)		2.2232 *0.0011*	
Turnover (stocks traded, turnover ratio)			*-0.2731* *0*
Government consumption (government final consumption expenditure -% of GDP)	-0.0076 *0*	-0.0078 *0*	-0.0069 *0*
Capital formation (gross capital formation - % of GDP)	0.2499 *0*	0.2488 *0*	0.2456 *0*
Trade openness (trade - % of GDP)	-0.0016 *0.0009*	-0.0012 *0.015*	-0.0022 *0*
Inflation (inflation, consumer prices - annual %)	-0.0099 *0*	-0.0088 *0*	-0.0117 *0*
Education (secondary school enrollment - %)	0.0047 *0*	0.0048 *0*	0.0059 *0*
Initial Income (Initial GDP per capita)	-0.0012 *0.0002*	-0.0014 *0*	-0.0013 *0.0001*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.4307	0.4314	0.4341
Countries	120	120	120

Note:
P-values are reported in italics.

The above estimation for 120 countries includes 28 LDCs. In order to align to the existing literature, many of which do not have any LDC in their sample (Atje and Jovanovic, 1993, Demirgüç-Kunt and Levine, 199, Shen and Lee, 2006), and to verify if the inclusion of a large number of LDCs had any impact

on the relationship, estimation is repeated for 92 non-LDCs. The results of the estimation are reported in Table 6.5. However, the outcome is consistent with the results in Table 6.4 above.

Table 6.5 Growth effect with PRIVATE CREDIT and Stock Market, Cross-sectional, 92 countries (no LDCs)

Method: Pooled Least Squares
Sample: 1970 2006 (mean of 37 years)

Regressors	1	2	3
Constant	-0.0066	-0.0051	0.0015
	0.0835	*0.1802*	*0.6992*
Private credit (first difference)	-0.0557	-0.0565	-0.0628
(domestic credit to private sector - % of GDP)	*0*	*0*	*0*
Capitalisation (first difference)	0.8511		
(market capitalization of listed companies - % of GDP)	*0.1491*		
Value traded (first difference)		2.3541	
(stocks traded, total value - % of GDP)		*0.0002*	
Turnover			*-0.3351*
(stocks traded, turnover ratio)			*0*
Government consumption	-0.0062	-0.0063	-0.0052
(government final consumption expenditure -% of GDP)	*0*	*0*	*0*
Capital formation	0.1798	0.1797	0.1728
(gross capital formation - % of GDP)	*0*	*0*	*0*
Trade openness	-0.0002	0.0002	-0.0010
(trade - % of GDP)	*0.6603*	*0.6639*	*0.0298*
Inflation	-0.0110	-0.0097	-0.0136
(inflation, consumer prices - annual %)	*0*	*0*	*0*
Education	0.0093	0.0096	0.0110
(secondary school enrollment - %)	*0*	*0*	*0*
Initial Income	-0.0026	-0.0029	-0.0030
(Initial GDP per capita)	*0*	*0*	*0*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.2898	0.2922	0.3008
Countries	92	92	92

Note:
P-values are reported in italics.

6.3.2 Two-Stage Least Squares Estimation (TSLS)

In order to remove a possible endogeneity of the financial variables, the model is also estimated by two-stage pooled least square (TSLS) for both 120 countries and 92 countries (non-LDCs) separately. As in much of the existing literature, variables capturing the origins of the legal system of the countries have been used as instrumental variables alongside one lag value of the explanatory variables. The results reported in Table 6.6 (for 120 countries) and Table 6.7 (for 92 countries) are similar to POLS estimation above.

Table 6.6 Growth effect with PRIVATE CREDIT and Stock Market, Cross-sectional, 120 countries.

Method: Two Stage Least Squares Sample: 1970 2006 (mean of 37 years)			
Regressors	1	2	3
Constant	-0.0324 *0*	-0.0313 *0*	-0.0276 *0*
Private credit (first difference) (domestic credit to private sector - % of GDP)	-0.0747 *0*	-0.0741 *0*	-0.0781 *0*
Capitalisation (first difference) (market capitalization of listed companies - % of GDP)	3.2355 *0*		
Value traded (first difference) (stocks traded, total value - % of GDP)		2.5844 *0.0002*	
Turnover (stocks traded, turnover ratio)			*-0.2700* *0*
Government consumption (government final consumption expenditure -% of GDP)	-0.0069 *0*	-0.0074 *0*	-0.0065 *0*
Capital formation (gross capital formation - % of GDP)	0.2489 *0*	0.2467 *0*	0.2433 *0*
Trade openness (trade - % of GDP)	-0.0019 *0.0001*	-0.0012 *0.0148*	-0.0022 *0*
Inflation (inflation, consumer prices - annual %)	-0.0093 *0*	-0.0082 *0*	-0.0113 *0*
Education (secondary school enrollment - %)	0.0049 *0*	0.0051 *0*	0.0062 *0*
Initial Income (Initial GDP per capita)	-0.0015 *0*	-0.0017 *0*	-0.0015 *0*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.4296	0.4312	0.4340
Countries	120	120	120

Note:
P-values are reported in italics.
In the above Table, the estimation includes instrument variables: legal origin dummies from La Port et al. (2008) and one lag of the explanatory variables.

Table 6.7 Growth effect with PRIVATE CREDIT and Stock Market, Cross-sectional, 92 countries (no LDCs)

Method: Two Stage Least Squares Sample: 1970 2006 (mean of 37 years)			
Regressors	1	2	3
Constant	-0.0076 *0.0464*	-0.0057 *0.1351*	0.0000 *0.9915*
Private credit (first difference) (domestic credit to private sector - % of GDP)	-0.0564 *0*	-0.0576 *0*	-0.0632 *0*
Capitalisation (first difference) (market capitalization of listed companies - % of GDP)	1.8295 *0.003*		
Value traded (first difference) (stocks traded, total value - % of GDP)		3.2614 *0*	
Turnover (stocks traded, turnover ratio)			*-0.3201* *0*
Government consumption (government final consumption expenditure -% of GDP)	-0.0060 *0*	-0.0063 *0*	-0.0052 *0*
Capital formation (gross capital formation - % of GDP)	0.1838 *0*	0.1832 *0*	0.1761 *0*
Trade openness (trade - % of GDP)	-0.0002 *0.6445*	0.0005 *0.3285*	-0.0008 *0.0869*
Inflation (inflation, consumer prices - annual %)	-0.0099 *0*	-0.0082 *0*	-0.0125 *0*
Education (secondary school enrollment - %)	0.0090 *0*	0.0093 *0*	0.0106 *0*
Initial Income (Initial GDP per capita)	-0.0026 *0*	-0.0030 *0*	-0.0029 *0*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.2890	0.2916	0.3006
Countries	92	92	92

Note:
P-values are reported in italics.
In the above Table, the estimation includes instrument variables: legal origin dummies from La Port et al. (2008) and one lag of the explanatory variables.

In line with existing literature (see for example, Beck and Levine 2004, Favara, 2003, Saci et al. 2009), we also check upon the results by applying

BLACK MARKET PREMIUM as another control variable. The results shown in Table 6.8 are same like in POLS, although the variable PRIVATE CREDIT is now not significant. The sign for PRIVATE CREDIT, however, is still negative. In the case of stock markets, the preferred variable of the literature TURNOVER is now positive and significant. In addition the control variable, TRADE OPENNESS, which was before negative is now positive. On the whole, the inclusion of BLACK MARKET PREMIUMS in the estimation makes the results similar to the existing empirical works, except PRIVATE CREDIT, which is negative.

Table 6.8 Growth Effect with PRIVATE CREDIT and Stock Market - Cross-sectional. including additional control variable, BLACK MARKET PREMIUM.

Method: Two Stage Least Squares
Sample: 1970 2006 (mean of 37 years)

Regressors	1	2	3
Constant	0.0245	0.0223	0.0241
	0	*0*	*0*
Private credit (first difference)	-0.0067	-0.0058	-0.0021
(domestic credit to private sector - % of GDP)	*0.23*	*0.2958*	*0.6905*
Capitalisation (first difference)	5.8716		
(market capitalization of listed companies - % of GDP)	*0*		
Value traded (first difference)		2.2392	
(stocks traded, total value - % of GDP)		*0.0002*	
Turnover			*1.3156*
(stocks traded, turnover ratio)			*0*
Government consumption	-0.0006	-0.0021	-0.0029
(government final consumption expenditure -% of GDP)	*0.4122*	*0.0057*	*0*
Capital formation	0.1838	0.1806	0.1626
(gross capital formation - % of GDP)	*0*	*0*	*0*
Trade openness	-0.0023	-0.0004	0.0029
(trade - % of GDP)	*0*	*0.3698*	*0*
Inflation	-0.0114	-0.0100	-0.0033
(inflation, consumer prices - annual %)	*0*	*0*	*0.017*
Education	0.0114	0.0116	0.0101
(secondary school enrollment - %)	*0*	*0*	*0*
Initial Income	-0.0062	-0.0059	-0.0065
(Initial GDP per capita)	*0*	*0*	*0*
Black Market Premium	0.0003	0.0002	-0.0005
[(Black market rate - official rate)/ official rate]	*0.1338*	*0.3229*	*0.0055*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.4749	0.4767	0.5222
Countries	88	88	88

Note:
P-values are reported in italics.
The estimation using BLACK MARKET PREMIUM reduces the number of countries to 88 because of unavailability of the data (explained in Chapter four).

In the above Table, it can be seen that in the first and second regressions (PRIVATE CREDIT and CAPITALISATION, and PRIVATE CREDIT and

VALUE TRADED respectively), BLACK MARKET PREMIUM is positive and insignificant. In the third regression (PRIVATE CREDIT and TURNOVER), the variable has an expected negative sign and is significant.

To briefly summarise the main findings for the long term, unlike in previous literature, PRIVATE CREDIT has a robust, but negative impact upon GROWTH. This is the same for both POLS and TSLS estimations. The impact of stock markets, according to our results, is dependent upon the variable used. In the case of TURNOVER, the relationship is negative and significant. Estimation involving the control variable BLACK MARKET PREMIUM provides an expected sign and significant results to all variables, except PRIVATE CREDIT, which is negative throughout all estimations.

6.4 Short Term Estimation

The thesis now conducts the estimation for the short term i.e. with annual data.

6.4.1 Selecting the Best Effects of Estimation

The panel estimation basically depends upon the assumption made on the intercept, the slope coefficients and the error term. Hence, the estimation on annual data is made by applying no effect, fixed effects, and random effects.

Based on the redundant likelihood test (to select the best method between pooled and fixed effects) and the Hausman specification test (to select the best method between fixed and random), the fixed effect method for country and time period is chosen as the preferred estimation effect (results of the tests available in Appendix Tables 6 A.2 and 6 A.3).

6.4.2 Pooled Ordinary Least Squares Estimation for the Short Term

First the estimation using POLS with fixed effect (country and time period) is made. The results are shown in Table 6.9.

The estimation is for all 120 countries in the sample. Like in long term estimation, the dependent variable is GROWTH. The regressions include PRIVATE CREDIT and CAPITALISATION, PRIVATE CREDIT and VALUE TRADED, PRIVATE CREDIT and TURNOVER in the first, second and third regressions respectively. The p-values are provided in italics below the coefficient statistics of each variable.

The results show that PRIVATE CREDIT is always negative and significant, and the variables capturing the development of stock markets are always positive and significant. All control variables are exhibiting the expected signs and are mostly significant.

Table 6.9 Growth effect with PRIVATE CREDIT and Stock Market Annual Data

Sample (adjusted): 1975 2006	Method: Panel Least Square Fixed Effect - Cross section and time		
Regressors	1	2	3
Constant	0.3241	0.3238	0.3108
	0.142	*0.143*	*0.1587*
Private credit (first difference)	-0.0220	-0.0242	-0.0212
(domestic credit to private sector - % of GDP)	*0.0027*	*0.0007*	*0.0042*
Capitalisation (first difference)	0.8306		
(market capitalization of listed companies - % of GDP)	*0.0603*		
Value traded (first difference)		1.0257	
(stocks traded, total value - % of GDP)		*0.0085*	
Turnover			*0.3472*
(stocks traded, turnover ratio)			*0.0716*
Government consumption	-0.0414	-0.0414	-0.0406
(government final consumption expenditure -% of GDP)	*0*	*0*	*0*
Capital formation	0.2407	0.2365	0.2397
(gross capital formation - % of GDP)	*0*	*0*	*0*
Trade openness	0.0307	0.0318	0.0312
(trade - % of GDP)	*0*	*0*	*0*
Inflation	-0.0255	-0.0253	-0.0239
(inflation, consumer prices - annual %)	*0*	*0*	*0*
Education	0.0075	0.0089	0.0069
(secondary school enrollment - %)	*0.2724*	*0.1875*	*0.3062*
Initial Income	-0.0539	-0.0535	-0.0518
(Initial GDP per capita)	*0.0605*	*0.063*	*0.0712*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.4276	0.4266	0.4281
Countries	120	120	120
Total panel (unbalanced) observations	1396	1412	1378

It may be noted that in the estimation with annual data, the sample period has been adjusted to 1975- 2006, as the panel is unbalanced due to few missing observations for some years. The thesis has also tested the long

term relationship for the period 1975-2006 to confirm if this change in the sample period will have any effect in the result of the long term relationship. The results were very similar in the case of estimation made using the entire sample period 1970-2006. PRIVATE CREDIT is negative and significant as always. The result is available in Appendix Table 6 A.4.

6.4.3 Two-Stage Least Squares Estimation for the Short Term

The estimation results applying TSLS for all countries with fixed effect for both country and time period are reported in Table 6.10. Like in POLS, the regressions include PRIVATE CREDIT and CAPITALISATION, PRIVATE CREDIT and VALUE TRADED, PRIVATE CREDIT and TURNOVER in the first, second and third regressions respectively.

Table 6.10 Growth effect with PRIVATE CREDIT and Stock Market Annual Data TSLS

Sample (adjusted): 1991 2006	Method: Panel Least Square Fixed Effect - Cross section and time		
Regressors	1	2	3
Constant	0.1511	0.2536	0.2141
	0.6598	*0.5462*	*0.5182*
Private credit (first difference)	-0.0253	-0.0286	-0.0330
(domestic credit to private sector - % of GDP)	*0.431*	*0.4628*	*0.2788*
Capitalisation (first difference)	6.1009		
(market capitalization of listed companies - % of GDP)	*0.0452*		
Value traded (first difference)		-11.9812	
(stocks traded, total value - % of GDP)		*0.2187*	
Turnover			*-0.3041*
(stocks traded, turnover ratio)			*0.5918*
Government consumption	-0.0445	-0.0363	-0.0396
(government final consumption expenditure -% of GDP)	*0.0001*	*0.0108*	*0.0004*
Capital formation	0.2630	0.2109	0.2427
(gross capital formation - % of GDP)	*0.0019*	*0.0482*	*0.002*
Trade openness	0.0480	0.0329	0.0363
(trade - % of GDP)	*0.0005*	*0.0412*	*0.0029*
Inflation	0.0093	0.0125	0.0086
(inflation, consumer prices - annual %)	*0.4673*	*0.4371*	*0.4901*
Education	-0.0015	0.0091	0.0012
(secondary school enrollment - %)	*0.8883*	*0.5321*	*0.9037*
Initial Income	-0.0320	-0.0413	-0.0384
(Initial GDP per capita)	*0.4696*	*0.4455*	*0.3696*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.4776	0.2180	0.5060
Countries	118	120	120
Total panel (unbalanced) observations	1072	1077	1093

Note:
p-values are reported in italics.

The results again show that PRIVATE CREDIT is always negative and significant. The control variables are exhibiting expected signs (except

Inflation), although they are insignificant for some. It may also be noted that the number of countries, while regressing with capitalisation, has gone down to 118 from 120, due to a lack of sufficient data for estimation in the case of Bahrain and Guyana.

6.4.4 Dynamic GMM Panel Estimation for the Short Term

Like in most of the recent literature, the thesis now improves upon the methodology and applies GMM techniques of estimation in dynamic panel, developed by Arellano and Bond (1991). Two step GMM estimator is used for the estimation. We limit our GMM estimation to difference estimator (like in Rousseau and Wachtel, 2000), as the motivation is to test the model using different methods to check for the consistency of the results.

The results are reported in Table 6.11.

Table 6.11 Growth effect with PRIVATE CREDIT and Stock Market Annual Data GMM method

Cross-section fixed (dummy variables) Period fixed (dummy variables)	Transformation: First Differences Sample Adjusted: 1992 -2006		
Private credit (first difference) (domestic credit to private sector - % of GDP)	-0.0301 *0*	-0.0423 *0*	-0.0376 *0*
Capitalisation (market capitalization of listed companies - % of GDP)	0.9247 *0.6903*		
Value Traded (stocks traded, total value - % of GDP)		1.4977 *0*	
Turnover (stocks traded, turnover ratio)			*0.0464* *0.7227*
Government consumption (government final consumption expenditure -% of GDP)	-0.0588 *0*	-0.0757 *0*	-0.0637 *0*
Capital formation (gross capital formation - % of GDP)	0.1057 *0.0948*	0.2681 *0*	0.2221 *0*
Trade openness (trade - % of GDP)	0.0585 *0*	0.0725 *0*	0.0531 *0*
Inflation (inflation, consumer prices - annual %)	-0.0642 *0*	-0.0628 *0*	-0.0451 *0*
Education (secondary school enrollment - %)	-0.0084 *0.6268*	0.0176 *0.0016*	0.0137 *0*
Initial Income (Initial GDP per capita)	0.0576 *0.6042*	-0.1196 *0*	-0.0298 *0*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
Countries	117	118	118
Total panel (unbalanced) observations	954	956	973

Notes:
p-values are reported in Italics

As we can note from the above, the result in GMM panel technique is more robust with the variable VALUE TRADED with expected signs and significant result for all variables. (Similar to findings of Rousseau and Wachtel, 2000) However, the private credit is still negative in all. It may be noted that the method has removed 2 countries while regressions included VALUE TRADED and TURNOVER and 3 countries with CAPITALISATION.

6.4.5 Comparing Results of Different Estimation Techniques

In this section the results of various estimation techniques applied are compared. In terms of the measurement of banks and stock market developments, estimations are made for the preferred variables in the literature, PRIVATE CREDIT and TURNOVER. The results are made available in Table 6.10 where the results of GMM, TSLS and POLS are made available for comparison.

The relationship between PRIVATE CREDIT and GROWTH is always negative, although it is not significant in the case of TSLS.

The results in the short term are very much in line with the findings of the existing literature (Beck and Levine 2004, Loayza and Rancière, 2006) i.e. in the short term banks development and economic growth do not have a positive relationship. It may be noted that the results were obtained after controlling whether the variables were stationary.

Table 6.12 Growth effect with PRIVATE CREDIT and Stock Market, GMM. TSLS and POLS methods on Annual Data

Cross-section fixed (dummy variables) Period fixed (dummy variables)	GMM	TSLS	POLS
Constant		0.2141	0.3108
		0.5182	*0.1587*
Private credit (first difference)	-0.0376	-0.0330	-0.0212
(domestic credit to private sector - % of GDP)	*0*	*0.2788*	*0.0042*
Turnover	0.0464	-0.3041	*0.3472*
(stocks traded, turnover ratio)	*0.7227*	*0.5918*	*0.0716*
Government consumption	-0.0637	-0.0396	-0.0406
(government final consumption expenditure -% of GDP)	*0*	*0.0004*	*0*
Capital formation	0.2221	0.2427	0.2397
(gross capital formation - % of GDP)	*0*	*0.002*	*0*
Trade openness	0.0531	0.0363	0.0312
(trade - % of GDP)	*0*	*0.0029*	*0*
Inflation	-0.0451	0.0086	-0.0239
(inflation, consumer prices - annual %)	*0*	*0.4901*	*0*
Education	0.0137	0.0012	0.0069
(secondary school enrollment - %)	*0*	*0.9037*	*0.3062*
Initial Income	-0.0298	-0.0384	-0.0518
(Initial GDP per capita)	*0*	*0.3696*	*0.0712*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square		0.5060	0.4281
Countries	118	120	120
Total panel (unbalanced) observations	973	1093	1378

Notes:
p-values are reported in Italics

It is important to note on the result that the sign and level of significance of the variable capturing the development of stock markets (TURNOVER) is influenced by the estimation method. The relationship is positive and significant only for POLS, while it becomes insignificant for the other two methods.

6.4.6 Estimation for Least Developed Countries

In this section the estimation is separately carried out for the set of LDCs. As discussed in chapter four, 28 countries have been entered into estimation. As for these countries, more data was available enabling the researcher to conduct the estimation. It may be noted that for LDCs, where the data for the stock market variable was not available (for the period when the stock market was not in existence), a value of "0" has been assigned, based on the knowledge of the dates of establishment and of exchanges explored in the third chapter of this thesis. The names of the countries, their establishment dates of exchanges and banks are made available in Appendix Table 6 A.5.

Table 6.13 gives the short term results of the POLS fixed effect estimation for LDCs. Before conducting the estimation, the redundant likelihood test (to select the best method between pooled and fixed effects) and the Hausman specification test (to select the best method between fixed and random), were carried out, and we found that the fixed effect method, both for country and time period, was our preferred estimation effect (results of the tests available in Appendix Table 6 A.6 and 6 A.7).

Table 6.13 Growth effect with PRIVATE CREDIT and Stock Market POLS methods on Annual Data for LDCS

Sample (adjusted): 1991 2006	Method: Panel Least Square Fixed Effect - Cross section and time		
Regressors	1	2	3
Constant	0.2526	0.5192	0.5116
	0.4659	*0.1385*	*0.1453*
Private credit (first difference)	-0.0977	-0.0828	-0.0805
(domestic credit to private sector - % of GDP)	*0.0004*	*0.0028*	*0.0033*
Capitalisation (first difference)	19.8015		
(market capitalization of listed companies - % of GDP)	*0.7255*		
Value traded (first difference)		-127.5116	
(stocks traded, total value - % of GDP)		*0.5865*	
Turnover			*-0.9509*
(stocks traded, turnover ratio)			*0.9268*
Government consumption	-0.0862	-0.0507	-0.0493
(government final consumption expenditure -% of GDP)	*0*	*0.0119*	*0.0143*
Capital formation (first difference)	0.0217	-0.0038	-0.0033
(gross capital formation - % of GDP)	*0.6875*	*0.9455*	*0.953*
Trade openness	0.0840	0.0615	0.0625
(trade - % of GDP)	*0*	*0.0017*	*0.0015*
Inflation	-0.0334	-0.0500	-0.0515
(inflation, consumer prices - annual %)	*0.3841*	*0.207*	*0.1938*
Education (first difference)	0.1626	0.1299	0.1268
(secondary school enrollment - %)	*0.0037*	*0.0228*	*0.0253*
Initial Income	-0.0614	-0.0774	-0.0759
(Initial GDP per capita)	*0.2659*	*0.1723*	*0.1816*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.5940	0.5480	0.5442
Countries	28	28	28
Total panel (unbalanced) observations	193	196	197

Notes:
p-values are reported in Italics

As can be noted from Table 6.13, the variable PRIVATE CREDIT is always negative and significant, while the variables capturing the effect of stock markets are also negative and in all cases insignificant. All the other variables are producing expected signs although in some cases they are not significant.

6.5 Estimation using BANK CREDIT ALL SECTOR

In this section, the variable measuring banks development, PRIVATE CREDIT, has been replaced by BANK CREDIT ALL SECTOR and the estimation results are reported. In order to compare the results with PRIVATE CREDIT, all estimation techniques adopted above are now repeated for both long and short terms.

First the estimation for the long term is made by applying POLS and TSLS techniques.

Table 6.14 and Table 6.15 provide results for POLS and TSLS estimations respectively. The explanation of the results is made in subsequent paragraphs.

Table 6.14 Growth effect with BANK CREDIT ALL SECTOR and Stock Market – Cross Sectional

Method: Pooled Least Squares Sample: 1981 2006 (mean of 26 years)			
Regressors	1	2	3
Constant	-0.0600 *0*	-0.0618 *0*	-0.0607 *0*
Bank credit all sector (first difference) (credit to all sector except central government - % of GDP)	10.3831 *0*	10.4757 *0*	10.1976 *0*
Capitalisation (first difference) (market capitalization of listed companies - % of GDP)	-1.7670 *0.0208*		
Value traded (first difference) (stocks traded, total value - % of GDP)		-4.0987 *0*	
Turnover (stocks traded, turnover ratio)			*0.0127* *0.8205*
Government consumption (government final consumption expenditure -% of GDP)	-0.0101 *0*	-0.0097 *0*	-0.0100 *0*
Capital formation (gross capital formation - % of GDP)	0.2381 *0*	0.2402 *0*	0.2397 *0*
Trade openness (trade - % of GDP)	-0.0011 *0.0681*	-0.0019 *0.0017*	-0.0013 *0.0318*
Inflation (inflation, consumer prices - annual %)	-0.0110 *0*	-0.0130 *0*	-0.0109 *0*
Education (secondary school enrollment - %)	0.0009 *0.1102*	0.0008 *0.1598*	0.0007 *0.2422*
Initial Income (Initial GDP per capita)	0.0014 *0.0002*	0.0018 *0*	0.0014 *0.0002*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.4384	0.4420	0.4374
Countries	120	120	120

Notes:
p-values are reported in Italics

Unlike estimation using PRIVATE CREDIT, the results with BANK CREDIT ALL SECTOR is positive and significant.

The results for the stock market, although insignificant has a positive sign for the preferred variable by the literature, TURNOVER. Some control variables do not have expected signs (TRADE OPENNESS and INITIAL INCOME), while EDUCATION is insignificant, although positive.

Table 6.15 Growth effect with BANK CREDIT ALL SECTOR and Stock Market – Cross Sectional, TSLS

Method: Two Stage Least Squares Sample: 1981 2006 (mean of 26 years)			
Regressors	1	2	3
Constant	-0.0598 *0*	-0.0616 *0*	-0.0604 *0*
Bank credit all sector (first difference) (Credit to all sector except central government - % of GDP)	9.9110 *0*	10.0409 *0*	9.7749 *0*
Capitalisation (first difference) (market capitalization of listed companies - % of GDP)	-1.2783 *0.1056*		
Value traded (first difference) (stocks traded, total value - % of GDP)		-4.0695 *0*	
Turnover (stocks traded, turnover ratio)			*0.0231* *0.6811*
Government consumption (government final consumption expenditure - % of GDP)	-0.0096 *0*	-0.0092 *0*	-0.0096 *0*
Capital formation (gross capital formation - % of GDP)	0.2388 *0*	0.2406 *0*	0.2399 *0*
Trade openness (trade - % of GDP)	-0.0012 *0.0393*	-0.0019 *0.0012*	-0.0014 *0.0269*
Inflation (inflation, consumer prices - annual %)	-0.0103 *0*	-0.0122 *0*	-0.0101 *0*
Education (secondary school enrollment - %)	0.0008 *0.1792*	0.0007 *0.2253*	0.0006 *0.3343*
Initial Income (Initial GDP per capita)	0.0015 *0.0001*	0.0018 *0*	0.0014 *0.0001*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.4382	0.4419	0.4373
Countries	120	120	120

Notes:
p-values are reported in Italics

The results with BANK CREDIT ALL SECTOR do not change with TSLS except for some small differences in coefficient values.

Finally, the estimation is carried out keeping an additional control variable, BLACK MARKET PREMIUM. The results are reported in Table 6.16.

Table 6.16 Growth effect with BANK CREDIT ALL SECTOR and Stock Market – Cross Sectional, TSLS

Method: Two Stage Least Squares
Sample: 1981 2006 (mean of 26 years)

Regressors	1	2	3
Constant	0.0029	0.0003	0.0105
	0.5327	*0.953*	*0.0167*
Bank credit all sector (first difference)	12.8488	13.0659	13.0797
(credit to all sector except central government - % of GDP)	*0*	*0*	*0*
Capitalisation (first difference)	0.2346		
(market capitalization of listed companies - % of GDP)	*0.7635*		
Value traded (first difference)		-4.7225	
(stocks traded, total value - % of GDP)		*0*	
Turnover			*1.5043*
(stocks traded, turnover ratio)			*0*
Government consumption	-0.0063	-0.0060	-0.0073
(government final consumption expenditure -% of GDP)	*0*	*0*	*0*
Capital formation	0.1411	0.1412	0.1132
(gross capital formation - % of GDP)	*0*	*0*	*0*
Trade openness	0.0002	0.0001	0.0041
(trade - % of GDP)	*0.8045*	*0.9167*	*0*
Inflation	-0.0134	-0.0160	-0.0055
(inflation, consumer prices - annual %)	*0*	*0*	*0.0005*
Education	0.0099	0.0096	0.0087
(secondary school enrollment - %)	*0*	*0*	*0*
Initial Income	-0.0036	-0.0029	-0.0050
(Initial GDP per capita)	*0*	*0*	*0*
Black Market Premium	0.0005	0.0006	-0.0002
[(Black market rate - official rate)/ official rate]	*0.0085*	*0.0038*	*0.2451*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.4701	0.4820	0.5295
Countries	88	88	88

Notes:
p-values are reported in Italics

Having included BLACK MARKET PREMIUM the results have significantly improved. The results fully support the literature, as with TURNOVER the results now are positive and significant. The results also support the finance

and growth relationship when banks development is measured by BANK CREDIT ALL SECTOR.

Finally, the estimation is done for the short term. Table 6.17 provides estimation output using POLS, TSLS and GMM methods for annual data to check the short term effect.

Table 6.17 Growth effect with BANK CREDIT ALL SECTOR and Stock Market – Cross

Cross-section fixed (dummy variables) Period fixed (dummy variables)	GMM	TSLS	POLS
Constant		0.1949 *0.5518*	0.2648 *0.2232*
Bank credit all sector (first difference) (credit to all sector except central government - % of GDP)	-3.5374 *0*	-1.3252 *0.7985*	-7.1578 *0*
Turnover (stocks traded, turnover ratio)	-0.0209 *0.9495*	-0.3180 *0.5813*	*0.3031* *0.1101*
Government consumption (government final consumption expenditure -% of GDP)	-0.0546 *0*	-0.0248 *0.0475*	-0.0410 *0*
Capital formation (gross capital formation - % of GDP)	0.1726 *0*	0.1820 *0.0154*	0.1944 *0*
Trade openness (trade - % of GDP)	0.0410 *0*	0.0488 *0.0002*	0.0326 *0*
Inflation (inflation, consumer prices - annual %)	-0.0670 *0*	0.0001 *0.9902*	-0.0259 *0*
Education (secondary school enrollment - %)	0.0116 *0.1637*	0.0024 *0.812*	0.0038 *0.5984*
Initial Income (Initial GDP per capita)	-0.0868 *0.0006*	-0.0301 *0.4699*	-0.0445 *0.1133*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square		0.4956	0.4404
Countries	119	120	120
Total panel (unbalanced) observations	992	1094	1347

Notes:
p-values are reported in Italics

The short term results do not support the finance and growth link, which is similar to the literature in the case of the banks relationship with growth.

6.6 Discussions of the Results

In the long term analysis, following the literature, a simple POLS estimation method was applied first. Unlike in the literature, emphasis was given to testing for stationarity in order to avoid the problem of spurious regression. The results of the estimation did not support the literature on the positive relationship of banks development and economic growth. This was retested using TSLS method, and to be consistent with the literature, BLACK MARKET PREMIUM was also included as an additional control variable. The results were still rejecting the hypothesis that bank's development promotes economic growth. However, the results support the literature on the positive role of stock markets development upon economic growth. Two of the three indicators of stock markets support the positive impact upon economic growth using POLS and TSLS. In the case of estimation, in which BLACK MARKET PREMIUM was included, all stock market variables supported the finance and growth relationship.

In the short term analysis, the relationship was tested using POLS, TSLS and GMM methods. In all the estimation techniques, the relationship remained negative for banks. With regards to the impact of stock markets upon economic growth, the results supported stock markets relationship with economic growth when POLS (positive and significant) and GMM (positive although not significant for all variables) methods were used. However, the result was negative with TSLS for two stock market indicators. Hence, in the

short term the results of the estimation for stock market measures varied with the different methods of estimation used.

Lastly, the short term estimation that was carried out separately for 28 LDCs gave mostly negative and insignificant results.

The findings of the literature that finance contributes to growth in the long term could not be established. The work then advanced the estimation by applying BANK CREDIT ALL SECTOR (by replacing PRIVATE CREDIT). With this change, the result for both long and short term was in line with literature i.e. in the long term finance has a positive relationship with growth, but not in short term. Because theoretically BANK CREDIT ALL SECTOR should not be as efficient as PRIVATE CREDIT, based on the results, which is favourable with BANK CREDIT ALL SECTOR, and the fact that the sample included a large number of developing countries, it is believed that banks in a majority of developing countries have been supporting firms, which are not providing credit to private sectors, although they may be profitable. This is an important finding for policy implication in developing countries.

It is important to note that this work included a larger number of countries in the sample than in any other works in the related literature. The work is important and unique, as a large numbers of LDCs were involved in the estimation involving banks and stock market variables. Moreover, a number of estimation techniques were applied for the variables preferred by the literature. The work therefore overcomes selection biasness of much empirical work in this field that uses sample periods and countries of a similar time frame.

The conclusion made by Atje and Jovanovic (1993) that stock markets are supportive for economic growth, but the banks have not been supported once again by the results of the tests carried out in this thesis.

The short term results clearly reject the hypothesis of any positive relationship between banks development upon economic growth, which is in line with the results of some recent literature (Beck and Levine, 2004, Loyaza and Rancière 2006, Saci et al, 2009). Like in the literature, the result of the long term estimation supports the positive impact of stock market development upon economic growth. However, the work does not provide evidence of a positive relationship between banks development and economic growth over the long term, which is contradictory to the findings in the literature. The thesis considers it as an important contribution to the literature, and regards the findings as a major puzzle in finance and growth nexus. In an effort to explore this puzzle, the next chapter in this thesis investigates the relationship between banks and exchanges using new variables.

6.7 Appendix

Table 6 A.1 Summary Statistics, Beck and Levine (2004, p. 429)

	Economic growth	Turnover	Bank credit
Descriptive Statistics			
Mean	1.89	41.54	50.00
Maximum	8.57	340.02	124.38
Minimum*	-4.77	1.31	4.13
Std. Deviation	2.23	42.91	28.16
Observations	146	146	146
Correlations			
Economic growth	1		
	-0.001		
Turnover ratio	0.380	1	
	-0.001		
Bank credit	0.110	0.41	1
	-0.194	*-0.001*	

p-Values are reported in italics

Table 6 A.2 Results of Redundant Fixed Effects (POLS Vs. Fixed Effect Test) all countries

Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section Fixed effect	3.102877	-1,191,231	0
Period Fixed effect	3.338469	-191,231	0
Cross-Section/Period Fixed effect	3.33553	-1,381,231	0

Hypothesis for the test above

Ho: Estimates of the co-efficients of the cross-section dummies are equal to zero therefore fixed effect is not correct

H1: Estimates of the co-efficients of the cross-section dummies are different from zero therefore fixed effect is not correct

Table 6 A.3 Correlated Random Effects - Hausman Test (Fixed Vs. Random effect test) all countries

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	41.273105	8	0

Hypothesis for the test above

Ho: Estimates by Random are not different from those from fixed effects. Random should be preferred

H1: Estimates by Random effects are different from those from fixed effects. Random are not appropriate

Table 6 A.4 Growth effect with PRIVATE CREDIT and Stock Market, Cross-sectional, all 120 countries

Method: Pooled Least Squares
Sample: 1975 2006 (mean of 32 years)

Regressors	1	2	3
Constant	-0.0483	-0.0495	-0.0447
	0	*0*	*0*
Private credit (first difference)	-0.0687	-0.0669	-0.0716
(domestic credit to private sector - % of GDP)	*0*	*0*	*0*
Capitalisation (first difference)	0.8270		
(market capitalization of listed companies - % of GDP)	*0.234*		
Value traded (first difference)		-2.2183	
(stocks traded, total value - % of GDP)		*0.0029*	
Turnover			*-0.2097*
(stocks traded, turnover ratio)			*0.0001*
Government consumption	-0.0099	-0.0099	-0.0094
(government final consumption expenditure -% of GDP)	*0*	*0*	*0*
Capital formation	0.2419	0.2417	0.2396
(gross capital formation - % of GDP)	*0*	*0*	*0*
Trade openness	-0.0019	-0.0021	-0.0024
(trade - % of GDP)	*0.0005*	*0.0002*	*0*
Inflation	-0.0136	-0.0148	-0.0149
(inflation, consumer prices - annual %)	*0*	*0*	*0*
Education	0.0042	0.0042	0.0050
(secondary school enrollment - %)	*0*	*0*	*0*
Initial Income	0.0002	0.0006	0.0001
(Initial GDP per capita)	*0.4908*	*0.1191*	*0.6833*
Wald test for joint significance (*p*-Values)	*0*	*0*	*0*
R-square	0.4249	0.4260	0.4271
Countries	120	120	120

Note:
P-values are reported in italics.
In the Table above the estimation is made for the period over 1975-2006 to make it in line with the estimation for the short term (Table 6.9) and to see if there are any differences in the result.

Table 6 A.5 Establishment dates of banks and stock markets for LDCs (28) entered into estimation

#	Countries	Oldest Bank	Date of Estb.	First Exchange	Date of Estb.
1	Bangladesh	Standard Chartered	1905	Dhaka Stock Exchange	1956
2	Benin				
3	Burkina Faso				
4	Guinea-Bissau				
5	Mali		1962	BRVM	1998
6	Niger				
7	Senegal				
8	Togo				
9	Burundi	Banque De Credit Bujumbura	1922	None	N/A
10	Central African Republic				
11	Chad		1970	None	N/A
12	Equatorial Guinea				
13	Ethiopia	Bank of Abysinia	1906	None	N/A
14	Gambia	Standard Chartered Gambia	1894	None	N/A
15	Haiti	National Bank of Haiti	1880	None	N/A
16	Lesotho		1966	None	N/A
17	Madagascar	Banque-de-Madagascar	1926	None	N/A
18	Malawi	African Lake Corporation	1894	Malawi Stock Exchange	1996
19	Mauritania		1970	None	N/A
20	Mozambique		1970	Maputo Stock Exchange	1990
21	Nepal	Nepal Bank Ltd.	1937	Nepal Stock Exchange	1976
22	Rwanda	Banque Commerciale du Rwanda	1963	None	N/A
23	Sierra-Leone	Standard Chartered Sierra Leone	1894	Sierra Leone stock exchange	2009
24	Sudan	Bank of Khartoum	1913	Khartum Stock Exchange	1994
25	Uganda	Standard Chartered Bank Uganda	1912	Uganda Securities Exchange	1997
26	United Republic of Tanzania	Deutsch-Ostafrikanische Bank	1905	Dar es Salaam Stock Exchange	1996
27	Vanuatu		1970	None	N/A
28	Zambia	Standard Chartered Bank Zambia	1906	Lusaka stock exchange	1993

Note: For detail on Table, please see the third chapter

Table 6 A.6 Results of Redundant Fixed Effects (POLS Vs. Fixed Effect Test) 28 LDCs

Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section Fixed effect	3.6892	-27144	0
Period Fixed effect	1.72281	-14144	0.057
Cross-Section/Period Fixed effect	3.195616	-41144	0

Hypothesis for the test above

Ho: Estimates of the co-efficients of the cross-section dummies are equal to zero therefore fixed effect is not correct

H1: Estimates of the co-efficients of the cross-section dummies are different from zero therefore fixed effect is not correct

Table 6 A.7 Correlated Random Effects - Hausman Test (Fixed Vs. Random effect test) 28 LDCs

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	21.071905	7	0.0037

Hypothesis for the test above

Ho: Estimates by Random are not different from those from fixed effects. Random should be preferred

H1: Estimates by Random effects are different from those from fixed effects. Random are not appropriate

7. CHAPTER: BANKS IN DEVELOPED AND DEVELOPING EXCHANGES: AN EMPIRICAL ANALYSIS USING NEW VARIABLES

"On the corner is a banker with a motorcar
The little children laugh at him behind his back"

- From the song by the Beatles *Penny Lane.*

7.1 Introduction

In the second chapter of this thesis, various works that identified functions of both banks and markets important for economic growth were reviewed. Studies explaining the complementary role of banks and stock markets were also reviewed in the chapter. As these large financial institutions have common functions, and as they complement each other, the theoretical understanding was they should bear the same (positive) relationship with economic growth. Contrary to the expectation, the results of the empirical investigation in the previous chapter provide evidence of a negative relationship between banks development and economic growth, although it is positive for stock markets.

On the above, it is again important to note that banks are publicly owned and listed in exchange, and within an exchange as shown in this chapter banks may have a big or small share of the total share market. This chapter therefore aims to investigate the nature of the relationship between banks and exchange, particularly when the size of banks inside the exchange is large and when it is small.

This chapter is organized as follows. Section 7.2 reviews literature on banks and markets. The chapter has constructed some new variables and datasets that are discussed in section 7.3. This chapter applies common methods of testing co-integration, namely Johansen's (1988) procedure and Engle and Granger's (1987) two step method. In addition, bootstrapping is carried out to check the significance of the correlation among variables. These are explained in section 7.4. Section 7.5 concludes.

7.2 Review of Literature

Studies about the financial system involving both banks and markets are not very old and very few empirical works are available in this area.

Atje and Jovanovic (1993) carried out the first cross country growth analysis involving banks and stock markets, and found a positive influence of stock markets, but a negative influence for banks. The debate on comparative advantages of bank based and market based economies became more intense in the literature afterwards. Some of them have included comparison of financial systems in different countries, particularly developed countries, while others investigated the nature of relationship between the banks and markets.

In comparing the systems, Allen (1993) suggested bank-based systems more suitable to countries with traditional industries where there is consensus about policies, and market-based systems for dynamic industries where wider agreement is lacking. Allen and Gale (1995) provided further details expanding over Allen (1993). The authors include some interesting quantitative measures of share of banks and markets in their analysis. For example, they show the ownership of publicly listed banks during the period 1990-1991 was 8.9% in Germany compared to only 0.3% in the USA (Allen and Gale 1995, p.188, Table 3).The authors continue to explore the bank and market based economies, and in Allen and Gale (1997) they suggest the bank based system would achieve a higher level of welfare than market based. The authors cite examples of German and US financial systems. They argue that German banks' can rely on their high volume of reserves

when they have difficult times e.g. when assets returns are low (p. 542). Levine (1997) compares the close bond between banks and industrialists in bank-based economies such as Germany and Japan, and greater liquidity and risk sharing opportunities in market-based countries, such as the United Kingdom and the United States. The author finds the bank-based financial structure of Japan superior to that of the United States, but raises concern over the available quantitative measures that differentiate an economy into bank-based and market-based. The author doubts whether Japan is a bank-based economy (as Japan has one of the best developed stock markets in the world). Levine (1997) therefore suggests the need for further research with new quantitative measures of the financial structure and the functioning of the financial system (p. 719). Allen and Gale (2000) provided a more comprehensive explanation of the financial structures in five developed economies (France, Germany, and Japan as bank-based, and the United Kingdom and the United States as market-based), and the effect of the structures in resource allocation and economic development in these countries. The authors found that both banks and markets are important for a good financial system. Nevertheless, they stress the need for more research in the area to understand the advantages and disadvantages of the different financial systems (Allen and Gale, 2001).

Some empirical works have suggested that there is a complementary role played by banks and markets. Boyd and Smith (1996) suggest that stock markets and banks may act as complements, rather than as substitute sources of capital. Similar to Boyd and Smith (1996), Demirgüç-Kunt and Levine (1996) find that across countries the level of stock market

development is positively correlated with development of financial intermediaries. Demirgüç-Kunt and Levine (1996) use data on 44 developed and emerging markets from 1986 to 1993 and find that large stock markets are more liquid, less volatile, and more internationally integrated than smaller markets. The authors find developed markets having developed intermediaries. Thus, they conclude that stock markets and financial intermediaries complement each other, and therefore they grow together when they develop.

Boot and Thakor (1997) explains the interaction between banks and markets. They make models of financial systems based on three types of informational asymmetries. The first one is about imperfect knowledge on the quality of investment projects available to borrowers. This is better handled by financial markets as markets are better at pricing the value of firms. The second is post-lending moral hazard, and the third is uncertainty that the borrower would be prone to moral hazard. The remaining two are better handled by banks as banks continue to retain information about the borrowers. The authors therefore present optimal combination of banks and markets as better financial system architecture. The authors also find that when the borrowers prosper (which is at the expense of the bank), the capital market expands.

Garcia and Liu (1999) use seven countries in Latin America, six countries in East Asia, and two developed industrial countries (United States and Japan) in their empirical analysis, regarding the macroeconomic determinants of stock market surge between the period 1980-1995. They argue that a more

developed banking sector in East Asian economies led to the growth in size of markets in the region. The authors use stock market capitalization as a measure of stock market development. They find stock markets as a complement rather than a substitute for the banking sector. Similarly, Li (2007) finds development of financial intermediaries having positive association with the size of equity markets. The author uses 33 developed and developing countries. The author finds the stock markets of less developed countries growing much faster in size than those in developed countries in the sample, whereas more stock markets in developed countries enjoyed faster growth in trading activity than the developing countries.

Levine (2002) could not find support for any one (bank-based or market-based) financial system. He instead favoured overall financial development, importantly influenced by legal system. Chakraborty and Ray's (2006) findings are similar to Levine's (2002), as they were also unable to find one type of system superior to the others, although they suggested that the bank-based system was more beneficial to industrial countries. Deidda and Fattouh (2008) in their model find that both banks and stock markets are important for growth. However, in their study, the growth impact of bank development is lower when the level of stock market development is higher. Minier (2009) finds that opening stock exchanges is important for growth. The author finds higher growth during the first 5 years of existence of the exchange. However, the longer-term results, according to Minier (2009), are ambiguous.

7.3 Data and Sources

In line with the review of various studies made above that have recommended identification of relevant proxies, for the better understanding of the financial system (Levine, 1997, Allen and Gale,.2001), this chapter uses new and important variables to examine the nature of the relationship between banks and exchanges. The data is constructed for exchanges in 10 countries namely Bangladesh, Hong Kong, Kenya, Korea, Indonesia, Malaysia, Pakistan, Sri Lanka, Singapore and Thailand. The motivation for selecting these countries is to include a variety of exchanges (well established, systematically more developed, less developed) in the investigations that are explained below.

1. Exchanges in Hong Kong and Singapore are some of the most developed ones in the world, and in comparison to others in the sample, they were established a long time ago.

2. Exchanges in countries such as Korea, Malaysia and Thailand are not very old, but are regarded as systematically more developed exchanges than many (Australia, Canada and many in Europe) in the world (Demirgüç-Kunt and Levine, 1996).

3. Exchanges in Bangladesh, Pakistan and Sri Lanka are not very new (for example Dhaka Stock Exchange was established two years before Korea stock exchange, Exchange in Pakistan was established before Korea), but they are not as developed as some others in the sample.

4. Exchange in Kenya is relatively new and has fewer (only 47 as of March 2010) numbers of listed companies.

The proxies used by this chapter are market capitalisation and age of exchange. They are discussed next.

7.3.1 Market Capitalisation

Unlike in the existing empirical works that have used total market capitalisation, this thesis has constructed market capitalisation separately for banks (hereinafter "BANKCAP") and for all companies other than banks (hereinafter "NONBANKCAP").

The data on market capitalisation is available from various sources, such as the World Bank, World Federation of Exchange and International Monetary Fund. In the sources, the data is however only available for all listed companies (including banks) in total, whereas the chapter aims to obtain BANKCAP and NONBANKCAP separately. To achieve this, data on total market capitalisation has been downloaded using Datastream. [Datastream is mainly a time series data downloading software from Thomson Reuters. (http://thomsonreuters.com). It may be noted that the data on BANKCAP and NONBANKCAP are from Datastream where market capitalisation for "composite" or "all share" index has been obtained. Details about selection of index, Datastream Mnemonic (code to obtain the data), and the establishment dates of exchanges are available in Appendix Table 7 A.1.Data on BANKCAP and NONBANKCAP are new in the literature. This thesis therefore provides detail of the steps followed to obtain the data in Appendix Table 7 A.2, using Kenya as an example. As a reference, the

various steps followed may be repeated to find the data for countries not covered in this chapter]. The data is then separated between BANKCAP and NONBANKCAP through manual intervention in Microsoft Excel.

7.3.2 Age of Exchange

This chapter explores the history and collects the dates of establishment of exchanges to find the age of the exchange (hereinafter "AGEEXCHANGE").

The simple assumption made here is older exchanges in general are more developed, and therefore the age of exchange (hereinafter "AGEEXCHANGE") is a quantitative measure of size of exchange. While a new exchange may have grown up quickly in size (For example an exchange established in an emerging market) or a country may have an exchange established a long time ago, but it may not have achieved expected development (such as due to political problems hindering the progress of the economy), in general, the assumption that older exchanges are more developed is true for most of the countries. In order to check upon this assumption, Table 7.1 shows the age of exchange of major exchanges worldwide (58 exchanges) where the exchanges are ranked based on highest average market capitalisation for the period 1991 to 2008.

Table 7.1 Major Exchanges around the world, Age of Establishment in 2008 and Ranking based on Average Market Capitalization between 1991-2008.

Exchange	Age in 2008	Ranking
NYSE Euronext (US)	406	1
Tokyo SE	130	2
NASDAQ OMX	37	3
London SE	207	4
NYSE Euronext (Europe)	406	5
Shanghai SE	18	6
Deutsche Börse	188	7
NASDAQ OMX Nordic	37	8
TSX Group	147	9
Hong Kong Exchanges	117	10
Bombay SE	133	11
SIX Swiss Exchange	15	12
National Stock Exchange India	16	13
BME Spanish Exchanges	177	14
Borsa Italiana	11	15
Australian SE	21	16
MICEX	16	17
Taiwan SE Corp.	47	18
Korea Exchange	52	19
BM&FBOVESPA	0	20
Johannesburg SE	121	21
Saudi Stock Market – Tadawul	1	22
Shenzhen SE	18	23
OMX Stockholm SE	145	24
Osaka SE	130	25
Singapore Exchange	9	26
Mexican Exchange	114	27
Bursa Malaysia	48	28
American SE	87	29
OMX Helsinki SE	96	30
Jasdaq	45	31
Oslo Børs	189	32
Thailand SE	33	33
Athens Exchange	132	34
Egyptian Exchange	125	35
Santiago SE	115	36
Irish SE	35	37
Istanbul SE	23	38
OMX Copenhagen SE	89	39
Tel Aviv SE	55	40
Wiener Börse	237	41
Indonesia SE	96	42
Colombia SE	7	43
Warsaw SE	17	44
Luxembourg SE	81	45
Philippine SE	16	46
Buenos Aires SE	154	47
Amman SE	9	48
New Zealand Exchange	34	49
Budapest SE	144	50
Tehran SE	41	51
Lima SE	148	52
Cyprus SE	12	53
Ljubljana SE	19	54
Mauritius SE	19	55
Colombo SE	23	56
Bermuda SE	37	57
Malta SE	16	58

Note:
The age of exchange is derived by finding out the date of establishment of the exchange from the websites of the exchanges and subtracting it from 2008 to find the age in 2008. The ranking of the exchanges is made on the basis of their average market capitalisation for the period 1991-2008. The exchange with the highest average market capitalisation is ranked no 1, second highest no. 2 and so on. For example, the highest average market capitalization (US Dollars 9.3 trillion) calculated comes from NYSE Euronext (US) and hence ranked 1. Data on market capitalisation of the exchanges annually for the period 1991-2008 and the year of establishments are available in Appendix Table 7 A.3. Market capitalisation is the year end figure. The source of the data for market capitalisation for the table above is World Federation of Exchanges (http://www.world-exchanges.org/).

Contrary to the assumption, some exchanges in the table are relatively new but have better rankings. For many of the exchanges, it is so because such

exchanges have been formed by merging previously established exchanges.

Some notes into this are provided in Table 7.2.

Table 7.2 Detail of some exchanges on date of establishment

NYSE Euronext NYSE was formed in 1924. Euronext is the consolidation of various exchanges in Europe including the oldest in the world - Amsterdam Stock Exchange. NYSE Euronext is another merger that launched from 4th April 2007. NYSE Euronext (US) and NYSE Euronext (Europe) have its origin from the oldest exchange in the world. According to NYSE EURONEXT website *"The founding of the Dutch East India Company (VOC) on 20 March 1602 marked the worldwide start of share trading."* Source: NYSE Euronext[78]
NASDAQ OMX, and NASDAQ OMX Nordic The current form of NASDAQ QMX and NASDAQ QMX Nordic have histories that date back to 1808 when Copenhagen Securities Exchange (non-profit organization) started trading. Source: NASDAQ OMX[79]
Shanghai Stock Exchange The Stock exchange in China has a very old history. Shanghai Stock Exchange is the oldest in China. Shanghai Securities and Commodities Exchange established in 1920; Shanghai Chinese Merchant Exchange established in 1921. Both were merged in 1929 to form the Shanghai Stock Exchange Source: Cultural China[80]
SIX Swiss Exchange Switzerland's three stock exchanges in Geneva, Basle and Zurich are merged to form the SWX. The first Swiss stock exchange was the Société des agents de change réunis, founded in Geneva in 1850. Source: Six Swiss Exchange[81]
National Stock Exchange India In India, the stock exchange has a long history. BSE is the oldest in Asia, which was established in 1875. Source: Bombay Stock Exchange Limited[82]
Borsa Italiana The exchange was founded in 1997 following the privatisation of the exchange. In 2008, Borsa Italiana celebrated 200 years of operation. Source: Borsa Italiana[83]
Australian Stock Exchange Limited The Australian Stock Exchange Limited (now known as ASX Limited) was formed in 1987 by the amalgamation of six independent stock exchanges that formerly operated in the state capital cities. Each of those exchanges had a history of share trading dating back to the 19th century. Source: Australian Securities Exchange[84]

Continued

BM&FBOVESPA

Exchange was created in 2008 with the integration of the Brazilian Mercantile & Futures Exchange (BM&F) and the São Paulo Stock Exchange (Bovespa). The São Paulo Stock Exchange was established in 1890.

Source: BOVESPA[85]

Singapore Exchange

SGX was inaugurated on 1 December 1999, following the merger of two established and well-respected financial institutions - the Stock Exchange of Singapore (SES) and the Singapore International Monetary Exchange (SIMEX).

http://www.sgx.com/wps/portal/corporate/cp-en/about_sgx

Singapore Stockbrokers' Association was established in 1930. Interchange of currency between Malaysia and Singapore ceased in 1973, and the exchange became the Stock Exchange of Singapore. The Singapore International Monetary Exchange was a future exchange that was established in 1984.

Source:Bursa Malyasia[86]

Nevertheless, there are still some exchanges in Table 7.1 that do not fully agree on the assumption that older systems are always more developed. For some of them there could be political and other reasons attached to it. For example, MICEX is the Russian stock exchange. The exchange was only established after the fall of the former USSR but the ranking is comparatively higher. Here, it may be argued that some form of capital market was working in Russia and some other Eastern European countries even prior to establishment of the exchange. For example Warsaw Stock Exchange, Poland have mentioned in its website *"Traditions of the capital market in Poland dates back to 1817 when it was set up to act first in the Warsaw Stock Exchange Merchant"*. (Warsaw Stock Exchange [87]) (http://www.gpw.pl/). Some other exceptions to the assumption include the Saudi Stock Market – Tadawul. But according to the website of the exchange *"Saudi joint stock companies had their beginnings in the mid 1930's, when*

the "Arab Automobile" company was established as the first joint stock company." Saudi Stock Exchange[88] (http://www.tadawul.com.sa/).

The chapter now tests the assumption for the sample countries. The market capitalisation and age of exchange are reported in Table 7.3.

Table 7.3 Average market capitalization for the period 1991-2008 and age of exchange between 1991-2008 for sample countries.

Country	Market Capitlaisation	Age of Exchange
Hong Kong	505,366	117
Korea	332,734	52
Malaysia	171,536	78
Singapore	170,331	78
Thailand	90,488	45
Indonesia	61,690	96
Pakistan	18,614	61
Kenya	3,784	20
Sri Lanka	2,990	23
Bangladesh	2,221	54

Note: Year of establishment is obtained from website of stock exchanges of the countries. Details available in Appendix Table 7 A.1. Age of exchange is calculated by subtracting the date of establishment from 2008 to find the age in 2008.
Market capitalisation above is from Standard & Poor's, Emerging Stock Markets Factbook and supplemental S&P Data downloaded from ESDS International. The market capitalisation figures are in million US Dollars.

The table shows that Korea, Thailand, Indonesia and Bangladesh do not fully agree with the assumption that older exchanges are more developed. However, Korea and Thailand as stated above are systematically more developed markets, so they were able to grow quickly.

In Indonesia, although the exchange was established in 1912, it was closed for several years due to World War I and II. It was reactivated in 1952 by the Capital Markets Emergency Act, 1952, but the exchange activity was almost dull until 1977. The company "PT Semen Cibinong" was the first issuer listed

in the JSX in 1977. The exchange only had 24 issuers until 1987. People preferred community banking instruments compared to the capital market instruments (Indonesia Stock Exchange[89]).

Bangladesh, despite being established more than five decades ago, is much less developed in terms of size in comparison to others in the sample. It may be noted that Bangladesh became independent from Pakistan only in 1971 after the war, which must have led to big disruption in the progress of the capital market.

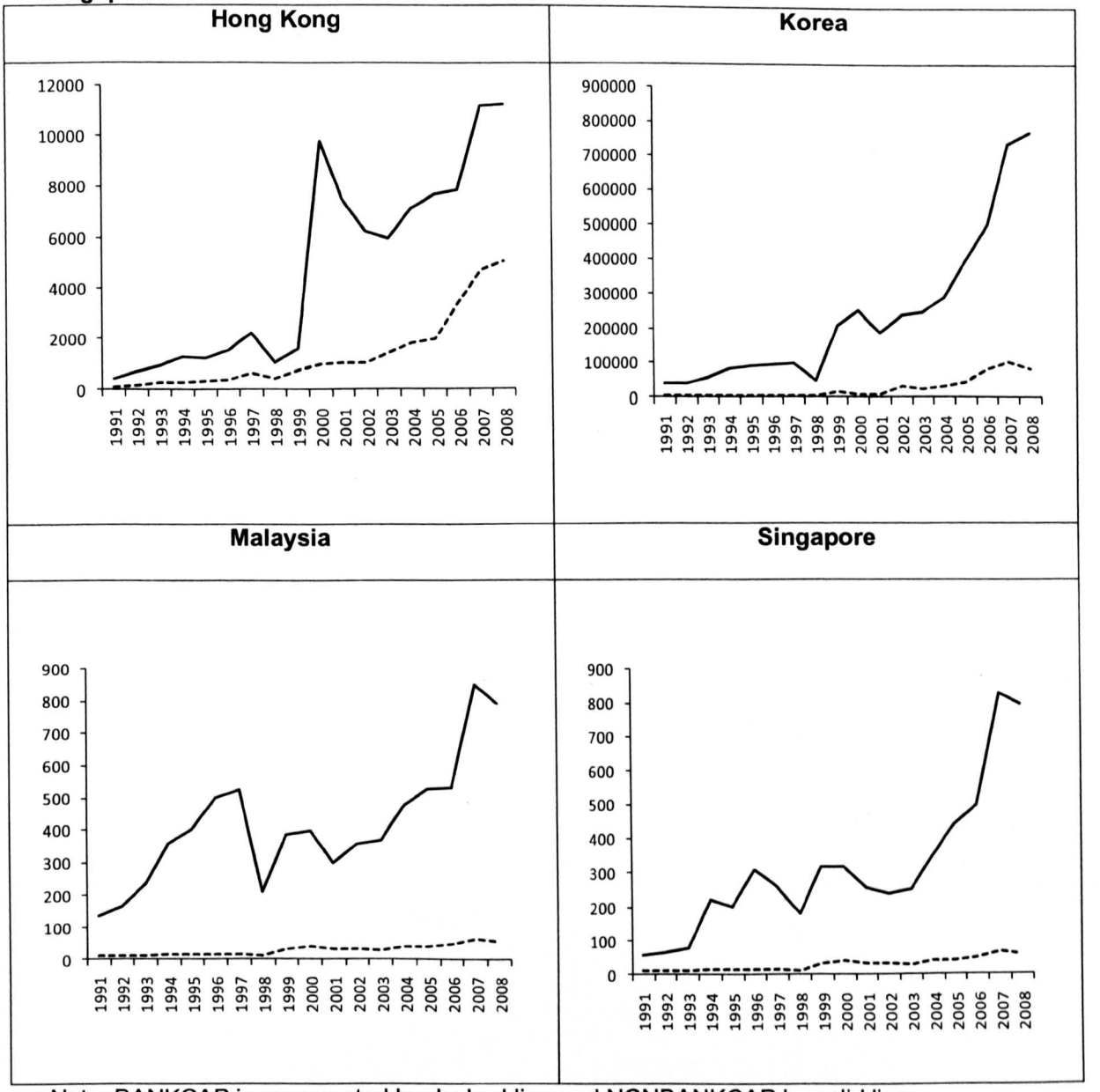
Nevertheless, the limitations of AGEEXCHANGE cannot be fully ignored. Therefore, it will be applied as an additional test into the empirical investigation.

7.4 Methodology

First, the nature of the relationship between BANKCAP and NONBANKCAP has been analysed by plotting the values in line charts for the exchange of each country. The figures are in trillion local currency.

As shown in Figure 7.1, Charts for Hong Kong, Korea, Malaysia, and Singapore do not present any kind of relationship on the movement among the series BANKCAP and NONBANKCAP.

Figure 7.1 BANKCAP and NONBANKCAP for Hong Kong, Korea, Malaysia and Singapore.

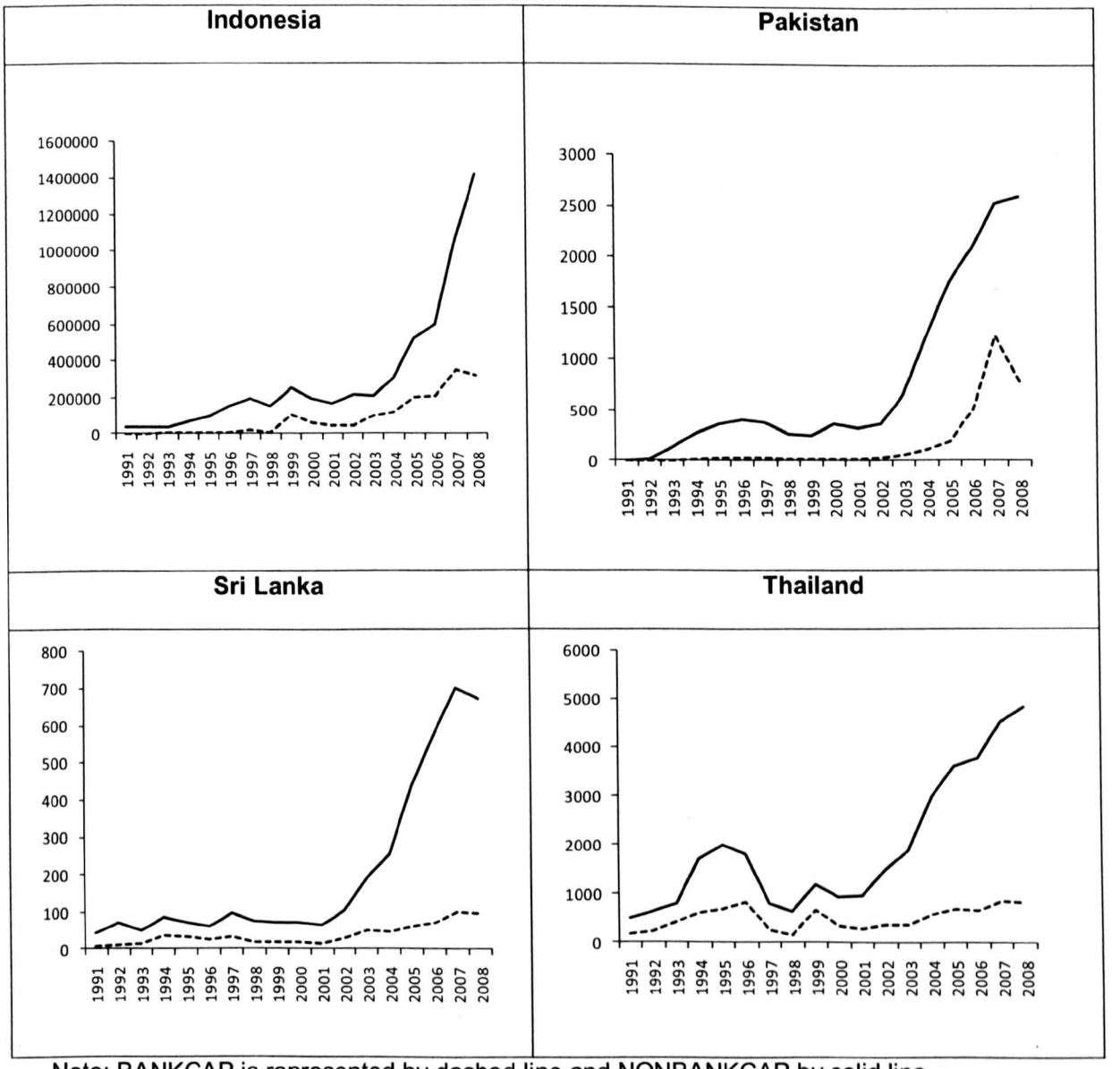


Note: BANKCAP is represented by dashed line and NONBANKCAP by solid line.

Next, the line chart for Indonesia, Pakistan, Sri Lanka and Thailand are presented.

Thailand shows some coherence in movement. However, the lines diverge after 2001. It is difficult to interpret Indonesia and Sri Lanka but market capitalisation of both countries grew up significantly after about 2001(like Thailand). In the case of Pakistan again the pattern is not clear.

Figure 7.2 BANKCAP and NONBANKCAP for Indonesia, Pakistan, Sri Lanka and Thailand.

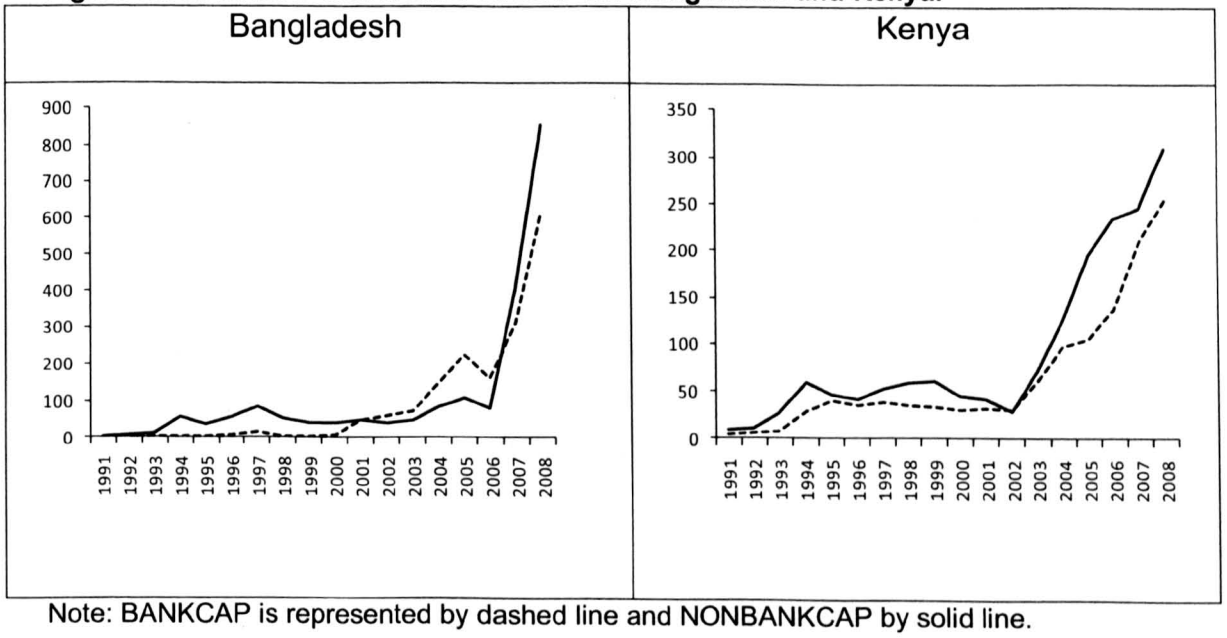


Note: BANKCAP is represented by dashed line and NONBANKCAP by solid line.

Finally, an eye ball of the line graphs of Bangladesh and Kenya show that the two variables have moved in coherence. In the case of low developed countries or new exchanges, such as Kenya, we believe that banks have very dominant roles shaping the size of exchange, as banks seem to represent a significant portion of total market capitalisation. In the line charts the movements of series for Bangladesh, Kenya and Thailand (until 2001) are evidencing the dominant role of banks in shaping the exchange. In fact,

Bangladesh BANKCAP is higher than NONBANKCAP. In Kenya, in 2002, the total market capitalisation is almost equal to BANKCAP. It may be noted that compared to other countries in the sample, these countries have less developed exchanges.

Figure 7.3 BANKCAP and NONBANKCAP for Bangladesh and Kenya.



Note: BANKCAP is represented by dashed line and NONBANKCAP by solid line.

Next, the average number of banks, and companies other than banks, has been shown along with the concentration of banks in the exchange in Table 7.4. The no of banks and non bank companies are manually counted for every year for the period 1991-2008.

Table 7.4 Average No. of banks, and non banks companies (average 1991-2008) and percentage of banks in exchange

Country	No of Banks listed on the exchange	No of other companies listed on the exchange	Banks concentration (%)
Malaysia	3	592	0.51
Singapore	3	363	0.87
Hong Kong	6	569	1.09
Korea	12	553	2.08
Thailand	9	307	2.94
Sri Lanka	11	184	5.98
Pakistan	12	180	6.67
Indonesia	15	221	6.79
Bangladesh	19	160	12.19
Kenya	5	13	37.59

Note:
The countries are kept in order of bank concentration in the exchange in descending order.

The highest concentration of banks in the total number of listed companies is from Kenya followed by Bangladesh. Malaysia, Singapore, Hong Kong and Korea have very low numbers of banks in the exchange (less than 2.1%). They are some of the most developed and fastest growing exchanges in the world (Demirgüç-Kunt and Levine, 1996). Thailand, Sri Lanka, Pakistan and Indonesia range between 3 to 7 percent approximately with Thailand recording the lowest at 2.94%. The stock exchange in Thailand is again systematically more developed than many developed in the world (Demirgüç-Kunt and Levine, 1996).

Since Malaysia, Singapore, Hong Kong, Korea and Thailand have more developed exchanges than others, the table above is also telling the story that an exchange with a higher concentration of banks is less developed compared to one with lower concentration. The chapter aims to establish this

relationship more closely and hence uses co-integration techniques as the empirical approach to investigate on the relationship.

This chapter applies Johansen(1988) and the Engle-Granger (1987) two step method of co-integration. Johansen (1988) is applied as the main test for the variable BANKCAP and NONBANKCAP. As an additional test, Engle-Granger (1987) carried out where the variable AGEEXCHANGE is used.

Two variables will be co-integrated to test if they have a long term, or equilibrium, relationship between them. So the test will help establish if there is co-integration between banks and exchanges, confirming evidence of any long term relationships.

The idea of co-integration basically states that even though individual series may have a unit root, there may exist such a linear combination of variables, which is stationary (Campbell and Perron, 1991). A technical note to Campbell and Perron (1991) is provided inside the text box next page.

Technically explanation on co-integration, Campbell and Perron (1991, p. 164)

We start with an (n x 1) vector of variables Y_t. To keep the framework simple, we suppose that each element of this vector has a representation given by

$$Y_{it} = TD_{it} + Z_{it} \quad A_i(L)Z_{it} = B_i(L)e_{it} \qquad (i = 1, \ldots, n)$$

Where,

TD_{it} is the deterministic component of variable i

Z_i is its noise function modeled as an ARMA process, and

e_{it} the innovation is $N(O, \sigma_i^2)$.

Definition : A vector of variables defined by the equation is said to be co-integrated if there exists at least one non zero *n*-element vector B_i such that B_iY_t is trend-stationary.

First, Johansen co-integration test will be applied to find Trace/ Maximal Eigenvalue values. The hypotheses of the test are provided next.

H_0: r = 0 so there is no co-integration

H_1: r > 0 so there is co-integration

To support Johansen's two step co-integration test, the Engle and Granger (1987) procedure will also be performed. To achieve this, the residuals from the regression equation are calculated. On the residuals, ADF unit root tests (The unit root test is conducted for both intercept and trend. ADF is augmented Dickey Fuller test.) are applied to find the t statistics. The co-integrating regression equation estimated on the residuals is

$$\Delta \varepsilon_{t-1} = \gamma \varepsilon_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta \varepsilon_{t-1} + u_t \ldots\ldots\ldots\ldots\ldots 7.1$$

Where t-statistics is γ

The null hypothesis is $\gamma = 0$ i.e. there is no co-integration against the alternative hypothesis that $\gamma < 0$.

It is expected that if the t-statistics is higher, this will indicate closer association between the variables and vice versa. If the hypothesis is true then t-statistics for less developed stock exchanges will be higher. On the other hand, a developed stock exchange should have a lower t- statistics value i.e. associated to a lesser extent.

The correlation coefficient is calculated between t-statistics and variables representing stock exchange development (AGEXCHANGE). If the correlation is negative then jt would imply that in countries with highly developed stock exchanges, the banks and stock markets will have a lower degree of co-integration as compared to countries with less developed exchanges.

As a further robustness check, bootstrapping (Bootstrapping with replacement) of the variables (AGEXCCHANGE and ADF t-statistics) can be done to find the level confidence interval between the two (Bootstrapping is done in MATLAB. MATLAB is a numerical computing environment maintained by The MathWorks, www.mathworks.com).

Finally, if the difference is stationary (from co-integration test), this should imply that banks are dominant for the stock market (and the country does not have well developed exchange). Co-integration does not seek the causality. However, the exchange banks are only one out of many industries in a country. So it should not be the only element responsible for the growth of a stock market. In other words, if the difference between total market capitalisation and bank stock capitalization remains stationary, this practically means that banks' stock is the main element in the stock market contributing to its growth.

7.5 Results and Discussions

The Johansen co-integration results are reported in Appendix Table 7 A.4. The test shows that there is co-integration among BANKCAP and NONBANKCAP for Bangladesh, and Kenya (Trace test at 8%). The co-integration for Thailand can be established at 9% from the Trace test and 8 % from the Maximum Eigenvalue test.

The countries that have no co-integration are Hong Kong, Indonesia, Korea, Malaysia, Pakistan, Singapore, and Sri Lanka. Both the Trace and Maximum Eigenvalue tests support the results.

The results are similar to those predicted through the graph of the lines. This means stock exchanges that have a larger share of banks are co-integrated.

The chapter now runs the Engle and Granger (1987) two step method of calculating co-integration. The OLS equation is run and the series for residual is derived, in which the ADF test is performed.

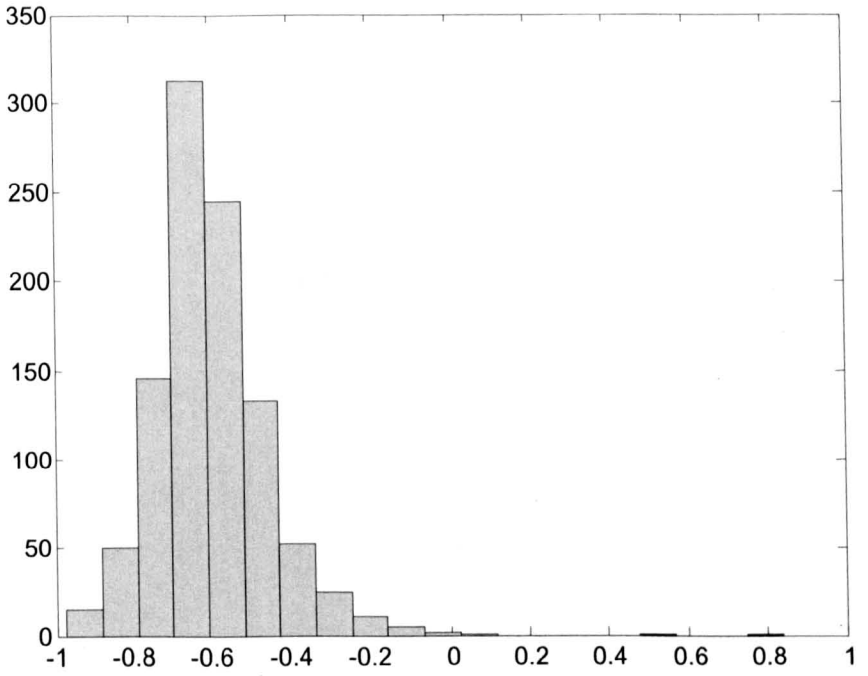
This test shows that the variables are not co-integrated for many countries. However, it is well established that the Engle and Granger (1987) method can be unreliable in the case of small samples. Hence, the t-statistics computed from ADF tests of the residuals is taken. A higher t- statistics will mean the variables are more correlated and vice versa. The ADF t-statistics values of the unit root test on the residuals using Engle and Granger (1987) are made available in Table 7.5.

Table 7.5 ADF t-statistics

Country	ADF t-statistics
Bangladesh	-1.403
Hong Kong	-1.491
Indonesia	-1.962
Kenya	-2.574
Korea	-2.719
Malaysia	-1.740
Pakistan	-3.085
Singapore	-1.279
Sri Lanka	-2.659
Thailand	-3.554

In addition, the re-sampling of the AGEXCHANGE and ADF t-statistics vectors a 1000 times is done to consider the variation in the resulting correlation coefficients. Correlation coefficient is computed on each sample and obtained in the histogram that is shown in Figure 7.4.

Figure 7.4 Histogram of correlation between the variables



The histogram shows that nearly all the estimates lie on the interval [-1 to -0.2].

Next bootstrapping is done for the pairs consisting of t-stats of ADF tests and AGEXCHANGE (to construct a confidence interval). After bootstrapping the correlation coefficient 5,000 times (this also helps in minimising error bias in small time series data) at 95% confidence interval, lower/upper limit of -0.2103 and -0.8577 respectively are obtained.

The above implies an evidence for an inverted relation between t-stats of ADF test and AGEEXCHANGE. In other words when the age of exchange is high the t-statistics are low, and therefore no co-integration and vice versa.

This (evidence of negative correlation between t-statistics and AGEEXCHANGE) implies that in countries with highly developed stock

exchanges, the banks and stock markets will have less co-integration as compared to countries with less efficient exchanges. The implication is that in less developed stock exchanges the variables BANKCAP and NONBANKCAP are more co-integrated, suggesting stationarity of the relationship. In practical terms, this means that banks' stocks are the main element in the stock market contributing to its growth. Since banks are causing this (although there are many other industries in a country) in the stock exchange, banks are the dominant players and the exchange may be less developed.

7.6 Test of the Results

The variables used are the first of its kind in the literature. In order to further support the findings (least developed exchanges have banks as dominant players in the market) the thesis has collected the market capitalisation of the Nepal Stock Exchange (NEPSE: NEPSE is the only stock exchange of Nepal. It was established in 1983. http://www.nepalstock.com/). Nepal is not included in the sample data for empirical investigation. Hence the testing of the results obtained should be unbiased when tested for NEPSE.

The number of listed companies in the exchange (as of July 2009), after separation in financial and non-financial sectors, are presented in Table 7.6.

Table 7.6 Number of listed companies in NEPSE

Types	Total Number of Listed Companies	Category	Number listed
Financial Intermediaries	133	Commercial Banks	23
		Finance Companies	62
		Development Banks	32
		Insurance Companies	16
Non Financial	31	Hotels	4
		Manufacturing & Processing	17
		Others	2
		HydroPower	4
		Tradings	4

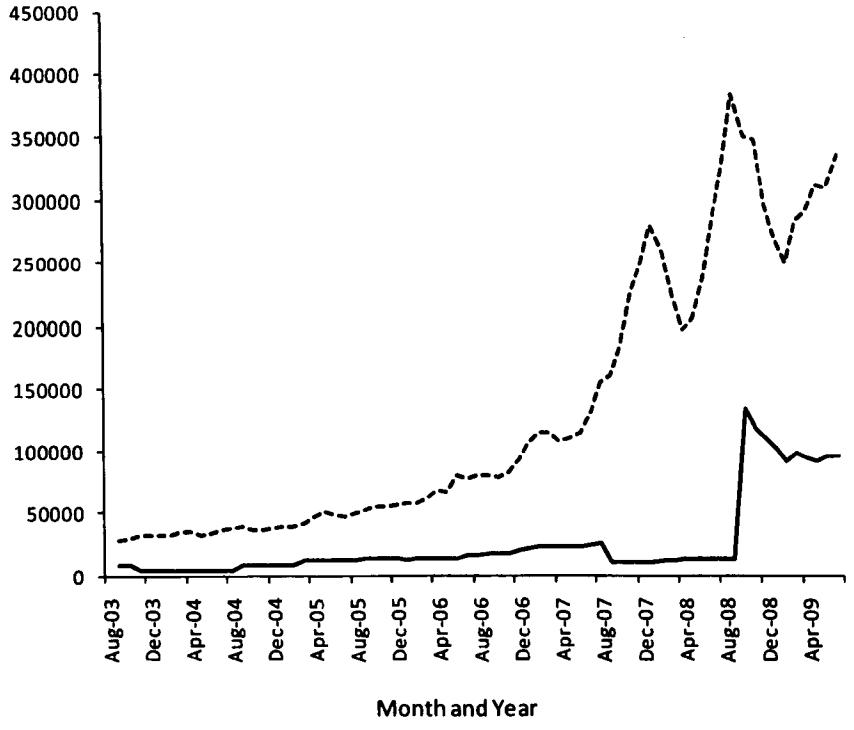
Data source: NEPSE

The thesis has collected monthly data of the market capitalisation of all the industries listed in exchange for six years (from August 2003 to July 2009). The source of the data is the website of NEPSE. The data is constructed for banks and non bank companies separately.

Throughout the 6 years the contribution of banks in total market capitalisation has remained at 82% on average.

The line graph of the data for BANKCAP and NONBANKCAP is provided in figure next.

Figure 7.5 BANKCAP and NONBANKCAP of Nepal Stock Exchange.

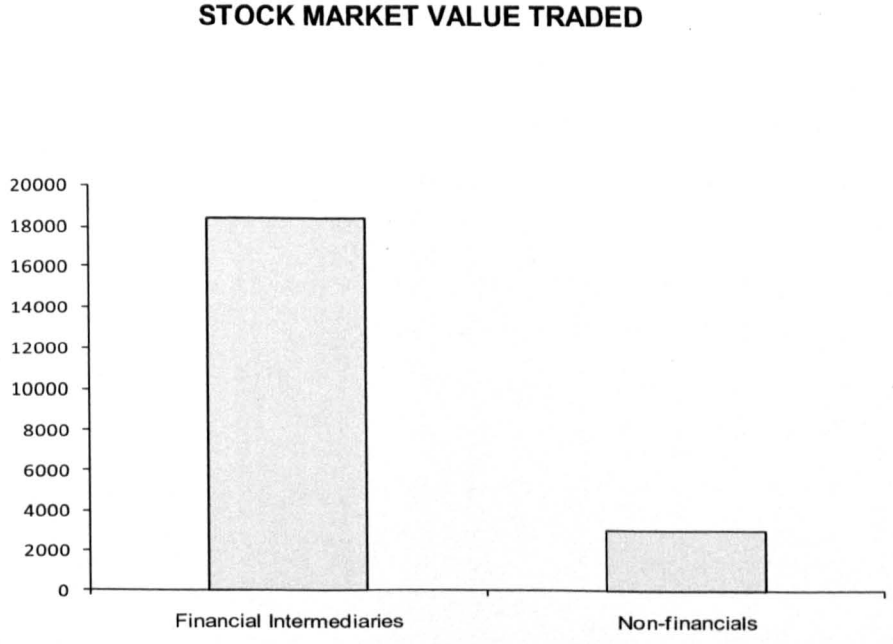


Note: BANKCAP is represented by a dashed line and NONBANKCAP by a solid line. The amount is in million local currency. The sudden increase in the capitalisation of non bank companies in August 2008 is due to listing of the telecommunication company (Nepal Doorsanchar Company Ltd.) into NEPSE. Nepal Doorsanchar Company Ltd. was listed in the exchange on 25th August 2008.[90]

The thesis has also collected data on value traded and number of shares traded for one year, on a monthly basis (July 2007 to June 2009) for all companies listed in the exchange.

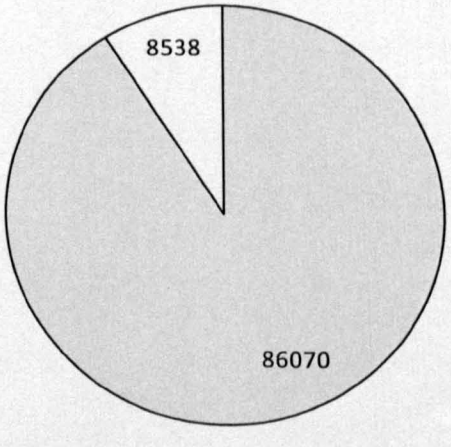
The results as shown by the column graph next in figure 7.6 indicates that financial institutions represented 85.84% of the total value traded in the period. The amount is in million local currency.

Figure 7.6 Stock Market Value Traded over July 2007 to June 2008 for financial and non-financial companies listed in NEPSE



Similarly, almost 91% of the total number of shares was traded on account of financial institutions.

Figure 7.7 Number of Shares Traded in Financial and Non- Financial Sectors over July 2007 to June 2008.



Note: The shaded area represents the number of shares traded by all the financial intermediaries. The source of the data is NEPSE. The data is constructed by the author. In the original dataset, the data is available based on industry (Financial – Commercial Banks, Finance Companies, Insurance Companies and Development Banks and in Non-Financial sector – Manufacturing and Processing, Trading, Hotels, Hydro Powers, and Others)

Next, the Johansen co-integration test is carried out. The results show co-integration between the market capitalisation of financial and non-financial stocks (Appendix Table 7 A.5).

7.7 Conclusion

In sum, it is found that more developed exchanges have poor co-integration with banks' development. The hypothesis that poor countries will have higher levels of co-integration was confirmed by a high 95% confidence interval of correlation coefficient. This implies that the less developed exchanges are relying mainly upon banks and hence do not have a developed stock exchange. The result of the empirical investigation has been checked and confirmed using Nepal as a sample. The chapter finds co-integration in the series and also a large dominance of banking sector in the exchange of Nepal. The chapter sends the message that the listing of more non bank companies inside the exchange can be important for the development of exchange.

7.8 APPENDIX

Table 7 A.1 Name of the Exchange, Establishment Date, and Datastream Code used to download the data

Bangladesh	**Hong Kong**
Bangladesh has two stock exchanges, namely Dhaka Stock Exchange (DSE) and Chattagong Stock Exchange (CSE). The former was established in 1954 as "East Pakistan Stock Exchange Ltd". The name was changed to Dhaka Stock Exchange in 1964[91]. (http://www.dsebd.org/ilf.php). CSE was established in 1995 and has relatively fewer numbers of companies as compared to DSE. In order to download the data on capitalisation, Datastream provided market capitalisation for "all quoted shares" has been used to download the data. The mnemonic in Datastream is FBANG. Date of establishment of exchange: 1954.	Hong Kong is the most investor friendly place in the world. (Index of economic freedom has ranked Hong Kong as no 1 in many criteria[92] related with economic freedom for the last several years). As the first exchange, the Association of Stockbrokers in Hong Kong was established in 1891. At present, the stock exchange is known as Hong Kong Exchanges and Clearing Limited (HKEx). It is a merger of The Stock Exchange of Hong Kong Limited (SEHK), Hong Kong Futures Exchange Limited (HKFE) and Hong Kong Securities Clearing Company Limited (HKSCC)[93]. In order to download the data on capitalisation, Datastream provided market capitalisation for "all domestic and foreign shares" has been used to download the data. The mnemonic in Datastream is FHKQ. Date of establishment of the exchange: 1891
Indonesia	**Kenya**
The first Stock Exchange in Indonesia was built in Batavia (currently known as Jakarta) by the Dutch East Indies in 1912. Later, new stock exchanges were established in Semarang and Surabaya. Surabaya Stock Exchange was merged into Jakarta Stock Exchange (JSX). As a result, JSX changed its name into the Indonesia Stock Exchange. [94] The data for "Jakarta Composite Index" is downloaded using Datastream where the mnemonic is LJAKCOMP. Date of establishment of the exchange: 1912	In Kenya, until 1963, the trading of shares was limited to European communities. In 1988, the first privatisation through Nairobi Stock Exchange took place when it sold the 20% of the share of the Kenya Commercial bank. So we take 1988 as the date of establishment of NSE.[95] The stock market capitalisation for "Nairobi Stock Exchange Index" is obtained using Datastream where the mnemonic is LNSEINDX. Date of establishment of the exchange: 1988
Korea	**Malaysia**
The Daehan Stock Exchange, the predecessor of the Korea Stock Exchange (KSE), was established in 1956. In 1962, the KSE reorganized into a joint stock corporation. The Korea Exchange was established in 2005 as a merger of the Korea Stock Exchange, the KOSDAQ and the Korea Futures Exchange. The Korea Exchange is one of Asia's largest exchanges with around 1,800 listed companies. [96] The data for "KOSPI Composite Index constituents" is obtained using Datastream where the mnemonic is LKORCOMP.	The first formal securities business organisation in Malaysia was the Singapore Stockbrokers' Association that was established in 1930. The Malayan Stock Exchange was established in 1960 and the public trading of shares commenced. Currency interchangeability between Malaysia and Singapore ceased in 1973, and the Stock Exchange of Malaysia became Kuala Lumpur Stock Exchange Berhad. On April 14, 2004, the name was changed to Bursa Malaysia Berhad[97]. The data for "Malaysia all quoted securities" is obtained using Datastream where the mnemonic is FMALQ.

Continued

Pakistan	**Singapore**
Karachi Stock Exchange is the premier stock exchange of the country. It was established in 1947 with 5 listed companies. Total no of companies listed is 651 as of March 2010. KSE has now 4 indices namely KSE 100, KSE 30, KSE All Share Index and KMI 30[98]. "All stock Pakistan stocks" data is obtained from Datastream. The mnemonic is PAKALL.	Singapore Stockbrokers' Association was established in 1930. Interchange of currency between Malaysia and Singapore ceased in 1973, and the exchange became the Stock Exchange of Singapore. The Singapore International Monetary Exchange was a futures exchange that was established in 1984. The Singapore Stock Exchange established on 1st December 1999 resulted from the merger of the two financial institutions - the Stock Exchange of Singapore and the Singapore International Monetary Exchange[99]. In the Datastream "Singapore All Quoted Securities" is taken to download the data. The mnemonic is FSINQ.
Sri Lanka	**Thailand**
Exchange for some specific purpose (when British Planters needed funds to set up Tea Plantations in Sri Lanka in the 19th century) was established a long time ago, however formal exchange market, Colombo Stock Exchange, was established only in 1985[100]. In order to download the data on capitalization, Datastream provided "Research Stocks" is used where the mnemonic is FSRILA.	The first stock exchange was established in 1962 privately. A more formal exchange was established in 1975 and the name given was The Securities exchange of Thailand. On January 1, 1991 its name was formally changed to "The Stock Exchange of Thailand", SET[101]. In the Datastream, "Stock Exchange of Thailand (S.E.T.)" is taken to download the data. The mnemonic is LBNGKSET

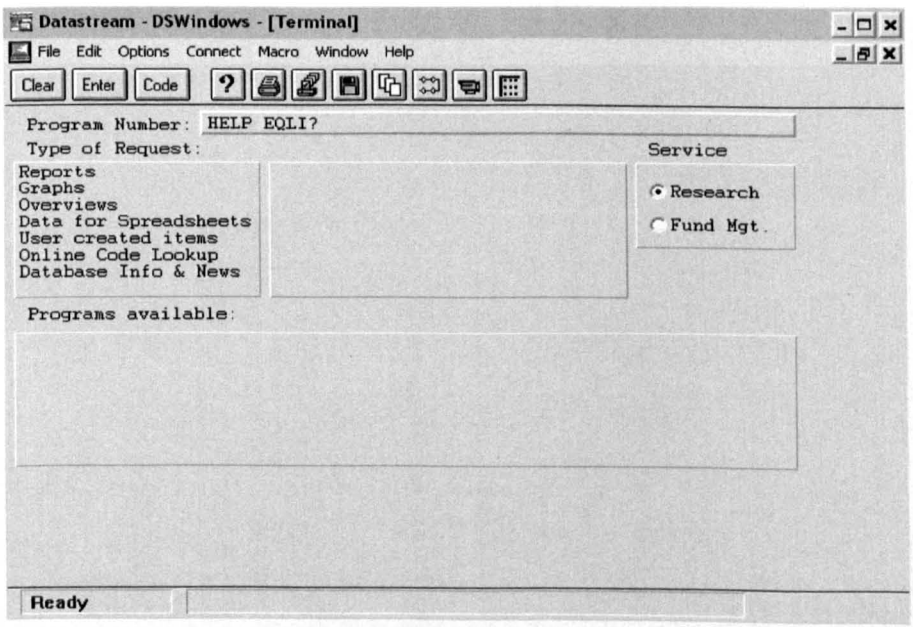
Appendix 7 A.2 Steps to obtain BANKCAP and NONBANKCAP data from Datastream and processing in Microsoft Excel.

The steps that can be followed to obtain the data from Datastream in DSWindows Version 2.2D.05 is illustrated using Kenya as an example.

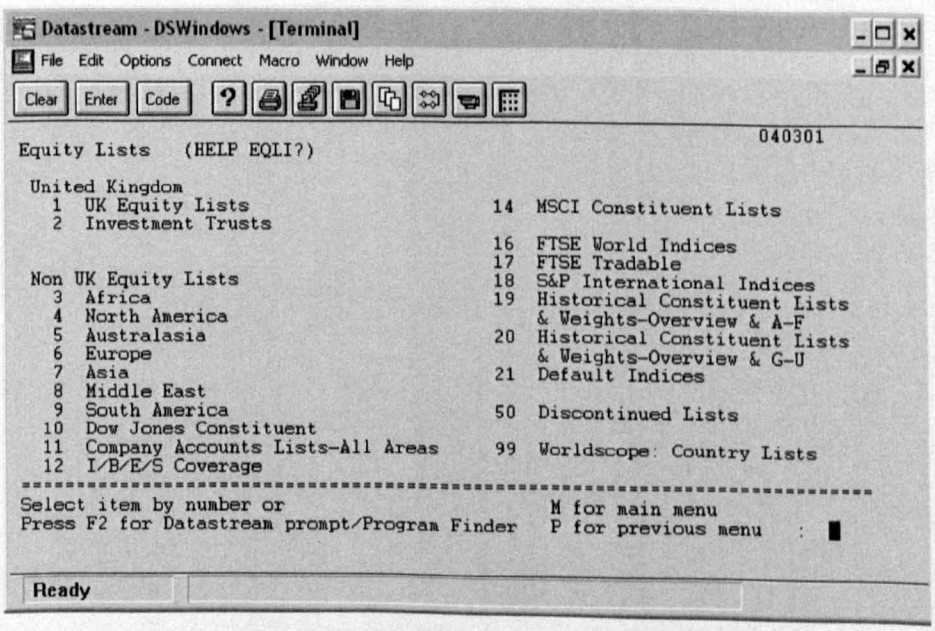
First the mnemonic for each company inside the index is needed. This is explained in A 7.2.1. Next, a micro files need to be made to download the data for all stocks inside the index which is illustrated in A 7.2.2.

A 7.2.1

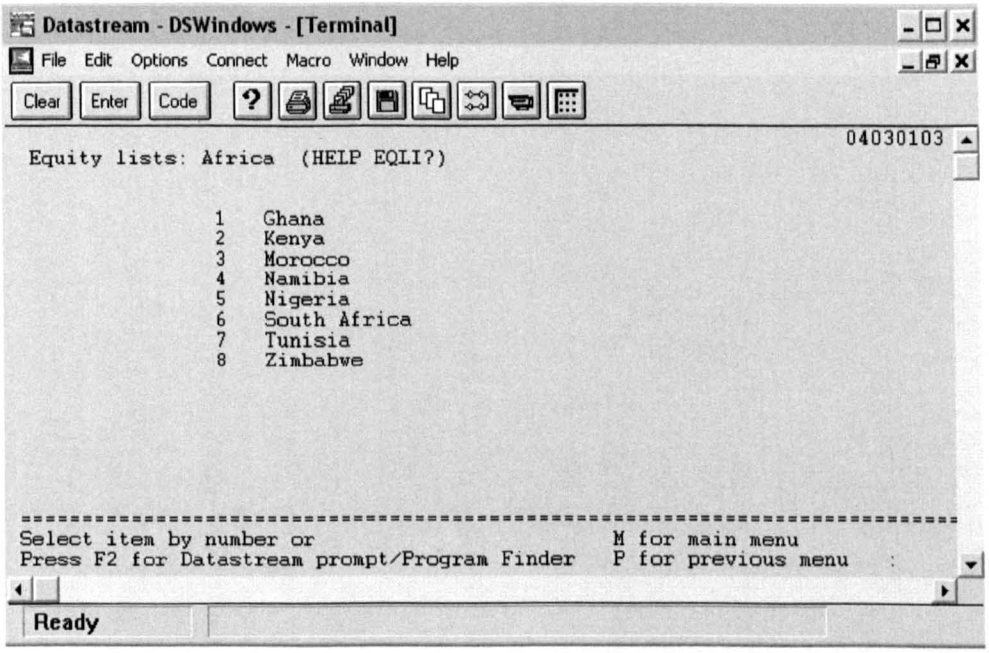
Open the Datastream window



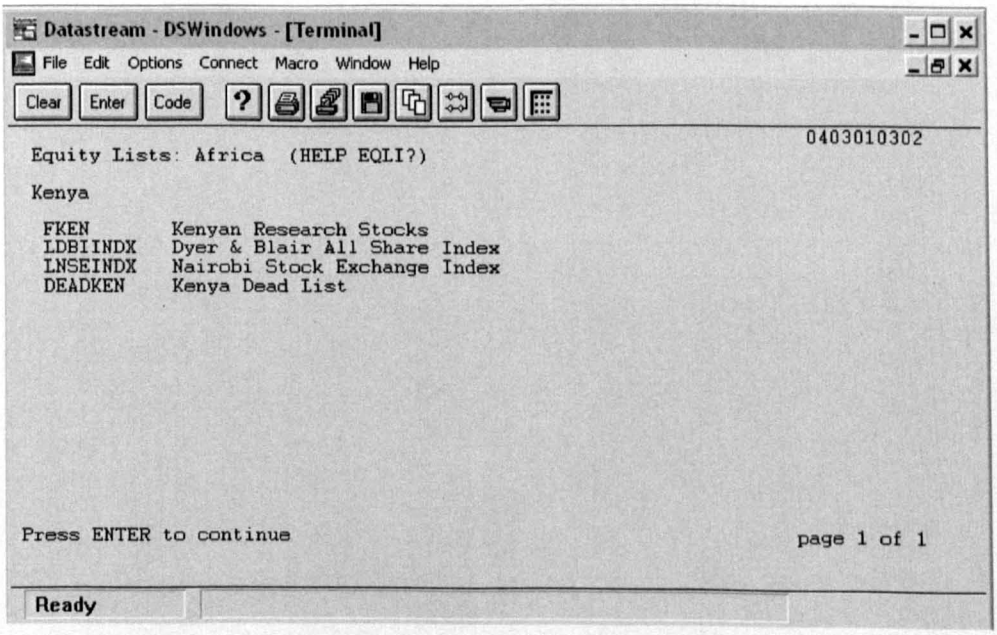
As shown above, go into the main screen, type HELP EQLI? and press Enter. This will take you to the following screen. Choose the equity list.



Here, Kenya belongs to Africa, so type 3. Press enter and the next screen will appear as follows

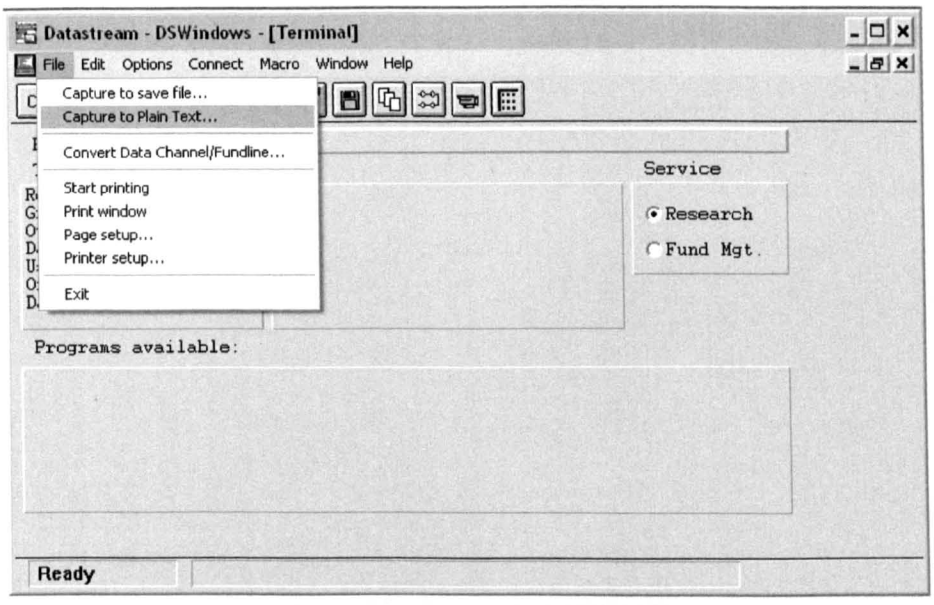


Now type 2 and press Enter. The next screen will ask you to choose the index.

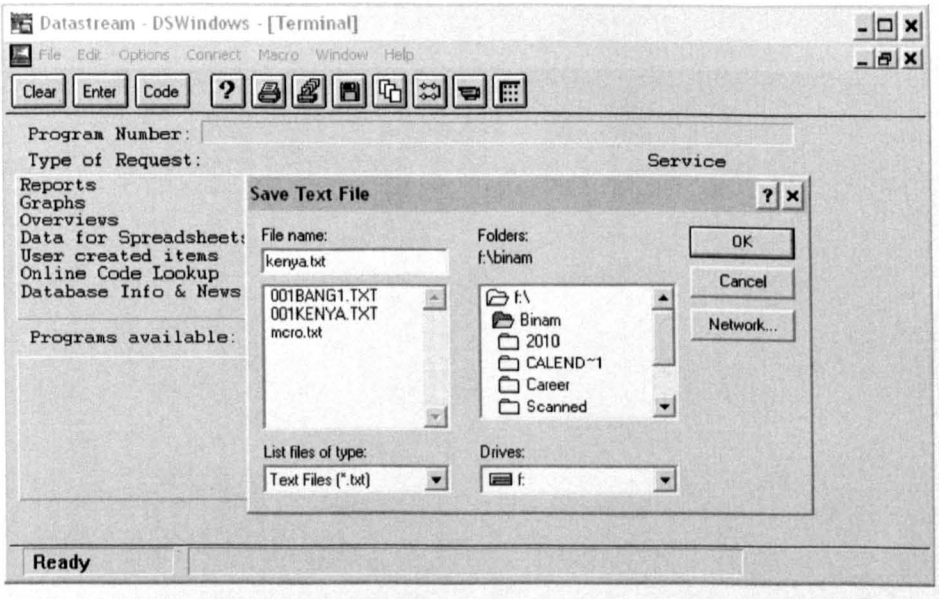


The index with more numbers of stocks is preferred. Nairobi Stock Exchange Index is taken. The mnemonic needed is LNSEINDX. Copy the mnemonic for Nairobi Stock Exchange Index "LNSEINDX" by highlighting and using key board combination of Ctrl + C.

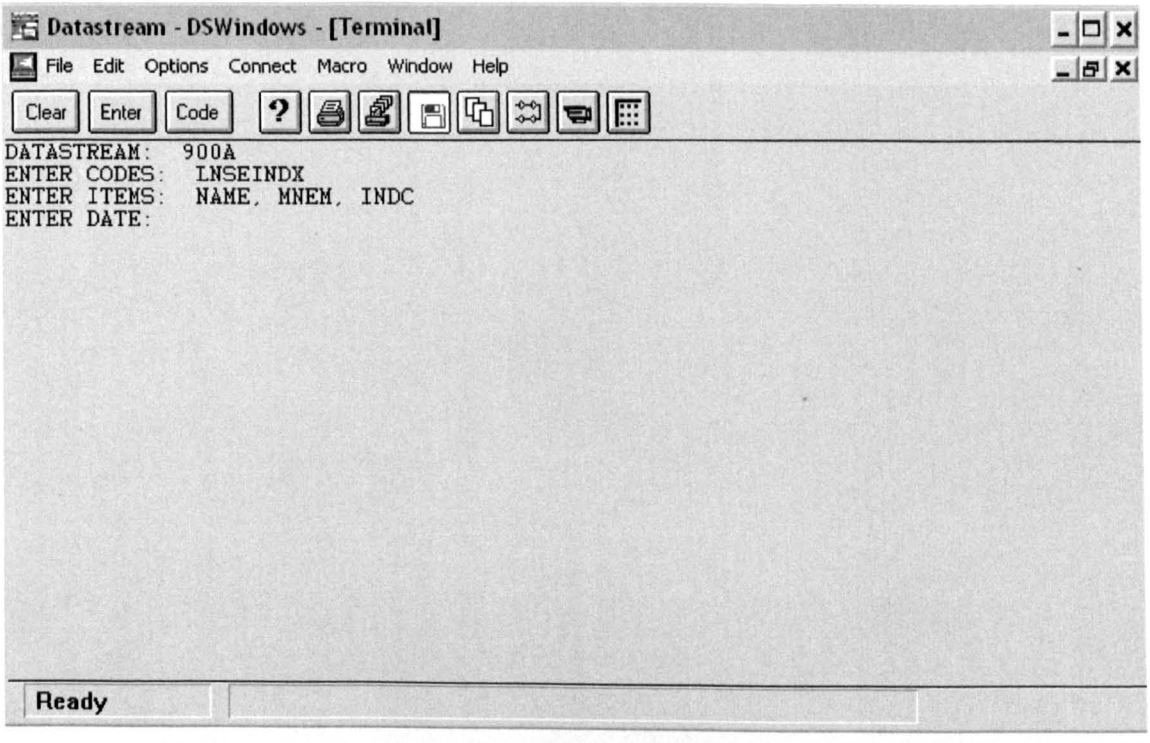
Go to main menu, File, Capture to Plain Text, give name and location for the file to save.



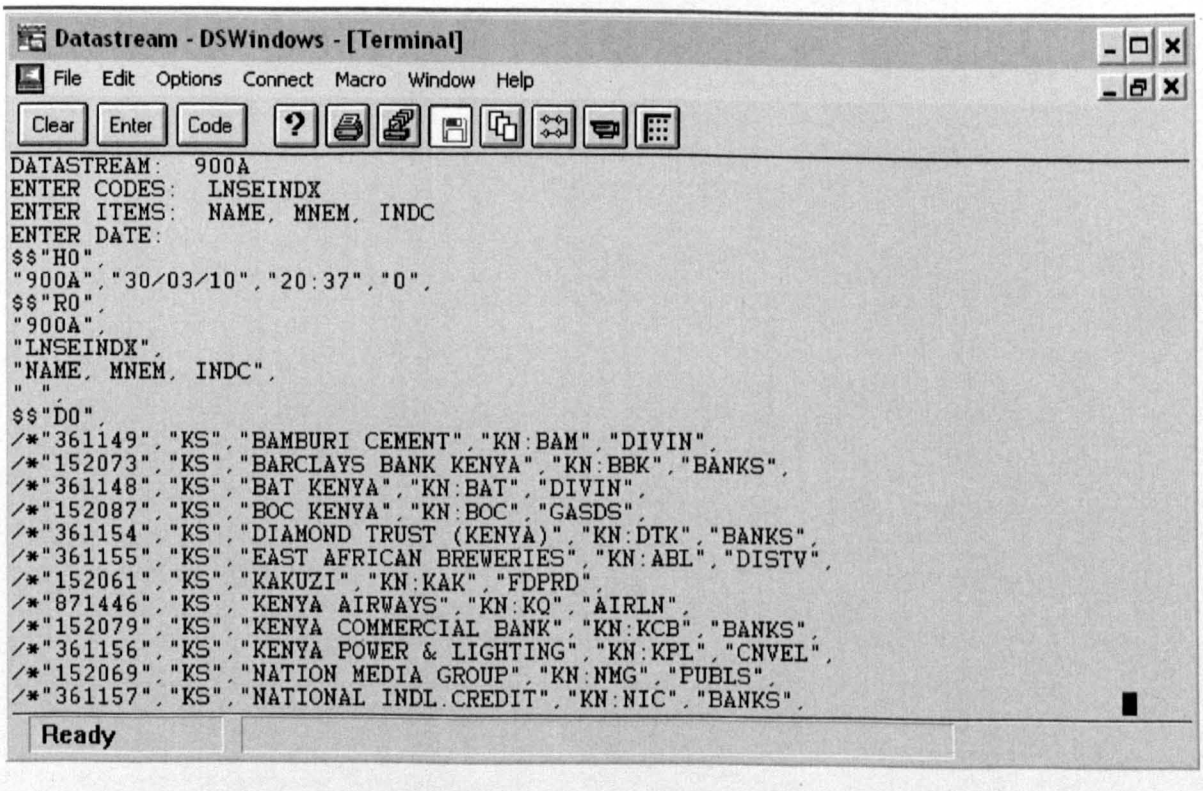
Say the location given is F drive and file name is Kenya. Save the file in txt format.



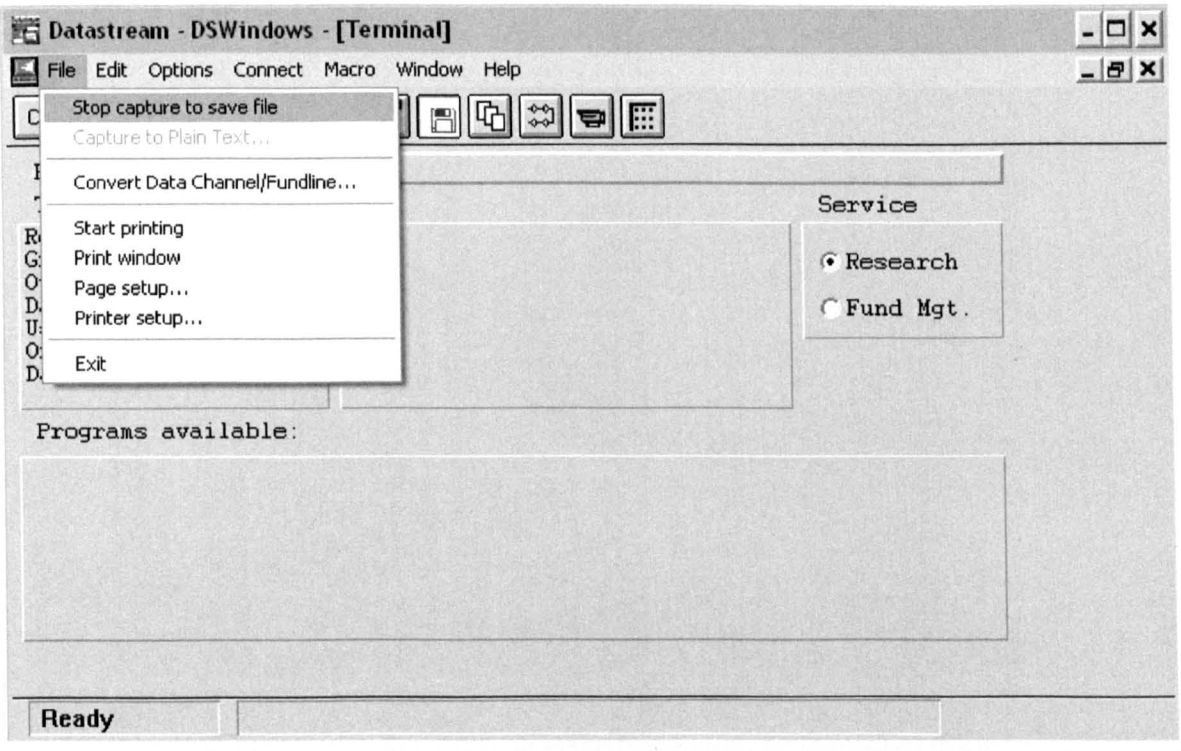
Now at the Datastream prompt type 900A and press Enter. Paste the copied Mnemonic (here LNSEINDX) in the Enter Codes section. Enter Items: NAME, MNEM, INDC and hit enter. Leave the date field empty and hit Enter. It can be seen in the screen next.



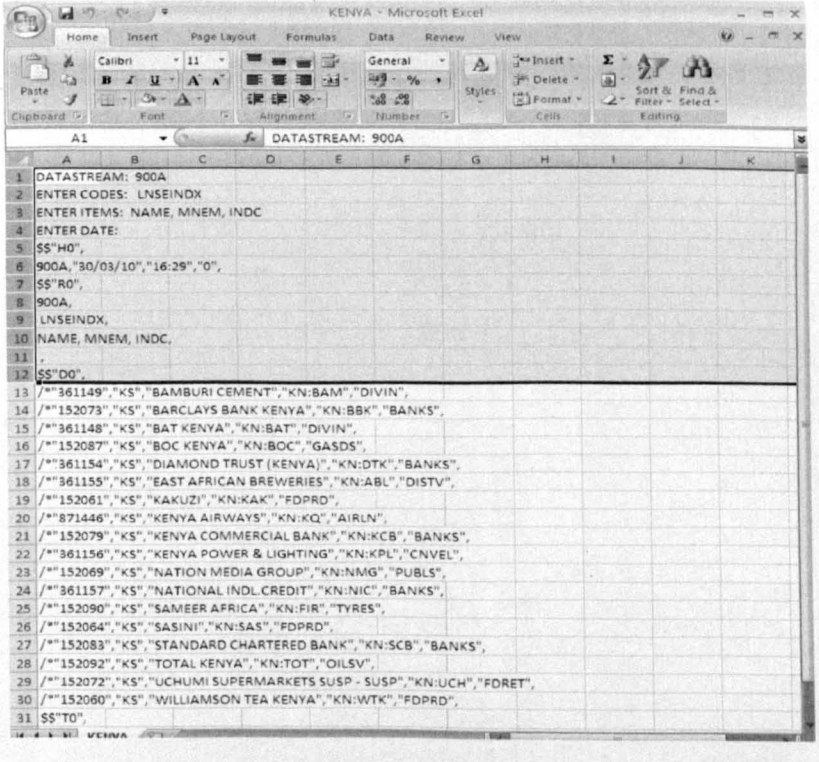
The next screen will appear as follow.



Hit Enter again and again until the main window appears. Go to File Stop Capture to save file as shown in the screen next.



The file is now available in the saved location (F drive named Kenya in this illustration). Open the file in Excel format. Delete all the rows that are not needed (those highlighted as shown below)



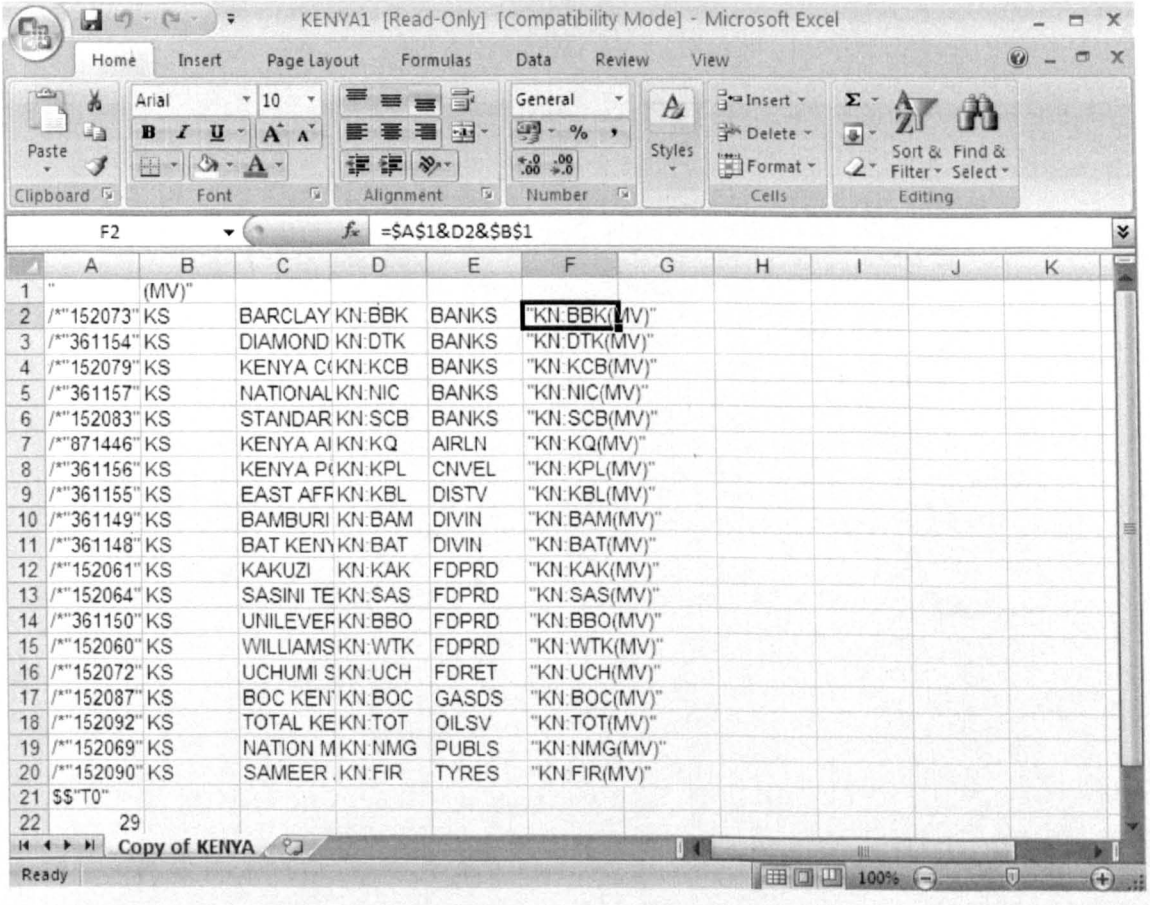
Go to Data – Text to Column and press next and choose comma, then finish. Now sort, based on column E, and keep Banks on the top using cut, and then insert copied cell. Insert a row on the top and,

First column keep – "

Second Column – (MV)"

Go to column F second row and type A1&D2&B1. This can be seen in the screen next.
(The idea is to get the mnemonic inside the inverted comma with MV inside brackets in the end)

Now copy and paste the result of the cell F2 for all rows

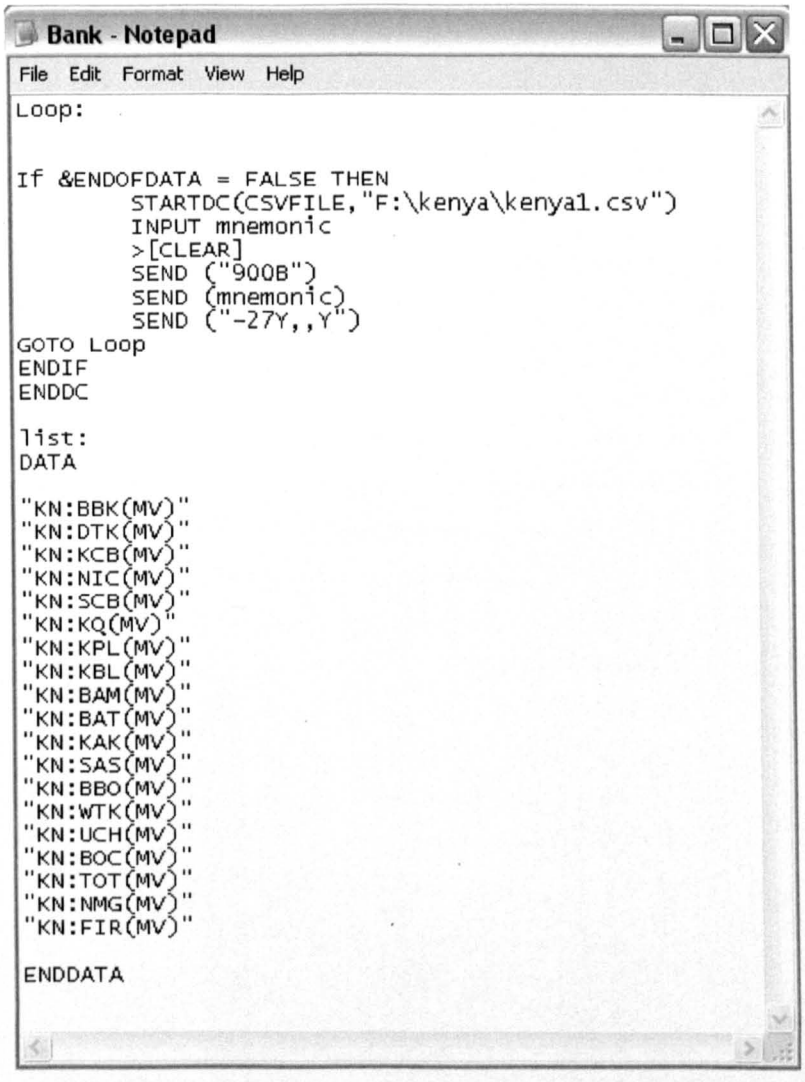


	A	B	C	D	E	F	G	H	I	J	K
1	"	(MV)"									
2	/*"152073"	KS	BARCLAY	KN:BBK	BANKS	"KN:BBK(MV)"					
3	/*"361154"	KS	DIAMOND	KN:DTK	BANKS	"KN:DTK(MV)"					
4	/*"152079"	KS	KENYA C(	KN:KCB	BANKS	"KN:KCB(MV)"					
5	/*"361157"	KS	NATIONAL	KN:NIC	BANKS	"KN:NIC(MV)"					
6	/*"152083"	KS	STANDAR	KN:SCB	BANKS	"KN:SCB(MV)"					
7	/*"871446"	KS	KENYA AI	KN:KQ	AIRLN	"KN:KQ(MV)"					
8	/*"361156"	KS	KENYA P(	KN:KPL	CNVEL	"KN:KPL(MV)"					
9	/*"361155"	KS	EAST AFR	KN:KBL	DISTV	"KN:KBL(MV)"					
10	/*"361149"	KS	BAMBURI	KN:BAM	DIVIN	"KN:BAM(MV)"					
11	/*"361148"	KS	BAT KEN\	KN:BAT	DIVIN	"KN:BAT(MV)"					
12	/*"152061"	KS	KAKUZI	KN:KAK	FDPRD	"KN:KAK(MV)"					
13	/*"152064"	KS	SASINI TE	KN:SAS	FDPRD	"KN:SAS(MV)"					
14	/*"361150"	KS	UNILEVER	KN:BBO	FDPRD	"KN:BBO(MV)"					
15	/*"152060"	KS	WILLIAMS	KN:WTK	FDPRD	"KN:WTK(MV)"					
16	/*"152072"	KS	UCHUMI S	KN:UCH	FDRET	"KN:UCH(MV)"					
17	/*"152087"	KS	BOC KEN'	KN:BOC	GASDS	"KN:BOC(MV)"					
18	/*"152092"	KS	TOTAL KE	KN:TOT	OILSV	"KN:TOT(MV)"					
19	/*"152069"	KS	NATION M	KN:NMG	PUBLS	"KN:NMG(MV)"					
20	/*"152090"	KS	SAMEER .	KN:FIR	TYRES	"KN:FIR(MV)"					
21	$$"T0"										
22	29										

A 7.2.2
In the column F above, all the mnemonics needed are available. To download the data using individual mnemonic is time consuming hence a macro file can be made. Assuming a folder has been created in F drive called Kenya, the file that is made in text format should have contents as shown inside the box next.

```
Loop:

If &ENDOFDATA = FALSE THEN
        STARTDC(CSVFILE,"F:\kenya\kenya1.csv")
    INPUT mnemonic
        >[CLEAR]
        SEND ("900B")
        SEND (mnemonic)
        SEND ("-27Y,,Y")
GOTO Loop
ENDIF
ENDDC

list:
DATA

"KN:BBK(MV)"
"KN:DTK(MV)"
"KN:KCB(MV)"
"KN:NIC(MV)"
"KN:SCB(MV)"
"KN:KQ(MV)"
"KN:KPL(MV)"
"KN:KBL(MV)"
"KN:BAM(MV)"
"KN:BAT(MV)"
"KN:KAK(MV)"
"KN:SAS(MV)"
"KN:BBO(MV)"
"KN:WTK(MV)"
"KN:UCH(MV)"
"KN:BOC(MV)"
"KN:TOT(MV)"
"KN:NMG(MV)"
"KN:FIR(MV)"

ENDDATA
```

In the notepad, it will appear as shown next.



The file with the market capitalization for banks and companies other than banks is then available in the F drive named Kenya1.csv. With some manipulation the data can be separated for banks and companies other than banks.

Table 7 A.3 Year of Establishment and Market Capitalisation of Exchanges around the world

Exchange	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average	Estb.
NYSE Euronext (US)	3,484.3	3,798.2	4,213.0	4,147.9	5,654.8	6,842.0	8,879.6	10,277.9	11,437.6	11,534.6	11,026.6	9,015.3	11,329.0	12,707.6	13,632.3	15,421.2	15,650.8	9,208.9	9,347.9	1792
Tokyo SE	3,117.3	2,318.9	2,906.3	3,592.2	3,545.3	3,011.2	2,160.6	2,439.5	4,463.3	3,157.2	2,264.5	2,069.3	2,953.1	3,557.7	4,572.9	4,614.1	4,330.9	3,115.8	3,232.8	1878
NASDAQ OMX	490.7	618.8	791.7	793.7	1,159.9	1,511.8	1,726.4	2,243.7	5,204.6	3,597.1	2,739.7	1,994.5	2,844.2	3,532.9	3,604.0	3,865.0	4,013.7	2,249.0	2,387.9	1971
London SE	986.1	928.4	1,150.6	1,145.3	1,346.6	1,642.6	1,996.2	2,372.7	2,855.4	2,612.2	2,164.7	1,856.2	2,460.1	2,865.2	3,058.2	3,794.3	3,851.7	1,868.2	2,164.1	1801
NYSE Euronext (Europe)	NA	NA	NA	761.0	906.5	1,105.7	1,322.7	1,903.3	2,444.3	2,271.7	1,889.5	1,538.7	2,076.4	2,441.3	2,706.8	3,712.7	4,222.7	2,101.7	2,093.7	1602
Shanghai SE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	306.4	360.1	314.3	286.2	917.5	3,694.3	1,425.4	1,043.5	1990
Deutsche Börse	392.5	346.9	460.8	499.3	577.4	664.9	825.2	1,086.7	1,432.2	1,270.2	1,071.7	686.0	1,079.0	1,194.5	1,221.1	1,637.6	2,105.2	1,110.6	981.2	1820
NASDAQ OMX Nordic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	728.8	802.6	1,122.7	1,242.6	563.1	891.9	1971
TSX Group	265.7	241.9	326.5	315.1	366.3	487.0	567.6	543.4	789.2	766.2	611.5	570.2	888.7	1,177.5	1,482.2	1,700.7	2,186.6	1,033.4	795.5	1861
Hong Kong Exchanges	121.9	172.0	385.0	269.5	303.7	449.2	413.3	343.6	609.1	623.4	506.1	463.1	714.6	861.5	1,055.0	1,715.0	2,654.4	1,328.8	721.6	1891
Bombay SE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	130.4	278.7	386.3	553.1	818.9	1,819.1	647.2	661.9	1875
SIX Swiss Exchange	173.8	189.1	270.9	284.7	398.1	400.3	575.3	701.6	693.1	792.3	625.9	547.0	727.1	826.0	935.4	1,212.3	1,271.0	880.3	639.1	1993
National Stock Exchange India	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	112.5	252.9	363.3	516.0	774.1	1,660.1	600.3	611.3	1992
BME Spanish Exchanges	127.3	98.8	118.9	123.6	150.9	241.0	290.4	399.8	431.6	504.2	468.2	461.6	726.2	940.7	959.9	1,322.9	1,781.1	948.4	560.9	1831
Borsa Italiana	158.8	123.7	145.3	186.0	209.5	256.6	344.7	566.0	728.2	768.4	527.5	477.1	614.8	789.6	798.1	1,026.5	1,072.5	522.1	517.5	1997
Australian SE	142.4	133.6	202.0	216.8	243.5	311.9	295.8	328.9	427.7	372.8	375.6	380.1	585.4	776.4	804.0	1,095.9	1,298.3	683.9	481.9	1987
MICEX	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	48.5	58.9	137.6	153.3	266.4	886.5	1,221.5	337.1	388.7	1992
Taiwan SE Corp.	123.5	100.2	193.3	247.3	187.2	273.8	287.8	260.5	376.5	247.6	292.9	261.3	379.1	441.4	476.0	594.7	663.7	356.7	320.2	1961
Korea Exchange	96.5	107.7	139.6	191.8	182.0	139.1	41.9	114.6	306.1	148.4	194.5	216.1	298.2	389.5	718.0	834.4	1,122.6	470.8	317.3	1956
BM&FBOVESPA	32.2	45.4	96.8	189.3	147.6	216.9	255.5	160.9	228.0	226.2	186.2	121.6	226.4	330.3	474.6	710.2	1,369.7	592.0	311.7	2008
Johannesburg SE	168.0	148.7	215.9	240.0	277.1	239.6	211.6	150.7	180.5	131.3	84.3	116.5	260.7	442.5	549.3	711.2	828.2	482.7	302.2	1887
Saudi Stock Market - Tadawul	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	73.2	74.9	157.3	306.2	646.1	326.9	518.9	246.3	293.7	2007
Shenzhen SE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	156.6	152.9	133.4	115.7	227.9	784.5	353.4	274.9	1990
OMX Stockholm SE	97.1	78.1	107.0	130.6	172.6	240.4	264.7	278.7	373.3	328.3	236.5	179.1	293.0	NA	NA	NA	NA	NA	213.8	1863
Osaka SE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	192.0	183.7	212.1	147.4	183.8	1878
Singapore Exchange	47.6	48.9	135.1	136.3	151.0	153.1	106.3	96.5	198.0	155.1	117.3	101.6	148.5	217.6	257.3	384.3	539.2	265.0	181.0	1999
Mexican Exchange	102.8	138.7	200.9	130.2	90.7	106.8	156.6	91.7	154.0	125.2	126.3	103.9	122.5	171.9	239.1	348.3	397.7	234.1	169.0	1894
Bursa Malaysia	56.7	91.5	219.8	190.2	213.8	306.2	93.2	95.6	139.9	113.2	119.0	122.9	161.0	181.6	180.5	235.6	325.3	189.2	168.6	1960
American SE	124.5	88.8	105.1	86.0	103.1	97.9	124.6	126.3	90.7	82.7	60.2	45.7	92.9	83.0	201.4	282.8	257.8	132.4	121.4	1921

Continued

Exchange	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average	Estb.
OMX Helsinki SE	14.2	12.2	23.6	38.3	44.1	62.6	73.3	153.8	349.4	293.6	190.5	138.8	170.3	NA	NA	NA	NA	NA	120.4	1912
Jasdaq	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	112.2	120.7	93.2	108.7	1963
Oslo Børs	22.0	17.8	27.5	36.5	44.6	56.9	66.5	46.3	63.7	65.3	69.4	68.1	95.9	141.6	191.0	279.9	353.4	145.9	99.6	1819
Thailand SE	37.5	57.3	127.5	125.6	135.8	95.9	22.8	34.1	57.2	29.2	36.0	45.4	119.0	115.4	123.9	140.2	197.1	103.1	89.1	1975
Athens Exchange	12.9	10.7	13.6	12.8	16.5	23.6	33.8	80.1	196.8	107.5	83.5	66.0	103.8	121.9	145.1	208.3	265.0	90.2	88.5	1876
Egyptian Exchange	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	38.5	79.5	93.5	139.3	86.0	87.4	1883
Santiago SE	28.0	29.6	44.9	68.2	72.9	66.0	72.0	51.9	68.2	60.4	56.3	49.8	87.5	116.9	136.5	174.4	212.9	131.8	84.9	1893
Irish SE	NA	NA	NA	NA	25.8	34.7	49.4	66.6	68.8	81.9	75.3	59.9	85.1	114.1	114.1	163.3	143.9	49.5	80.9	1973
Istanbul SE	15.5	9.8	36.6	21.6	20.8	30.3	61.1	33.6	112.7	69.7	47.1	34.2	68.4	98.3	161.5	162.4	286.6	118.3	77.1	1985
OMX Copenhagen SE	44.8	30.1	41.7	48.8	57.7	71.1	93.8	98.9	105.3	107.7	85.1	76.7	118.2	NA	NA	NA	NA	NA	75.4	1919
Tel Aviv SE	13.2	27.9	47.5	31.1	35.1	34.5	44.4	39.2	63.5	65.3	58.2	40.8	68.9	90.2	122.6	161.7	235.1	107.7	71.5	1953
Wiener Börse	26.0	21.7	28.3	30.8	32.5	33.6	37.3	35.5	33.0	29.9	25.2	33.6	56.5	87.8	126.3	199.1	236.4	76.3	63.9	1771
Indonesia SE	6.8	12.0	32.8	47.2	66.5	90.9	29.1	22.1	64.0	26.8	23.0	30.1	54.7	73.3	81.4	138.9	211.7	98.8	61.7	1912
Colombia SE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14.3	25.2	50.5	56.2	102.0	87.7	56.0	2001
Warsaw SE	0.1	0.2	2.7	3.1	4.6	8.4	12.1	20.5	29.6	31.4	26.2	28.8	37.4	71.5	93.6	151.8	211.6	90.8	45.8	1991
Luxembourg SE	11.3	11.9	19.3	28.5	30.4	32.4	33.9	37.9	35.9	34.0	23.8	24.6	37.3	50.1	51.2	79.5	166.1	66.6	43.1	1927
Philippine SE	10.8	15.3	40.1	56.6	58.8	80.5	31.2	34.9	41.5	25.3	20.6	18.2	23.2	28.6	39.8	68.3	102.9	52.0	41.6	1992
Buenos Aires SE	18.6	18.6	44.1	36.9	37.8	44.7	59.3	45.3	55.8	45.8	33.4	16.5	35.0	40.6	47.6	51.2	57.1	39.9	40.5	1854
Amman SE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	18.4	37.6	29.7	41.2	35.9	32.6	1999
New Zealand Exchange	14.3	14.7	24.6	27.1	31.9	36.9	29.9	24.5	27.8	18.5	17.7	21.7	33.0	43.7	40.6	44.8	47.5	24.2	29.1	1974
Budapest SE	NA	NA	NA	NA	NA	NA	NA	NA	NA	11.9	10.4	13.0	18.9	28.3	32.6	41.9	46.2	18.5	24.6	1864
Tehran SE	NA	1.3	1.1	2.4	6.5	12.9	11.5	11.1	17.2	5.9	7.4	11.8	27.5	42.6	36.4	36.3	43.9	48.7	19.1	1967
Lima SE	1.1	2.6	5.1	8.2	10.9	12.6	15.5	9.9	12.1	9.7	9.8	11.4	14.1	18.0	24.1	40.0	69.4	37.9	17.4	1860
Cyprus SE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.9	6.6	16.2	29.5	8.0	13.0	1996
Ljubljana SE	NA	NA	NA	0.2	0.3	0.9	1.9	3.0	2.9	3.1	3.5	5.6	7.1	9.7	7.9	15.2	28.8	11.8	6.8	1989
Mauritius SE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1	2.3	5.0	7.9	4.7	4.4	1989
Colombo SE	1.9	1.4	2.5	2.9	2.0	1.9	2.1	1.7	1.6	1.1	1.3	1.7	2.7	3.7	5.7	7.8	7.6	4.3	3.0	1985
Bermuda SE	NA	NA	NA	NA	NA	NA	NA	1.5	1.3	2.2	2.5	2.2	2.9	1.9	2.1	2.7	2.7	1.9	2.2	1971
Malta SE	NA	NA	0.0	0.0	0.4	0.4	0.4	0.8	3.9	2.0	1.4	1.4	1.8	2.8	4.1	4.5	5.6	3.6	2.1	1992

Note: Age of Exchange of the stock exchanges have been obtained from the history/ about us section of the exchange website.

Table 7 A.4 Results of Johansen Co-integration Test

Country	Test Type and detail	P-values
Bangladesh	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None	0.00
	At most 1	0.34
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.00
	At most 1	0.34
Kenya	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None *	0.08
	At most 1	0.77
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None *	0.04
	At most 1	0.77
Hongkong	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None	0.35
	At most 1	0.65
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.31
	At most 1	0.65
Indonesia	No. of CE(s)	
	None	0.17
	At most 1	0.56
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.15
	At most 1	0.56
Korea	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None	0.16
	At most 1	0.69
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.11
	At most 1	0.69
Malaysia	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None	0.11
	At most 1	0.98
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.03
	At most 1	0.98
Pakistan	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None *	0.28
	At most 1	0.54
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None *	0.28
	At most 1	0.54
Singapore	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None	0.82
	At most 1	0.98
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.61
	At most 1	0.98
SriLanka	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None *	0.42
	At most 1	0.33
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None *	0.64
	At most 1	0.33
Thailand	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None *	0.09
	At most 1	0.49
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None *	0.08
	At most 1	0.49

Table 7 A.5 Results of Johansen Co-integration Test: Nepal

Country	Test Type and detail	P-values
Nepal	Unrestricted Co-integration Rank Test (Trace)	
	No. of CE(s)	
	None	0.0671
	At most 1	0.6196
	Unrestricted Co-integration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None *	0.0409
	At most 1	0.6196

8. CHAPTER: FINANCE AND GROWTH: STYLISED FACTS ON THE ROLE OF INTERNAL, BANK AND EQUITY FINANCES IN DEVELOPING COUNTRIES

"Tell me what you see"

- A song by the Beatles.

8.1 Introduction

"How do firms choose their capital structures?" .., the answer is, "We don't know"

- *Myers (1984, p.575)*

In the previous chapter, data on stock market capitalisation of major stock exchanges in various regions of the world were presented. An analysis of the data shows that the market is growing rapidly, but at a different degree of pace in different regions. On average, over the past decade, (between 1998 and 2007), the market grew more than 6 % in exchanges in the American region and 4.2 % in Europe. In the Asia-Pacific region, this growth is highest at nearly 18%. Over the decade, more new exchanges have been opened, including in the poor regions of the world (for example, Maldives 2002, Sierra Leone, 2009) and many new exchanges are in the pipeline (for example, Cambodia Stock Exchange[102]).

In the previous chapter, it was also noted that the size of market (measured by market capitalization) in rapidly growing economies such as Hong Kong, Korea, Malaysia, Singapore were very low for banks compared to non bank companies. In contrast, the size of banks in poor regions, such as Bangladesh and Kenya were substantially high.

The first paragraph above shows that stock markets are growing more rapidly in regions where growth is taking place faster. The second paragraph explains that when growth takes place, the structure of finance shifts from banks to markets. (This is in line with the findings, which show that at higher levels of stock market development, the contribution of bank's development

to long term growth, becomes less positive (Deidda and Fattouh, 2008, p. 31).

In this chapter, some interesting facts about the use of banks and market finances have been revealed. In addition, the chapter finds internal finance as a more popular form in finance, in a large sample of developing worlds. These facts on the composition of finance do not follow the recommendations of the empirical works.

The chapter is organized as follows. In the remaining section of 8.1, various facts related with internal, debt and equity sources of finances for a large number of developing countries have been discussed. Regarding debt and equity finance, this chapter finds the former more popular than the latter, although empirical literature recommends equity as a better option than debt. In section 8.1.2, attempts have been made to shed some light on this issue where facts related to the listing criteria of companies in exchange, the evolution of banks and exchange, and the role of banks in uplifting stock markets have been discussed. Section 8.2 presents the data and variables of the empirical investigation carried out by this chapter to test the relationship between internal, bank and equity finance upon economic growth. Section 8.3 is on methodology and results, and finally section 8.4 concludes. Review of some important literature has been made wherever applicable.

8.1.1 Sources of Finances in Developing Countries

Access to credit is very important for households, firms and governments. However, with different degrees, in particular among developing and emerging countries, access to credit is difficult, restricted and linked to

availability of collateral. These few, relatively simple statements are backed up by a recent survey carried out by the World Bank that can give interesting insights into this matter. (Enterprise Surveys of the World Bank provides the world's most comprehensive company-level data in emerging markets and developing economies[103].

First of all, internal finance, as predicted by numerous theories stemming from Corporate Finance (mainly Pecking Order theory), but usually overlooked by the empirical literature on finance and growth, as shown in Table 8.1, covers almost two thirds of the financial needs of the companies surveyed by the World Bank. [Note on Pecking order theory: the pecking order theory of capital structure says that when outside funds are necessary, firms prefer debt to equity. Equity is rarely issued because of lower information costs associated with debt issues (Myers, 1984, Shyam-Sunder and Myers 1999). Nevertheless, empirical literature on pecking order theory is mixed and inconclusive (Fama and French, 2002, Prasad et al., 2001). Some studies even oppose the theory (Brennan and Kraus, 1987, Vilasuso and Minkler, 2001). Hence, there is a need to test its application to see if the theory supports the link of financial development and economic growth; an area overlooked by the existing literature.]

Although the share of internal finance varies from 12.9% (Peru survey for 2002 that jumps to 47% in a more recent and larger survey) to 95% (Uzbekistan), it nonetheless seems to be quite stable across the entire sample of countries with a coefficient variation (i.e. the standard deviation

divided by the mean) of 0.24, the lowest of all other forms of financing. This shows that the degree of convergence is quite high.

At the other end of the spectrum, companies access capital through equity only in barely four cases out of 100 (3.7%), although the coefficient of variation at 1.98 is the highest in Table 1, which shows a relatively high degree of variation. Bank Finance accounts only for 15% of finance with a reasonably high level of convergence.

Table 8.1 Various sources of finance, percentage of finance and Coefficient of Variation

Type of finance	Average (%)	Coefficient of Variation
Internal finance	65.2	0.24
Bank finance	14.9	0.66
Informal	4.9	0.86
Leasing	2.9	1.49
State	1.1	1.41
Supplier Credit Finance	3.2	0.87
Credit Cards Finance	0.3	1.62
Equity	3.7	1.98
Others	3.3	1.49

Note: The mean and variation above have been calculated using the data from Enterprise Surveys, the World Bank.

To examine the pattern of financing in different countries, some facts on internal, equity and debt finances have been presented next.

8.1.1.1 Internal Finance

As shown in Table 8.2, the companies that rely most on internal sources are mainly located in the former Soviet Union countries and Sub-Saharan African countries.

8.1.1.2 Debt Finance

The high level of reliance on internal funding, and to a lesser extent to bank credit, should not be entirely surprising given the fact that borrowing from banks usually requires the availability of collateral assets.

Table 8.3 shows that on average the size of collateral is 135.7% of the loan size with a very low variation (coefficient of variation is 0.30). The other side of the coin is that 81% of loans require collateral (in this case there is even lower volatility of the figure). The Table shows the source of the collateral assets with land being the most important one. Also personal assets play an important role with very low variability among countries (coefficient of variation 0.53). Machinery (0.70) and intangibles also play an important role, but also a higher variability among countries (1.31).

Table 8.2 Countries with more than 70% funding from internal finance

#	Country	Internal Finance for Investment (%)	Bank Finance for Investment (%)	Equity Finance for Investment (%)
1	Uzbekistan	90.72	3.26	0.12
2	Angola	88.47	3.99	0
3	Azerbaijan	88.13	0.87	0.38
4	Niger	86.99	9.66	0
5	Egypt	86.15	6.93	3.78
6	Congo, D. Rep.	85.32	2.05	0.16
7	Guinea-Bissau	85.29	0	0
8	Tajikistan	85.15	0.77	0.35
9	Mali	84.75	11.68	0
10	Uruguay	82.48	7.47	0.2
11	Serbia	82.26	7.35	1.39
12	Russia	81.03	5.67	0.4
13	Syria	80.71	4.29	0
14	Namibia	79.44	15.49	0
15	Albania	78.27	11.47	0.16
16	Kyrgyz Republic	77.41	7.08	0.43
17	Mauritania	77.32	6.06	0
18	Kazakhstan	77.17	11.63	1.69
19	Benin	77.14	13.65	0.80
20	Botswana	77.14	11.64	0
21	Madagascar	76.29	11.84	2.04
22	Swaziland	75.84	8.72	0
23	Ukraine	75.75	6.96	4.39
24	Armenia	74.55	12.45	0.15
25	Algeria	74.25	16.28	0
26	Romania	73.31	11.81	0.57
27	Belarus	73.09	5.48	2.47
28	Burkina Faso	72.95	16.68	0
29	Uganda	71.41	13.54	1.96
30	Greece	71.32	13.32	6.09
31	Argentina	70.95	3.85	0.47
32	Moldova	70.55	13.70	0.32
33	Senegal	70.47	18.44	0

Source: Enterprise Surveys, the World Bank

Note: The percentage of internal, debt and equity finances is from the period 2002 – 2006. Where data were available for more than one year, average has been computed. The data is based on a sample of 94 countries (Appendix Table 8 A.1).

Table 8.3 Size of collateral and coefficient of variation

Detail on Collateral	Average	Coefficient of variation
Size of collateral (% of the loan amount)	135.7	0.30
Proportion of loans requiring a collateral of which:	81	0.14
Land	45.4	0.52
Personal assets	12.6	0.53
Machinery	15.7	0.70
Intangibles	9.6	1.31

Data Source: Enterprise Surveys, the World Bank

8.1.1.3 Equity Finance

Table 8.4 shows the list of countries with more than 2% in equity finance and the share of internal and bank finance in those countries.

Table 8.4 Countries with more than 2% funding from internal finance

#	Country	Equity Finance for Investment (%)	Internal Finance for Investment (%)	Bank Finance for Investment (%)
1	Cambodia	46.09	20.24	2.87
2	Vietnam	27.79	30.12	27.91
3	Peru	21.08	30.43	30.16
4	Latvia	16.85	46.45	14.89
5	Hungary	15.73	56.48	14.32
6	Turkey	15.71	68.80	5.29
7	Pakistan	14.75	58.12	6.49
8	Thailand	13.45	19.33	58.33
9	China	12.39	15.24	20.37
10	Germany	9.31	50.64	22.60
11	Slovakia	8.26	65.32	6.17
12	Korea	8.06	64.96	20.04
13	Mongolia	7.77	51.89	27.87
14	Czech Republic	6.90	54.23	8.46
15	Greece	6.09	71.32	13.32
16	Macedonia, FYR	5.91	67.20	9.19
17	Croatia	5.06	51.68	22.69
18	Tanzania	4.76	67.95	16.34
19	Ukraine	4.39	75.75	6.96
20	Philippines	4.34	57.96	13.29
21	Brazil	4.29	56.32	14.30
22	Cameroon	3.99	67.88	12.39
23	Zambia	3.96	57.74	17.47
24	Egypt	3.78	86.15	6.93
25	Ecuador	3.29	46.89	27.42
26	Sri Lanka	2.83	50.02	15.30
27	Malawi	2.80	60.76	22.83
28	Eritrea	2.67	63.08	30.50
29	Belarus	2.47	73.09	5.48
30	Lebanon	2.39	47.92	33.75
31	Jamaica	2.22	39.63	28.70
32	Guyana	2.21	68.06	25.39
33	Honduras	2.20	52.26	27.88
34	Madagascar	2.04	76.29	11.84

Data Source: Enterprise Surveys, the World Bank

Note: Data on Table 8.4 is for years between 2002 – 2006. Where data were available for more than one years, average has been taken. The data is based on a sample of 94 countries. Full set of data is made available in Appendix Table 8 A.1.

The summary statistics for the data on internal, bank and equity finances are presented in a pie chart and Table 8.5 (Based on all 94 countries of Appendix Table 8 A.1) next.

Figure 8.1 Internal, Debt and Equity Finances in Developing Countries

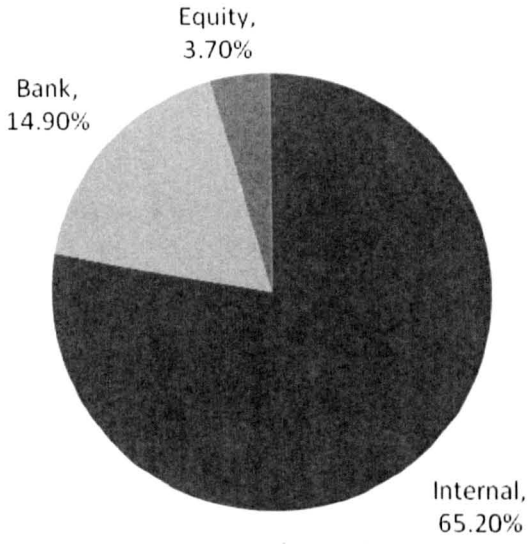


Table 8.5 Summary statistics for internal, bank and equity finance

Descriptive statistics	Internal finance	Bank finance	Equity finance
Mean	65.20	14.90	3.70
Standard Deviation	15.53	10.09	7.99
Median	66.26	13.37	0.93
Mode	77.14	16.34	0
Max	95.21	58.33	46.09
Min	12.89	0	0

It can be seen from the above that in terms of percentage of finance in total financing, internal finance is more popular compared to debt finance, with equity finance being the least popular financing option.

8.1.2 Bank or Equity Finances?: Literature and Reality

As discussed in chapter two of this thesis, the empirical literature on the relationship between finance and growth emphasises stock markets as a better option over banks. Many recent works concluded positive effects of stock market development upon economic growth, but a negative of banks

development (Beck and Levine, 2004, Saci et al. 2009, Shen and Lee, 2006). On this note, Atje and Jovanovic (1993, p. 636) have expressed concern over the slow pace of stock market development:

"We have found a large effect of stock markets on subsequent development. We have failed to find a similar effect of bank lending. That this differential effect should exist is in itself surprising. But if it is true, then it is even more surprising that more countries are not developing their stock markets as quickly as they can as a means of speeding up their economic development"

One of the possible constraints to the slow pace of stock market development, this chapter finds, is the complex criteria of getting listed in the stock exchanges. This is explained next.

In Table 8.6 some selected requirements for listing for a sample of exchanges have been presented. In the Table, some of the exchanges are developed (For example, exchanges in Australia and United Kingdom - Demirgüç-Kunt and Levine, 1996) while others are systematically more developed (For example exchanges in Hong Kong, Korea, Malaysia, Singapore and Thailand, Demirgüç-Kunt and Levine, 1996).

Table 8.6 Rules of listing in exchange in some developed and emerging economies

Stock Exchange, Country	Capital related requirement	Financial/ Audit requirement	Public shareholding requirement
Australian securities exchange, Australia (ASE)	a) At least 500 holders each having securities with a value of at least $ 2000 excluding restricted securities. Or b) 400 holders each having securities with a value of at least $ 2000 excluding restricted securities	Aggregate profit from continuing operation for the last 3 years must be minimum $ 1 million. Or, Tangible assets of at least $ 2 million or a market capitalisation of at least $ 10 million	If capital related requirement is b) then 25% shareholding by not related parties of the entity
Bursa Malaysia Securities Berhad, Malaysia (BM)	For listing on the main board must have a minimum issued and paid up capital of RM 60 million (Second board RM 40 million)	The audited profit and dividend record for the past 5 years and the latest interim results	An applicant must have at least 25% of the total number of shares for which listing is sought in the hands of a minimum number of 1,000 public shareholders holding not less than 100 shares each
Hong Kong Stock Exchange, Hong Kong (HKEX)	At least 1000 shareholders at the time of listing. A market capitalisation of at least HK$4 trillion at the time of listing	Revenue of at least HK $500 Million for the most recent audited financial year. Management continuity for at least the three preceding financial years	At least 25% of the issuer's total issued share capital must at all times be held by the public
Indonesia Stock Exchange, Indonesia (IDX)	Based on the last Audited Financial Report, the company must have at least an amount of Rupiah one hundred billion as Net Tangible Asset. The number of shareholders is at least 1,000 shareholders, who already have accounts in one of the Exchange Members	The company has been running its operational activities in the same core business for at least 36 months in sequence. Have audited the last three years Financial Reports, and have received Proper Opinion Without Exception for the last 2 years audited financial report and Interim Audited Income Statement (if exists)	The amount of shares owned by the minority shareholders after public offering is at least 100,000,000 (a hundred million) shares or 35% of paid up capital (depends on which one is smaller)
Korean Exchange, Korea (KRX)	The equity capital shall be at least KRW 10 billion or the base market value shall be at least KRW 20 billion (KRW 30 billion, in case of Kosdaq-listed company). No of shares to be listed at least 1 million	Average sales for recent 3 years at least KRW 20 billion or and the sales amount of the latest fiscal year shall be no less than KRW 30 billion. Income:- The income of the latest fiscal year shall be at least KRW 2.5 billion and the sum of the incomes of recent 3 fiscal years shall be higher than KRW 5 billion.	The total number of shares and the number of voting shares owned by the minority shareholders shall be at least 25/100 of the total issued shares and total voting shares, respectively.
London Stock Exchange, U.K. (LSE)	At least £ 700,000 for shares at the time of listing	At least 75% of the entity's business must be supported by a revenue earning record for the three years period	At least 25% of shares should be in public hands
Singapore Exchange, Singapore (SGX)	Market capitalisation of minimum S $ 80 million at the time of listing	Cumulative pre-tax profit of at least S$7.5 million over the last 3 consecutive years, with a pre-tax profit of at least S$1 million in each of those 3 years, or Cumulative pre-tax profit of at least S$10 million for the latest 1 or 2 year	The public float must be at least 25% if market capitalisation is less than $ 300 million, 20% if between $ 300 to $ 400, 15% if between $ 400 to $ 1 billion or 12 % if over $ 1 billion (No of shareholders in all case at least 1,000)
The Stock Exchange of Thailand, Thailand (SET)	Has paid-up capital only in respect of ordinary shares in an amount not less than 300 million baht. Has not less than 1,000 small ordinary shareholders	There shall be net profit during the latest 2 or 3 years prior to the submission of an application in aggregate not less than 50 million baht, provided that the net profit in the last year prior to the submission of an application must be at least 30 million baht and that there must be an accumulated net profit in the period to the submission of an application	The small ordinary shareholders under (a) must hold shares in aggregate not less than 25 per cent of the paid-up capital, or not less than 20 percent of the paid-up capital in the event that the paid-up capital of the applicant in respect only of its ordinary shares is not less than 3,000 million Baht, and each of those shareholders must hold shares not less than 1 trading unit as prescribed by the Exchange for the trading of the ordinary shares.

Source: Compiled from the information on listing criteria available inside the websites of the exchanges.

In addition, it is found that the listing criteria of stock exchanges are equally demanding in the exchanges of underdeveloped economies. The conditions of capital adequacy, financial performance, patterns of public shareholding

may only support very large companies for listing in exchange. Appendix Table 8 A.2 provides rules for listing related with capital, financial performance and public shareholding requirements for few exchanges in some less developed and low income countries.

On the findings of the literature that stock markets perform better than the banks, the chapter now explores history by studying the evolution of these two institutions. Going back to history is in line with the recommendation of some works, such as Levine (1997), who highlighted the need to understand the evolution of the financial system. According to Levine (1997, p. 720) *"we need theories of the simultaneous emergence of stock markets and banks and we need empirical proxies of the functions performed by the different components of financial systems"*.

Table 8.7 compares establishment dates of oldest banks and exchanges in American, Asian, the Pacific and European regions.

Table 8.7 Year of establishment: oldest bank and stock exchanges in America, Asia Pacific and Europe

Region	Year of Establishment of first stock exchange	Year of establishment of first bank
America	1792	Much before 1792[104] As an evidence, the First Bank's charter was drafted in 1791 by the Congress and signed by George Washington. So commercial banking activities must have started much earlier than this period.
Asia Pacific	1875	Bank of Bombay 1720[105].
Europe	1585	Bank of Venice was established in 12th Century (Hildreth, 1837).

Note: Name and year of establishments of major stock exchanges in America, Asia Pacific and Europe are provided in Appendix Table 8 A.3, 8 A.4 and 8 A.5 respectively.

It can be learnt from the above that commercial banks are usually set up (well) before stock markets. As discussed in the third chapter of this thesis, it is also true for least developed countries. Exchanges (where they exist i.e. in 18 countries) were established more than 5 decades after (55 years: 1994 – 1940) the establishment of commercial banks. Moreover, exchanges are dependent on banks in many respects. Firstly, banks can play an important role in the actual setting up and/or running of stock exchanges. For example, banks can own brokerage houses, shares of banks themselves are floated in stock markets (as parts of initial placement offers IPOs, further issuance or privatisation programmes), and banks may act as brokers or financial investment advisors. In addition, banks might be instrumental in setting up stock markets in a number of other ways (providing initial capital, management and operators). Banks could establish and/ or own their stock markets. This further justifies why banks were established prior to exchanges all over the world. Table 8.8 shows some examples of countries in which exchanges were set up by banks.

Table 8.8 Countries in which banks played a role to open stock exchange and date of establishment of exchange

Country	Date of Establishment	Founder
Croatia	1991	25 banks and insurance companies.
Estonia	1996	Founded by collection of commercial banks, brokerage firms and state actors.
Fiji	1994	Stock exchange established as a wholly owned subsidiary of Fiji Development Bank.
Iceland	1996	Joint venture of several banks and brokerage firms, at the initiative of Central Bank.
Jamaica	1968	Privately founded by four founding members in 1968 with involvement by Bank of Jamaica.
Korea	1956	Trading began March 1956 with 12 issues; established jointly by banks, insurance and securities companies under government sponsorship.
Nicaragua	1994	Government, banks and private companies met starting in 1990 to discuss forming stock market.
Taiwan	1961	Established late 1961 with capital from government operated and privately owned banks and enterprises.

From the various discussions made above, it can be seen that internal finance is the most popular form of finance in developing countries. Among debt and equity finances, although empirical literature suggests equity as a better option for growth, debt financing is more commonly used. Some possible reasons, as explained above, are the complex rules used, such as huge capital requirement and the time devoted (e.g. 3 years of financial statements) to listing, which is possibly not feasible for smaller or even medium sized firms. In addition, banks are generally established before exchange, and they support exchange in many ways. Besides, history of exchange is not very old in developing countries. For these reasons bank finance may have remained more popular than equity finance in developing countries.

Nevertheless, the importance of the establishment of exchange for growth cannot be underestimated and is equally important even in the poorest regions of the world (Minier, 2009). An exchange complements the financial systems in many respects (see Levine, 2005 for a survey). In addition, equity also has advantages over other sources of financing. For example, companies in countries with developed equity markets are less dependent on bank financing, creating a less risky financial structure in the event of a crisis (Claessens et al., 2006).

In order to investigate the relationship between different sources of finance and economic growth the chapter now carries out an empirical test.

8.2 Data and Variables

Data on share of internal, debt and equity finances (in percent) are used as independent variables. In the literature on finance and growth, this thesis could not come across any work that has used these variables. The dependent variable is the GDP per capita growth of next year. In order to select the control variables the variables Initial GDP per capita, Education, Government Expenditure, Capital Formation, Inflation and Dummy Legal Origin Variables from La Porta et al. (2008) have been used.

The sources of these data are available in Appendix Table 8 A.6.

A complete set of data for all the variables was available for 69 countries (out of 94 available in Appendix Table A 8.1), which also included large and rapidly growing economies, namely India and China. The name list of 69 countries is available in Appendix Table 8 A.7. In the empirical investigation,

experiments were made including and excluding India and China but the regression output remained the same. In order to have relatively similar countries, India and China have been excluded in the empirical analysis, which makes the total number of countries 67. The empirical part is now discussed next.

8.3 The Estimation

Given the nature of the World Bank Enterprise Survey database, only a pure cross-sectional analysis could be carried out.

The normal growth regression equation is therefore,

$$GROWTH_i = \beta_1 + \beta_2 INTERNAL_i + \beta_3 DEBT_i + \beta_4 EQUITY_i + \beta_5 CONTROL_i + \varepsilon_i$$

...8.1

Where,

GROWTH	:	Real GDP per capita growth
DEBT	:	Debt Finance
INTERNAL	:	Internal Finance
EQUITY	:	Equity Finance
CONTROL	:	Initial GDP per capita, Education, Government consumption, Capital formation, Inflation and Dummy legal origin variables
i	:	represents country

The data for the variables are converted into natural logarithm to avoid a potential nonlinear relationship between economic growth and the assortment of economic indicators (Beck et al. 2000c, p.44).

The dependent variable is the GDP per capita growth of the next year. So the finance (INTERNAL, BANK, and EQUITY) should explain the rate of growth

of the economy one period later. The choice of one year ahead was basically dictated by the availability of data. Therefore, caution should be exercised when interpreting the results.

The results of the estimation of the model are reported on Table 8.9.

The results show that many of the control variables behave in the expected manner, although some of them are not significant. GOVERNMENT CONSUMPTION, CAPITAL FORMATION and EDUCATION have expected signs and are significant. TRADE OPENNESS, INFLATION and INITIAL Income have expected signs but are insignificant.

Based on the results discussed in chapter six, it was expected that bank finance will have a negative sign and will be significant, which has proved to be true. However, the expectation that equity finance will be positive and significant (based on the findings of the literature) has been rejected.

In the introductory part of this chapter, the data on various countries revealed that the percentage of internal finance in total finance is significantly higher as compared to debt and equity finance. So, possibly internal finance should maintain a positive relationship with economic growth. This however is not supported by the results.

Table 8.9 Estimation Result

Dependent Variable: Growth of GDP per capital Method: Pooled Least Squares Included observations : 87	
Constant	-0.146044 *0.0399*
Debt finance	-0.183701 *0.0131*
Internal finance	-0.026433 *0.7405*
Equity finance	-0.063566 *0.4638*
Government consumption (government final consumption expenditure -% of GDP)	-0.040167 *0.0003*
Capital formation (gross capital formation - % of GDP)	0.057505 *0.049*
Trade openness (trade - % of GDP)	0.002823 *0.7665*
Inflation (inflation, consumer prices - annual %)	-0.190905 *0.7951*
Education (secondary school enrollment - %)	0.047207 *0.0001*
Income (Initial GDP per capita)	-0.006898 *0.1104*
R-square	0.449675
Countries	

Notes:
p-values are reported in Italics

The results, as can be seen above, contradict the understanding developed in chapter six for internal and equity financing (Internal and Equity should have a positive contribution).

To further check the robustness to the results, the sample is split into two parts (below and under the median income per capita set at US Dollars 1,587) by including an interaction term. The inclusion of the interaction terms will enable us to confirm whether the relationship is linear, and whether the

results are different to different groups of countries. The results are reported on Table 8.10. The results are again more or less the same.

Table 8.10 Estimation Results Dependent Variable: Growth of GDP per Capital

Method: Pooled Least Squares Included observations : 87	
Constant	-0.148053 *0.1376*
Income > $ 1,587 (Initial GDP Per capita > median income $ 1,587)	-0.027152 *0.7975*
Debt finance	-0.252162 *0.0218*
Internal finance	-0.028873 *0.8243*
Equity finance	-0.062972 *0.6786*
Government consumption (government final consumption expenditure -% of GDP)	-0.037134 *0.0022*
Capital formation (gross capital formation - % of GDP)	0.060217 *0.0004*
Trade openness (trade - % of GDP)	0.000831 *0.9348*
Inflation (inflation, consumer prices - annual %)	-0.01132 *0.9882*
Education (secondary school enrollment - %)	0.045952 *0.0002*
Income (Initial GDP per capita)	-0.005531 *0.3835*
Interaction between income & debt finance (linearity) Initial Income > $1,587 x debt finance	0.135884 *0.3635*
Interaction between income & internal finance (linearity) (Initial Income > $1,587 x internal finance)	0.009596 *0.955*
Interaction between income & equity finance (linearity) (Initial Income > $1,587 x equity finance)	0.012044 *0.9482*
R-square	0.465404
Countries	87

Notes:
p-values are reported in Italics

As per the results, it is difficult to confirm which among internal, debt or equity is a more important source of finance for economic growth. This applies to both rich (income above $ 1,587) and poor (income above $ 1,587) countries. However, in both estimations the bank finances have remained negative and

significant, which is supporting the results of chapter six, that banks do not have a positive relationship with growth. These results therefore appear to lend some support to the findings of recent papers (Atje and Jovanovic, 1993, Beck and Levine, 2004, Favara, 2003, Loayza and Rancière, 2006, Saci et al., 2009).

The internal financing as seen in the preceding section is more widely used than debt or equity finance however the empirical work does not provide support to growth. This implies that by using internal finance, firms are not able to achieve as much as they could. This should be true as in more developing countries the share of internal finance is higher, which lowers in developed countries.

8.4 Conclusion

This chapter attempted to share some interesting facts on internal, debt and equity finances in a large set of developing countries using data provided by the Enterprise Surveys of the World Bank, and from the information available from major exchanges of the world.

The data from the list of 94 developing countries show that internal finance is the most preferred means of finance followed by debt and equity finances.

It is found that in developing countries, the debt finances are heavily dependent on adequate provision of collateral security, generally more than 100 percent of the value of the loan.

Various facts revealed in this chapter shows that countries are unable to comply with the recommendation of the literature that promotes opening of

exchanges for faster economic growth. The chapter finds listing in an exchange practically difficult for small and medium firms (important for growth) owing to complex requirements, which is similar in both developed and developing economies, calling for a different set of policy prescriptions, especially for the poor regions of the world.

Contrary to the findings of some studies that opposed the pecking order theory (Brennan and Kraus, 1987, Vilasuso and Minkler, 2001), the data supports the findings of Myers, (1984), and Shyam-Sunder and Myers (1999) that when outsider funds are necessary people prefer Debt over Equity.

In connection to the conclusion of some recent literature that promotes equity option superior to bank finance for economic growth, empirically this chapter could not establish any conclusive results on which option is more preferable (for growth). A firm conclusion can only be driven by enlarging the sample size. However, the empirical analysis rejected the hypothesis of banks finance as positive to economic growth which is in line with the findings of some recent literature.

8.5 Appendix

Appendix Table 8 A.1 Percentage of Internal, Bank and Equity finances for various numbers of firms (observation) observed in 94 developing countries over 2002 to 2006

#	Country	Year	Observation	Internal	Bank	Equity
1	Albania	2002	170	78.47	4.78	0.32
	Albania	2005	204	78.06	18.16	0
2	Algeria	2002	557	74.25	16.28	0
3	Angola	2006	425	88.47	3.99	0
4	Argentina	2006	1063	70.95	3.85	0.47
5	Armenia	2002	171	84.93	3.38	0.09
	Armenia	2005	351	64.17	21.52	0.21
6	Azerbaijan	2002	170	83.17	1.37	0.76
	Azerbaijan	2005	350	93.08	0.36	0
7	Bangladesh	2002	1001	59.85	29.71	0.38
8	Belarus	2002	250	73.31	3.81	0.04
	Belarus	2005	325	72.87	7.15	4.9
9	Benin	2004	197	77.14	13.65	0.8
10	Bolivia	2006	613	64.08	24.94	1.1
11	Bosnia Herzegovina	2002	182	65.81	10.73	0.89
	Bosnia Herzegovina	2005	200	64.95	25.6	0
12	Botswana	2006	342	77.14	11.64	0
13	Brazil	2003	1642	56.32	14.3	4.29
14	Bulgaria	2002	250	73.73	8.34	1.21
	Bulgaria	2005	300	66.17	19.22	0.18
15	Burkina Faso	2006	139	72.95	16.68	0
16	Burundi	2006	270	62.9	15.01	0
17	Cambodia	2003	503	20.24	2.87	46.09
18	Cameroon	2006	172	67.88	12.39	3.99
19	Cape Verde	2006	98	66.41	21.06	0
20	Chile	2004	948	47.35	30.76	1.2
21	China	2003	3948	15.24	20.37	12.39
22	Colombia	2006	1000	33.06	35.86	0.35
23	Congo, Dem. Rep.	2006	340	85.32	2.05	0.16
24	Costa Rica	2005	343	60.07	8.82	0.67
25	Croatia	2002	187	47.81	17.4	6.04
	Croatia	2005	236	55.54	27.98	4.07
26	Czech Republic	2002	268	54.29	9.46	6.05
	Czech Republic	2005	343	54.17	7.46	7.75
27	Ecuador	2003	453	46.89	27.42	3.29
28	Egypt	2004	977	86.15	6.93	3.78
29	El Salvador	2003	465	47.08	30.37	1.21
30	Eritrea	2002	79	63.08	30.5	2.67
31	Estonia	2005	219	64.61	11.98	1.28
32	Ethiopia	2002	427	69.78	21.24	0.98

Continued

#	Country	Year	Observation	Internal	Bank	Equity
33	Georgia	2002	174	71	12.12	0.06
	Georgia	2005	200	63.36	24.59	0
34	Germany	2005	1196	50.64	22.6	9.31
35	Greece	2005	546	71.32	13.32	6.09
36	Guatemala	2003	455	59.19	18.57	1.5
37	Guinea-Bissau	2006	159	85.29	0	0
38	Guyana	2004	163	68.06	25.39	2.21
39	Honduras	2003	450	52.26	27.88	2.2
40	Hungary	2002	250	60.49	10.18	15.79
	Hungary	2005	610	52.47	18.46	15.66
41	India	2002	1827	..	..	..
	India	2006	4235	57.66	27.65	0.91
42	Indonesia	2003	713	41.89	16.34	1.34
43	Ireland	2005	501	48.52	27.94	1.04
44	Jamaica	2005	94	39.63	28.7	2.22
45	Kazakhstan	2002	250	75.49	7.22	3.32
	Kazakhstan	2005	585	78.84	16.03	0.06
46	Kenya	2003	284	52.66	32.4	0.35
47	Korea	2005	598	64.96	20.04	8.06
48	Kyrgyz Rep	2002	173	72.08	5.34	0
	Kyrgyz Rep	2005	202	82.73	8.81	0.86
49	Latvia	2002	176	46.29	13.37	14.15
	Latvia	2005	205	46.6	16.4	19.54
50	Lebanon	2006	354	47.92	33.75	2.39
51	Lesotho	2003	75	67.86	9.29	1.79
52	Lithuania	2002	200	74.43	5.79	0
	Lithuania	2005	205	56.88	10.57	2.87
53	Macedonia	2002	170	67.75	6.9	9.56
	Macedonia	2005	200	66.65	11.48	2.26
54	Madagascar	2005	293	76.29	11.84	2.04
55	Malawi	2005	160	60.76	22.83	2.8
56	Mali	2003	155	84.75	11.68	0
57	Mauritania	2006	237	77.32	6.06	0
58	Mauritius	2005	212	48.74	33.63	0.61
59	Mexico	2006	1480	66.26	6.73	0.06
60	Moldova	2002	174	66.26	11.34	0
	Moldova	2005	350	74.84	16.05	0.63
61	Mongolia	2004	195	51.89	27.87	7.77
62	Morocco	2004	850	63.4	19.17	1
63	Namibia	2006	329	79.44	15.49	0

Continued

#	Country	Year	Observation	Internal	Bank	Equity
64	Nicaragua	2003	452	65.01	18.77	0.64
65	Niger	2005	125	86.99	9.66	0
66	Oman	2003	337	57.37	18.66	1.52
67	Pakistan	2002	965	58.12	6.49	14.75
68	Panama	2006	604	62.66	25.52	0.11
69	Paraguay	2006	613	68.87	8.74	1.09
70	Peru	2002	576	12.89	20.98	41.73
71	Philippines	2003	716	57.96	13.29	4.34
72	Poland	2002	500	66.91	10.84	2
73	Portugal	2005	505	66.2	14.46	0.76
74	Romania	2002	255	75.1	8.21	0.74
	Romania	2005	600	71.51	15.41	0.39
75	Russia	2002	506	77.08	4.82	0.6
	Russia	2005	601	84.97	6.51	0.2
76	Senegal	2003	262	70.47	18.44	0
77	Serbia	2002	250	84.6	3.89	1.85
	Serbia	2005	300	79.92	10.8	0.93
78	Slovakia	2002	170	65.32	6.17	8.26
79	Slovenia	2002	188	72.05	7.05	0.39
	Slovenia	2005	223	65.72	23.43	0.06
80	South Africa	2003	603	58.45	16.53	0.13
81	Spain	2005	606	59.9	21.85	1.82
82	Sri Lanka	2004	452	50.02	15.3	2.83
83	Swaziland	2006	307	75.84	8.72	0
84	Syria	2003	560	80.71	4.29	0
85	Tajikistan	2002	176	81.42	0.76	0.7
	Tajikistan	2005	200	88.87	0.78	0
86	Tanzania	2003	276	67.95	16.34	4.76
87	Thailand	2004	1385	19.33	58.33	13.45
88	Turkey	2002	514	82.46	4.08	1.21
	Turkey	2005	557	55.14	6.49	30.2
89	Uganda	2003	300	71.41	13.54	1.96
90	Ukraine	2002	463	82.09	3.48	0.67
	Ukraine	2005	594	69.41	10.44	8.11
91	Uruguay	2006	621	82.48	7.47	0.2
92	Uzbekistan	2002	260	86.23	1.86	0.23
	Uzbekistan	2005	300	95.21	4.66	0
93	Vietnam	2005	1150	30.12	27.91	27.79
94	Zambia	2002	207	57.74	17.47	3.96

Appendix Table 8 A.2 Rules of listing in exchange in samples of some less developed/ low income countries.

Stock Exchange, Country	Capital related requirement	Financial/ Audit requirement	Public shareholding requirement
Colombo Stock Exchange, Sri Lanka	An issued and paid up capital of Rs 75 Million	A profit before tax for three consecutive years immediately preceding the date of application	25% of the issued capital must be held by/ offered to the public
Dhaka Stock Exchange (DSE), Bangladesh	Minimum paid up capital Taka 100 million	Operation for at least immediate last 5 years. Profit in 3 years out of the immediate 5 completed financial years	25% of the shareholding to be offered for sales within 30 trading days from the date of commending the normal trading
Malawi Stock Exchange, Malawi	A subscribed capital of at least K100 million	A satisfactory profit history for the preceding three financial years	25% of each class of equity shares shall be held by the public, unless otherwise agreed with the committee. No. of public shareholder should be minimum 300 for equity shareholding
Nairobi Stock Exchange, Kenya	The issuer shall have a minimum authorized issued and fully paid up share of Kshs. 50 million. Net assets immediately before the public offering of shares should not be less than Kshs. 100 million	The issuer must have declared positive profits after tax attributable to shareholders in at least three of the last five completed accounting periods to the date of the offer	Following the public share offering at least 25% of the shares must be held by note less than 1000 shareholders excluding employees
Nepal Stock Exchange, Nepal	Paid up capital of minimum NPR 2.5 million	Statement of audited accounts for the last 3 years	Issued capital if below NPR 10 million - 25 % to general public. issued capital if in between NPR 10 million to 50 million - 20% to general public. issued capital in between NPR 50 Million to 100 million - 15 % to general public
Uganda Stock Exchange, Uganda	Issuer will have authorised, issued, paid up capital for a minimum of 50,000 currency points and net assets of 100,000 currency points before the public offering of shares (one currency point is equal to 20,000 Uganda shelling)	The issuers have published audited financial statements for a period of at least five years complying with international accounting standards	Immediately following the public share offerings at least 20% of the shares to be held by not less than 1000 no of shareholders
Maldives Stock Exchange	It has an issued and paid up capital of a minimum of MRF 5, 000,000. For listing in secondary board issued and paid up capital is minimum Mrf. 1,000,000	Continuing listing requirement include circulation of annual report which among others should include various debt and equity related financial information	There shall be a minimum of 250,000 shares open for subscription.

Appendix Table 8 A.3 Year of establishment, major stock exchanges in America

#	America	Year of Establishment
1	American SE	1921
2	Bermuda SE	1971
3	BM&FBOVESPA	2008
4	Buenos Aires SE	1854
5	Colombia SE	2001
6	Lima SE	1860
7	Mexican Exchange	1894
8	NASDAQ OMX	1971
9	NYSE Euronext (US)	1792
10	Santiago SE	1893
11	TSX Group	1861

Appendix Table 8 A.4 Year of establishment major stock exchanges in Asia Pacific

#	Asia Pacific	Year of Establishment
1	Australian SE	1987
2	Bombay SE	1875
3	Bursa Malaysia	1960
4	Colombo SE	1985
5	Hong Kong Exchanges	1891
6	Indonesia SE	1912
7	Jasdaq	1963
8	Korea Exchange	1956
9	National Stock Exchange India	1992
10	New Zealand Exchange	1974
11	Osaka SE	1878
12	Philippine SE	1992
13	Shanghai SE	1990
14	Shenzhen SE	1990
15	Singapore Exchange	1999
16	Taiwan SE Corp.	1961
17	Thailand SE	1975
18	Tokyo SE	1878

Appendix Table 8 A.5 Year of establishment major stock exchanges in Europe

#	Europe	Year of Establishment
1	Athens Exchange	1876
2	BME Spanish Exchanges	1831
3	Borsa Italiana	1997
4	Budapest SE	1864
5	Cyprus SE	1996
6	Deutsche Börse	1585
7	Irish SE	1973
8	Istanbul SE	1985
9	Johannesburg SE	1887
10	Ljubljana SE	1989
11	London SE	1801
12	Luxembourg SE	1927
13	Malta SE	1992
14	OMX Copenhagen SE	1919
15	OMX Helsinki SE	1912
16	OMX Stockholm SE	1863
17	NASDAQ OMX Nordic Exchange	1808
18	NYSE Euronext (Europe)	1602
19	Oslo Børs	1819
20	SIX Swiss Exchange	1993
21	Warsaw SE	1817
22	Wiener Börse	1771

Appendix Table A 8.6 Variables, Definition, Expected signs and sources of data

Variables	Definition	Expected Sign	Original Source of Data	Source Data obtained
GROWTH	Real GDP per capita growth rate		World Bank national accounts data, and OECD National Accounts data files	ESDS International
DEBT	Bank finance for investment (%)	+	Enterprise Surveys, The World Bank Group	Enterprise Surveys, The World Bank Group
INTERNAL	Internal finance for investment (%)	+	Enterprise Surveys, The World Bank Group	Enterprise Surveys, The World Bank Group
EQUITY	Equity, sale of stock for investment (%)	+	Enterprise Surveys, The World Bank Group	Enterprise Surveys, The World Bank Group
GOVERNMENT CONSUMPTION	Ratio of general government consumption expenditure to GDP	-	World Bank national accounts data, and OECD National Accounts data files	ESDS International
CAPITAL FORMATION	Ratio of gross capital formation to GDP	+	World Bank national accounts data, and OECD National Accounts data files	ESDS International
TRADE OPENNESS	Trade as percentage of GDP	+	World Bank national accounts data, and OECD National Accounts data files	ESDS International
INFLATION	Change in consumer price index	-	International Monetary Fund, International Financial Statistics and data files	ESDS International
EDUCATION	Total secondary enrolment, regardless of age, to the population of the age group that officially corresponds to that level of education	+	UNESCO	The World Bank, ED Stats Query
INITIAL INCOME	The current GDP per capita in US Dollars of the start year cummulatively increased by the US inflation rate	-	Made from current GDP in USD cumulatively increased by the US inflation rate. Data from World Bank national accounts data, and OECD National Accounts data files.	ESDS International
LEGAL ORIGIN DUMMIES	"1" for true and "0" for false where 1 implies countries following legal system of a particular country		La Porta et al. (2008)	La Porta et al. (2008)

Appendix Table A 8.7 List of Countries in Empirical Investigation

#	Country	#	Country	#	Country
1	Albania	24	Germany	47	Namibia
2	Algeria	25	Greece	48	Nicaragua
3	Armenia	26	Guatemala	49	Oman
4	Azerbaijan	27	Guyana	50	Pakistan
5	Bangladesh	28	Honduras	51	Panama
6	Belarus	29	Hungary	52	Peru
7	Benin	30	India	53	Philippines
8	Brazil	31	Indonesia	54	Poland
9	Bulgaria	32	Kazakhstan	55	Romania
10	Cambodia	33	Kenya	56	Russia
11	Cameroon	34	Korea	57	Senegal
12	Cape Verde	35	Kyrgyz Republic	58	Serbia
13	Chile	36	Latvia	59	Slovakia
14	China	37	Lesotho	60	Slovenia
15	Colombia	38	Lithuania	61	South Africa
16	Costa Rica	39	Macedonia, FYR	62	Spain
17	Croatia	40	Madagascar	63	Syria
18	Czech Republic	41	Malawi	64	Tajikistan
19	Ecuador	42	Mali	65	Thailand
20	El Salvador	43	Mexico	66	Turkey
21	Estonia	44	Moldova	67	Uganda
22	Ethiopia	45	Mongolia	68	Ukraine
23	Georgia	46	Morocco	69	Vietnam

9. CHAPTER: CONCLUSION

"I know I will often stop and think about them"

- From the song by the Beatles *In My Life.*

9.1 Review

The In summary of the findings, the results of the research, which was motivated by an endeavour to advance what is known about the relationship between financial development and economic growth, clearly highlight some unforeseen outcomes.

Firstly, the perceived notion that financial institutions should have a positive impact upon economic growth, by facilitating the transmission of savings to investment, was shown not to be the case, whereby the empirical literature proved to show a variety of views about the nature of the relationship between financial development and growth. Furthermore, the majority of the empirical literature found a significant and positive relationship only with averaged data, and not with annual data. This is intensified by the fact that some recent papers, that have used both average and annual data, have found contradictory results on the relationship between financial development and economic growth, with the impact of financial development upon economic growth being positive in the long term, but negative in the short term. Moreover, it was also learnt that the empirical literature showed that the relationship between stock market development and growth remained positive irrespective of time horizons.

On reflection of the empirical works used in relation to the finance and growth relationship, most of them used similar countries and sample sizes in their empirical investigations. Therefore, this allowed for easy comparability of results, but may also have limited the robustness of results. In order to overcome this short falling, a number of previously ignored countries were

included in the research, by the construction of a larger database than what is offered by the empirical literature. This movement resulted in the findings being more substantiated by further, newer evidence, making them more robust. Similarly, the use of three estimation techniques: POLS, TSLS and Dynamic GMM panel to investigate the relationship between finance and growth ensured the validity and reliability of the results reached, which were that in all three estimation techniques employed, this thesis could not find evidence of a positive impact of banks' development upon economic growth in the short term. This result is in line with recent empirical literature on finance and growth. However, the lack of a positive impact was also confirmed in the long term (when applied with the preferred variable of the literature Private Sector Credit to GDP), contradicting the findings of existing empirical works that have found evidence of a positive and significant long term relationship between finance and growth. To be consistent with the existing empirical works and allow direct comparisons, the estimations were carried out for samples including and excluding LDCs. This, however, did not change the result. In fact, the separate estimation carried out for LDCs only gave negative results for both banks' and stock markets' relationship to growth.

In addition, the empirical results found that banks and markets are far from similar and realistically share many more differences than perceived in the literature. This challenged the widely held notion that banks and markets have common functions, or even that they complement each other. Also, with regards to the stock markets' influence upon economic growth, this thesis found that the results are also influenced by the method of estimation

and the measures of stock market developments employed. Furthermore, considering the fact that the existing empirical works have used mostly similar countries (developed, with active stock markets) this thesis finds that the type of relationship strongly depends on the variables chosen, the method of estimation, and the possible role of self-selection bias.

Further advancement of knowledge about the relationship between banks and stock exchanges suggest that exchanges that rely mainly upon banks do not have a developed stock exchange. Therefore, a new database was created to measure the stock market capitalisation of banks and non bank companies in a sample of 10 different of countries. The accuracy of the results of the empirical investigations is further confirmed by analysing the data of the Nepal Stock Exchange, and this database can be expanded and used for further research. Additionally, however, it was also found that listing criteria of exchanges makes it practically, very difficult for small and medium sized firms to raise funds through market floatation.

9.2 Recommendations for Future Research

This thesis has achieved some important results that have advanced the knowledge on the relationship between financial development and economic growth. However, there are some important issues that this research has identified, however was not able to investigate within the given time limit of the study. The followings are suggested areas for further research.

Firstly, recent papers (Laitner, 2000, Bah 2008) have revisited the Kuznets curve (1955, 1977), which predicts an inverted U-shaped relationship

between income inequality and economic growth. Laitner (2000) builds his paper on the prediction of the Solow (1956) mode, which states that a higher average propensity to save (APS) will lead to higher levels of income per capita. The author finds that saving rates tend to increase after industrialisation. Bah (2008) finds that the paths of structural transformation are different in developed and developing countries. In light of these developments in the literature, it would be interesting to research the impact on structural change, caused by financial development.

Secondly, the data related to market capitalisation of banks and non bank companies could be expanded to include a bigger sample of countries.

Thirdly, this thesis has used a large, if not the largest database in finance and growth literature, and estimations were also repeated for different sub-samples, such as including and excluding LDCs. However, to be more specific on one particular region or income level, it is recommended to carry out region specific analysis. Similarly, the validity of the study can be strengthened by enlarging the time series dimension of data for internal, bank and equity finances among firms of different countries. In this thesis the data on internal, bank and equity finances were used only for the period 2002-2006 as they were not available beyond that period. The World Bank Enterprise Surveys has been expanding the data on a regular basis, and this will provide the opportunity to reinvestigate the relationship in the future.

Finally, although the study has used legal origin dummy variables in the empirical investigations, they were not used to conduct any cost and benefit analysis of alternative legal rules applicable for financial institutions, which

may be beneficial to enhance savings and investment and therefore productivity and growth.

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