

Financial Development, Economic Growth
and
Crises

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To my parents and Adnan Khattak

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Abstract

The importance of financial markets in a globalised economy cannot be overstated. An obvious example is the 2008 collapse of Lehman Brothers, the consequences of which were not just confined to the United States but spread to almost all developed economies in the world. On a daily basis movement in the world's stock, bond, commodity and currency markets can be affected by as diverse factors as a revision to the inflation rate in China, an unexpected European Union meeting on the Euro or the announcement of company earnings in the U.S.

The link between financial markets and the real economy, the increased volatility in financial markets, and the repercussions of financial crises are issues of great interest to economic agents (policymakers, firms, households) around the world. However, they are of even greater significance to developing nations, as they try to raise their living standards. The research presented in this thesis aims to inform the discussion on the pertinence of financial development for economic growth.

Following a brief introduction, Chapter 2 sets the scene by reviewing the neo-classical growth models and endogenous growth theory. The rationale for focusing

on the role of financial development is discussed next followed by an evaluation of the empirical evidence. Chapter 3 concentrates on the measurement of financial development. Existing measures are examined and a new measure is introduced using the latest available data for the largest possible number of economies. The principal components methodology, which reduces the dimensionality of the data, is used for the construction of this new measure. This is then used to revisit the empirical relationship between financial development and growth in Chapter 4. The methodology employed is that of least squares dummy variables (LSDV) estimation, and the issue of potential endogeneity is explored through the use of two-stage ordinary least squares (OLS) and generalised method of moments (GMM).

Chapter 5 undertakes a large sample analysis to address the relationship between financial development, and the likelihood of financial crises and chapter 6 summarises the findings from this work and discusses limitations and possible extensions.

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CHAPTER 1

Introduction

The importance of financial markets in a globalised economy cannot be overstated. An obvious example is the 2008 collapse of Lehman Brothers, the consequences of which were not just confined to the United States but spread to almost all developed economies in the world. Daily movements in world stock, bond, commodity and currency markets can be affected by factors as diverse as a revision to the inflation rate in China, an unexpected European Union meeting on the Euro or the announcement of company earnings in the U.S.

The link between financial markets and the real economy, the increased volatility in financial markets, and the repercussions of financial crises are factors of great interest to economic agents (policymakers, firms, households) across the world. However, they are of even greater interest to developing nations. Establishing a framework of proper legal and policy structures and protecting property rights may be a prerequisite for the efficient allocation of resources and the instigation of capital

inflows from abroad but the question of ‘what is traded’ in the financial markets may also be of relevance. It has long been thought that speculation in the financial markets serves to align asset prices with fundamentals, at least in the long run, but the recent calamitous effects of speculation with collateralised debt obligations (CDOs) have sparked a debate as to how to properly regulate financial betting.¹

The issue of financial regulation is extremely topical, but it is beyond the scope of this thesis. This work has a more modest agenda: it uses the most-recent data to revisit the link between financial development and growth employing a newly created index of financial development (from principal components). It also examines the effect of the extent of financial development on the probability of a banking crisis or stock market crash. In other words, this work addresses the following questions: does higher financial development stimulate growth rates? And does higher financial development (captured by the prevalence of banks and the size of the stock market among other factors) increase or reduce the probability of a crisis?

Over the past thirty years, it has been argued that deeper financial systems promote economic growth. Early models of economic growth highlighted the importance of saving rates (i.e. how much an economy saves as a proportion to its income) and population growth rates in determining income per person (neoclassical growth theory). One implication of such models is that levels of income per person in both rich and poor countries should converge. Difficulties in reconciling the ‘convergence hypothesis’ with the actual data led to the development of ‘endogenous’ growth models that did not carry the same implication (i.e. countries need not converge to the same level of income per person).

This framework opened the way for considerations of other determinants for long-term growth such as fiscal policy and, more relevant to the purposes of this

¹Even more recently; in addition to CDOs, the role of credit default swaps (CDSs) has come into focus in relation to their effects on sovereign borrowing costs.

study, financial development. In the last two decades, the latter has become the focus of growing literature, which is surveyed in the next chapter.

The key role of the financial sector in economic growth was introduced by Schumpeter (1911). He argued that the service provision by financial intermediaries includes savings mobilisation, risk management, project evaluation, monitoring of managers, and facilitating transactions that are necessary for technological improvement and economic growth. Financial intermediaries need to be capable of efficient allocation of resources in order to enable the realisation of higher returns and desirable risk transformation.

Modern literature on economic growth starts with Robert Solow's (1956) work. At that time, the focus was kept on the functioning of labour and capital resources rather than financial markets. Following Solow's seminal contribution, economists such as Goldsmith (1969), McKinnon (1973) and Levine (1993) emphasised that finance can be an essential component for the growth within an economy.

The role of finance in promoting growth is especially relevant to policymakers in less-developed economies. Underdeveloped countries generally have an agenda to support financial sector reforms. As mentioned above, a better developed financial system reduces transaction, information and monitoring costs. It increases the efficiency of resource allocation and in turn this may spur growth. A well developed financial system promotes investment opportunities to potential businesses, mobilises savings, enables trading, monitors performance of managers, offers hedging, and diversifies risk (Levine 1993).

Proper legal and policy structures, including the protection of property rights, are required for a strong financial system. Most of the underdeveloped economies are facing financial repression in the form of high inflation rates, directed or subsidised credits, credit rationing, loan and deposit interest rate ceilings. According to Roubini and Sala-i-Martin (1992), strong financial repression can reduce per-capita

GDP by one percentage point per year. To the detriment of the size of the financial services sector in the economy, governments sometimes adopt policies of financial repression and resort to inflationary finance. Such policy choices provide an incentive for individuals to store nominal money. The negative effects of financial repression reduce the marginal product of capital input and thereby slow down economic growth (Roubini and Sala-i-Martin, 1992).

An efficient financial system offer improved financial decisions, supports better distribution of resources and potentially accelerates economic growth. A strong financial sector needs to have a deeply rooted domestic and international banking system, as well as liquid stock markets. The importance of a strong financial system in achieving high growth rates is acknowledged in several studies (reviewed in the next chapter), although the issue of causality is an unresolved one. The World Economic Forum has recently introduced an annual financial development index of 52 leading financial systems around the world. The index is constructed on the basis of seven pillars in three main categories, namely,

1. Factors, policies and institutions;
2. Financial intermediation;
3. Capital availability and access.

The first category is related to the policymakers i.e. institutional environment, business environment and financial stability. The second category is linked to financial intermediaries: banks, non-banks and financial markets. The third category basically concerns the end user of capital (size, depth and access). On the basis of these wide criteria, a financial development index is generated. The index has been standardised by scaling the variables from 1 to 7, in order of the least advantageous (with respect to financial development) to the most advantageous. Countries are

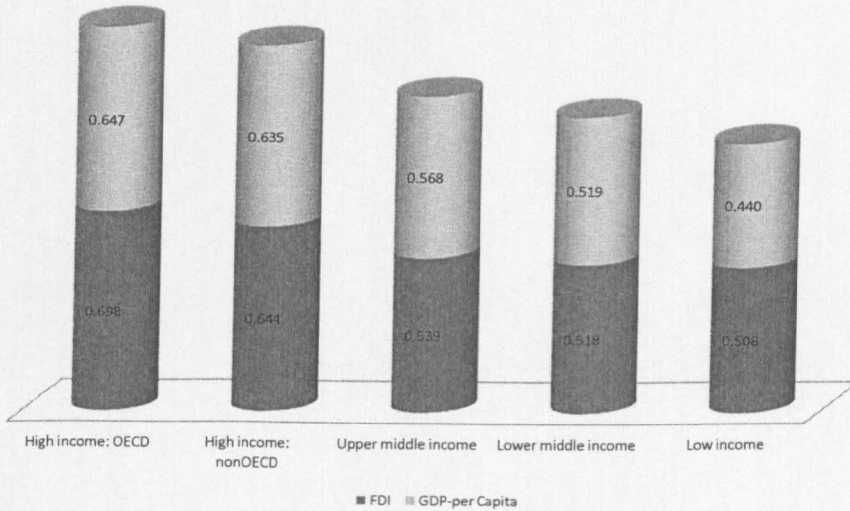


Figure 1.1: Financial Development Index (FDI) 2008 and (log) Average GDP per Capita. Source: World Economic Forum and Author's Calculations.

classified into five groups on the basis of their income levels. Figure 1 shows that countries that score highly in the financial development index have experienced high GDP per capita values –and vice versa.

Given the renewed interest in the effects of financial development, this study identifies three main areas of work. The first relates to the measurement of financial development. The second concerns the empirical link between financial development and growth whereas the third pertains to the possible link between financial development and the scope for financial crises.

The method of principal component analysis is employed to measure and construct a financial development index. The most up to date data set has been used to construct the index using a number of financial indicators, including the banking sector, stock market, and insurance market variables. This index can be used to

measure the financial ‘depth’ of an economy². Examining this index shows that during the past three decades, countries have moved towards more financial development. Almost all countries show an upward trend in the depth of their financial sector. In some countries, this is more evident in the banking sector whereas in others, it is more evident in the capital markets. Overall, the countries in the sample have experienced an increase in their levels of financial development.

A second objective is to quantitatively explore the relationship between financial development and growth. Recent data from the International Monetary Fund’s (IMF) International Financial Statistics are used. I have employed a panel of 95 countries to assess the impact of financial development on growth. The methodology used in this exercise consists of static and dynamic panel data estimations for the period of 1960–2009. A two-stage least squares estimation reveals that a causal relationship cannot be established. This means that the direction of the relationship cannot be determined, i.e. whether financial development promotes growth or that financial deepening, in fact, follows a growth surge.

Finally, a binary probit model is employed to examine the impact of financial advancement on the probability of a financial crisis. A well-regulated, deep financial system should reduce the likelihood of financial (banking or stock market) crises. Equally, a stock market whose high capitalisation is the result of unreasonable valuations (a ‘bubble’) or whose banks have expanded by being too reliant on interbank borrowing may lead to problems.

The work presented here is structured as follows. Chapter 2 discusses the existing literature on the finance/growth relationship. The main transmission channels for this relationship are also analysed here. Core issues regarding this relationship include the impact of financial liberalisation on growth. Some researchers are con-

²I use the terms financial advancement, development, depth and maturity interchangeably throughout the text.

cerned with structure of the financial system. There are two lines of thought; one suggests that developed financial systems focus more on the progress of financial markets whereas the other maintains that the financial structure does not matter in the development of a financial system.

Chapter 3 is concerned with the measurement of financial development and addresses one of the main research objectives. It is important to know how financial development can be measured before considering its impact on growth. A number of factors are relevant here, including the depth, size, access, and soundness of the financial system. The performance and activities of financial markets, banks, bond markets and financial institutions should also be taken into account. The higher the degree of financial development in a country, the wider the availability of financial services.

A developed financial system should offer higher returns with less risk. The existing literature on the measurement of financial development comprises two different 'groups'. The first group of studies measures financial development as a result of observed outcomes. As already mentioned, these studies include size, access and depth of financial systems. The second group includes proxies of a country's legal, business, political conditions as well as the stability of the financial system. In the construction of the researcher's index in this chapter, financial development has been measured on the basis of observed outcomes, as measures adopted by the second group are highly time invariant. Measurement is based upon different indicators of banking sector development, financial markets development, and insurance companies. A fresh approach is applied to serve this purpose, the principal component analysis. An index is constructed to examine the financial depth of an economy and is also used in the econometric analysis of subsequent chapters.

Chapter 4 examines the empirical relationship between financial development and economic growth. The most recent and extensive data set have been used for

the period from 1960 to 2009. The data is grouped on the basis of four income groups including low income countries, lower middle income countries, upper middle income countries and high income countries. The grouping of countries is based upon the World Bank income groups. As mentioned above, static and dynamic panel data models have been employed to study the relationship. Causality is checked using a two-stage least squares model. In addition to the index from chapter 3, the following variables are used as proxies of financial development: deposit money bank assets to (deposit money + central) bank assets; private credit by deposit money banks and other financial institutions (% GDP); liquid liabilities (% GDP); stock market capitalisation (% GDP); stock market turnover ratio to capitalisation; and stock market total value traded (% GDP). Controls include the following: trade (% of GDP); government expenditures (% GDP); the exchange rate regimes; inflation rates.

Chapter 5 examines the relationship between financial development and financial crises. There has been a notable increase in the frequency of the latter in the last 30 years (Bordo et al., 2001) and there is no shortage of studies which try to explain why this has been the case (a brief review of this literature is offered in the same chapter). Here, the focus is on financial depth: is it possible that, market capitalisations and increasingly risk-taking banks have actually increased rather than reduced crises? If there is asymmetric information in the financial system, this can lead to higher chances of financial crisis get higher (see Mishkin, 2000). This question is addressed with the use of a binary probit model³.

Finally, chapter 6 discusses and summaries the main findings of the study.

³The sources of all data used in chapters 4, 5, and 6 are listed in the appendix.

CHAPTER 2

A Review of the Literature

2.1 Introduction

This chapter reviews the main theories and literature associated with finance and growth relationship and covers the growth models, transmission channels, existing evidence and main issues.

The differences in economic growth and performance across countries are challenging and important areas of contemporary social sciences. The key concerns include “Why do some nations grow fast, and some fail to achieve even a moderate growth rate”. Huge differences in output per worker and income per-capita are recorded in different economies today. The gap between purchasing power parity (PPP adjusted dollars) among countries is also shocking. Countries with top places at World income distribution are thirty times richer than those at the bottom. How can one country become richer than another? Economists have to see beyond the mechan-

ism of growth models and raise questions about the elementary causes of economic growth (Ray 1998).

The income inequality among countries during the period of 1960-2009 (decade-wise) are graphically presented in figure 2.1 below. It can be observed that the distributions are rightward shifted during the period of 1960 to 2009 that represent growth in income. Empirical distribution during the period of 1960-70 depicts that most of the countries report less than \$1300 (in 2000 US\$) of real GDP per-capita. The mode of the distribution is around \$700. In 1990 to 2000, the mode of the distribution is around \$2000 but concentration is also found between \$20,000 to \$30,000. The density estimates during the recent period of 2000-09 also reflect noticeable inequality in income per-capita across the different income groups.

Series with a proportional growth rate become more informative when their logs (logarithms) are taken. Therefore, the log of GDP per-capita is considered in figure 2.2 during the period of 1960-2009. Countries are divided into four classifications based on World income groups, and the time period is divided into five decades for further understanding. The inequality of income can be noticed very clearly between low income and high income countries in these distributions. The *stratification phenomena* can be seen here since some of the middle income countries have joined the relatively high income group, whereas some have maintained their income classification or shown impoverishment¹. The density of rich countries has increased considerably during this period whereas some of the countries are still very poor.

Morley (1995) reported that the GDP per-capita of Latin America dropped by 11% during 1980s similarly growth of Africans economies also dropped during 1980s. Tanzania and Nigeria experienced a considerable decrease in per-capita income during this time period. East Asian economies, including Korea, Japan, Singapore,

¹Stratification is the phenomena where societies are treated with characteristics and creates hierarchal structures like inequality in wealth, education, power, etc. It divides society into layers, e.g. upper, middle and lower class.

Taiwan, Malaysia, Hong Kong, Indonesia and China grew at a spectacular rate during the era of 1990s. The per-capita income of these economies except China was reported to be around 5.5% annual increase during 1965-90, whereas China increased its annual per-capita income at 8.2% during the period 1980-1993. These growth rates are truly outstanding. In contrast Sub-Saharan Africa and Latin America growth languished during 1980s. Growth rates reflected a creeping trend and in numerous cases, there were even no signs of growth at all.

The world can be changed as a result of diversified growth experiences in a couple of decades. One way to analyse this is “doubling time” implied with the given growth rate². It is basically the number of years a country takes to double its income with a given growth rate. The calculation is made by dividing 70 into the annual growth rate in terms of percentages. A country with 5% annual growth will double its per-capita income in 14 years³, on the other hand, a country with 1% growth rate will need 70 years. Numbers in percentages look very small, but they add up very quickly indeed, and huge impacts can be made with small changes in growth rates for the longer period of time.

In the last century, the description of economic development was somewhat focused upon the significance of agriculture, industries, trade, and the like (Neo-classical exogenous growth theory). Countries were divided into two main categories; developed and less developed countries. Less developed economies tried to discover how the developed economies have maintained higher level of per-capita incomes. Per-capita income was considered to be the only parameter to measure the index of economic development. To overcome the problem of this single parameter, the focus was turned to improve physical capital, financial capital, and labour, along with the

²Ray 1998, pg.17.

³For example a dollar is invested at a rate of $r\%$ per year, and it takes T years to grow to \$2. If the equation is solved for T it becomes $[1 + (r/100)]^T = 2$. This implies that $T \ln_e [1 + (r/100)] = \ln_e 2$, while $\ln_e 2$ is approximately equal to 0.7. For small x values $\ln_e(1+x)$ is around x .

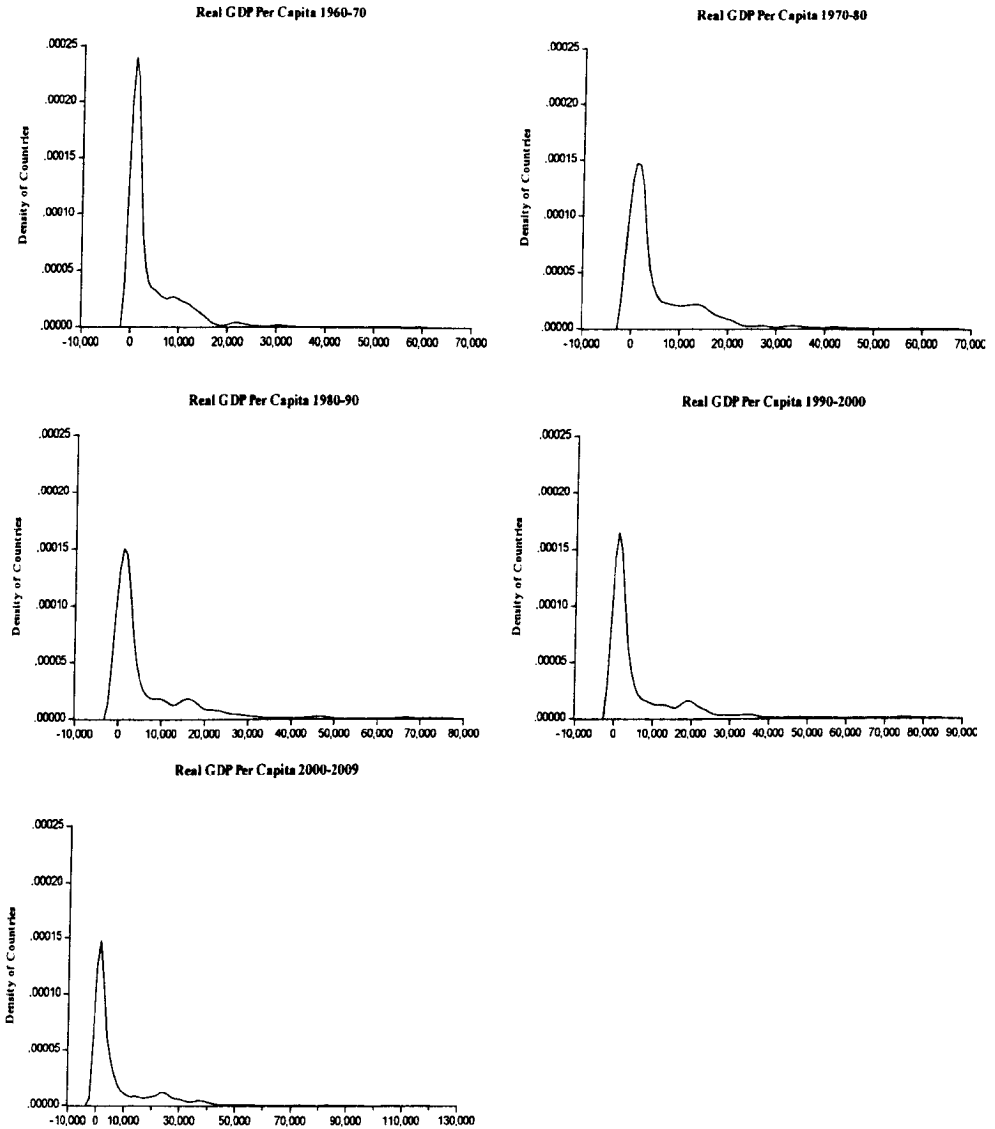


Figure 2.1: Empirical Distribution of Real GDP per-capita (1960 – 2009)

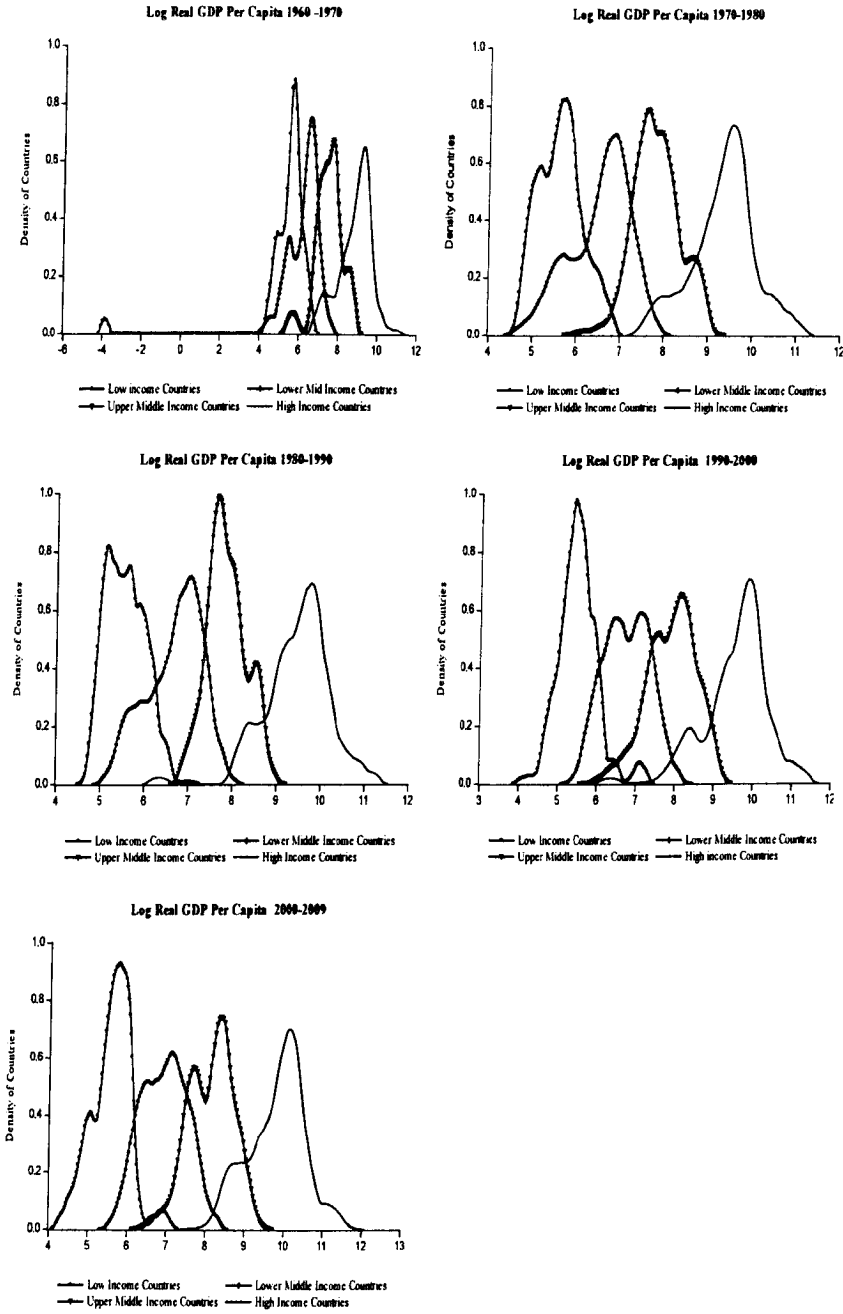


Figure 2.2: Empirical Distribution of Log Real GDP per-capita (1960 – 2009)

per-capita income to achieve high levels of growth (Endogenous growth theory). In the past three decades, the financial sector has received considerable importance in order to achieve high levels of growth.

Over the past half century, the debate on the finance and growth relationship has been developed to some extent. Subsequently, a number of researchers have examined different angles of financial development using different cross countries regressions, different industries and regional regressions, within one country regressions, level of financial development in different countries, etc. The modern literature on economic growth actually started in mid 1950s when Robert Solow presented his growth model. At that time, the focus was kept on the functioning of labour and capital resources rather than financial markets. Some leading economists such as Goldsmith (1969) and McKinnon (1973) emphasised the fact that finance can be an essential component of growth of an economy. Levine (1993) examined the cross country causal impact of the role of the financial sector on economic growth.

On the other hand, some studies doubt the leading role of a financial sector in economic development. Robinson (1952), Stiglitz (1996) suspected the importance of a financial system on economic growth. Arestis and Demetriades (1997) suggested that the impact of financial development on growth can be country specific.

The United States and England are pioneer economies that developed their financial sectors during the early stages. Rapid economic growth is the main objective for all underdeveloped and emerging economies.

The idea of the importance of the financial sector development in economic growth was pioneered by Schumpeter (1911). He argued that the service provision by financial intermediaries, including savings mobilisation, risk management, projects evaluation, monitoring the managers, and facilitating the transactions are necessary for technological improvement and economic growth. Financial intermediaries need to be capable of efficient allocation of resources, facilitating higher returns and

desirable risk transformation.

The key question for policymakers in less developed economies is how to have a process of sustained economic growth. Underdeveloped countries have the agenda to support financial sector reforms. It is suggested that policies focusing upon the improvement of the financial sector leads to economic growth. Both theories and practice have supported this. A better developed financial system reduces the transaction, information and monitoring costs. It increases the efficiency and in turn spurs the growth. A well developed financial system promotes investment opportunities to potential businesses, mobilises savings, enables trading, monitors the workings of managers, offers hedging, and diversifies risk. These systems help to provide efficient allocation of resources in the form of physical and human capital. They increase technical progress, so all this in turn spur economic growth (Levine 1993).

A proper legal and policy structure is required to have a strong financial system. Government imposed restrictions, and price distortions are the key obstacles in the development of a strong financial system. Most of the underdeveloped economies are facing financial repression in the form of high inflation rates, directed or subsidised credits, high required reserve ratios, credit rationing, loan and deposit interest rate ceilings. It is observed that strong financial repression can reduce per-capita GDP by one percentage point an year. Governments sometimes adopt policies of financial repression and raise inflation rates to get effortless inflationary income, but that lowers the amount of financial services in the economy. All these actions stimulate individuals to store nominal money. The negative effects of financial repression reduce the marginal product of the capital input and therefore, reduce the economic growth⁴.

⁴Roubini, N. and X. Sala-i Martin (1992).

2.2 Theoretical Background

In this section, major growth models and theories are discussed. The roots of the growth theories can be found to be as old as economics is. Capital accumulation and different forms of technical progress were the principal focal points for both classical and Keynesian theories. The main focus of economists in the eighteenth and nineteenth centuries was development economics. The main objective of their research was to determine the growth rates among different economies.

Smith (1776) is considered as the “father” of modern economics. He studied the reasons for distinct rates of growth in different countries and identified that increasing returns were due to the industrial sector compared to the agricultural sector. He emphasised the importance of the industrial sector for the development of an economy.

Today the picture of economic growth is quite different from the past one century. There is an urgent need for the developing countries to catch up at a fast pace in contrast to their previous experiences. The astonishing flow of information has raised the urgency as well. Awareness of change, inequality, differences in living standards among people has augmented. No single country can be blamed for the creation of inequality, but it does exist; therefore, the requirement for sustained growth is imperative.

2.2.1 Harrod-Domer Model

In simple words Harrod-Domer model suggests that economic growth is the outcome of abstention from present consumption. Numerous commodities are produced in an economy. The way of production creates income. The same income is utilised to purchase the commodities. The distribution of income and Individual preferences determine the choice of commodities to be produced. In short, production of

commodities generates income that generates demand for the same commodities.

The whole income is not spent on consumption, but some of it is abstained. A household creates a pool of funds that is utilised by the firms to purchase capital goods (i.e. investment). Purchasing power is transferred from savers to investors by banks, stock markets, governments and individual loans.

To start a new business or for the expansion of existing business, all generate a demand in a market for capital goods. The stock of capital is added in the economy through these goods, and even larger capacity is provided in the future for production, therefore, the economy grows. The basic starting point of all economic growth theories suggests that investment, and expansion are impossible without initial savings.

*“Economic growth is positive when investments exceed the amount necessary to replace depreciated capital, thereby allowing the next period’s cycle to recur on a larger scale. The economy expands in this case; otherwise it is stagnant or even shrinks. This is why the volume of savings and investments is an important determinant of the growth rate of an economy.”*⁵

If Y represents total output, C is total consumption, S is total savings and t is the time period, the variables are aggregated over the total population. In this case S will take out the borrowers of current consumption. Assuming a closed economy with no net flow of resources to and from the outside world and ignoring government expenditure and taxation, the following equation is true;

$$Y(t) = C(t) + S(t) \quad (2.1)$$

National income is distributed between savings and consumption. The produced

⁵Ray 1998 pg 54.

output should match the value of commodities produced for consumption, and those required by the investors.

$$Y(t) = C(t) + I(t) \quad (2.2)$$

Here I represent investments. Combining the equation 2.2 and 2.3 gives us,

$$S(t) = I(t) \quad (2.3)$$

Savings are equal to Investments. The stock of national capital K is augmented by investments replace the worn-out part. Assuming that some fraction δ of the capital stock is depreciating, if so;

$$K(t + 1) = (1 - \delta)K(t) + I(t) \quad (2.4)$$

And it shows how the changes over time take place in capital stock. The rate of saving s is saving as a ratio of income;

$$s = S(t)/Y(t) \quad (2.5)$$

And the rate of saving depends upon numerous factors in the economy.

Capital output ratio is also very important in this regard; it can be denoted as θ . It is basically the required capital in the economy for the production of a single unit of the output. Therefore, it is;

$$\theta = K(t)/Y(t) \quad (2.6)$$

By combining and rearranging the equations 2.3 and 2.4 give the Harrod-Domer equation.

$$s/\theta = g + \delta \quad (2.7)$$

Here g denotes the overall growth rate, it is extracted from the value $[Y(t+1)-Y(t)]/Y(t)$.

The most important aspect of this model is the savings rate s . Can it be considered as a parameter of growth that manipulates policy? It all depends upon the control of the policy maker over the economy. The endogeneity issue is also attached to this; saving rates can also be under the influence of per-capita income level in society.

The Harrod-Domer model strongly connects the growth with two basic variables:

1. The saving capability of economy, since an increase in savings will accelerate the growth rate.
2. The output ratio, A lower value of θ enhances growth rates.

Demas et al (1965) writes that *"In comparing the economic performance of different underdeveloped countries, it is often assumed that those countries with a relatively high per-capita income are, in some sense, more 'developed' or nearer the takeoff point than other countries with lower per-capita income. Again, this tendency often springs from the use of a saving-centered model of development of the*

Harrod-Domer type, where global aggregates of savings, investment, and output are considered to be central variables in the growth process".⁶

2.2.2 Neo-classical Model

The neo-classical growth model (Exogenous growth model) was developed by Robert Solow and Swan in (1956). The model was an extension to the Harrod-Domer model with an addition of the factors, including labour and technical progress. The main three propositions of the Solow growth model are:

1. In the long run, steady growth of the output is determined by the rate of growth of the labour force in efficiency units, and is independent of the saving and investment ratio to GDP. A higher saving or output ratio is offset by a higher capital output or lower productivity of the capital, because of the neo-classical assumption of diminishing returns to capital.
2. The level of per-capita income (PCY) depends upon the ratio of saving and investment to GDP. The level of PCY varies positively with saving and investment ratio and negatively with the rate of growth of the population.
3. Based on the preferences for savings vis-a-vis consumption and technology, there will be an inverse relationship between different countries in their capital to labour ratio and the productivity of the capital. Therefore, poor countries with a small amount of capital per head should grow much faster than the rich countries with larger amounts of capital per head. This will lead to a convergence of per-capita incomes and living standards across the world.

Three main assumptions behind this model are:

⁶Demas et al (1965), p.5.

- The model states that output depends upon the labour and capital, i.e. output is a function of capital and labour.

$$Y = F(K, L)$$

Where K is Capital, and L is labour, so an increase in output is directly linked with growth of capital and growth of labour. Growth of labour has two further aspects i.e. natural rate of population growth and exogenous technical progress. The growth of capital involves saving propensity, i.e. 's'. At this point, this point, At this point, At this point, role of financial systems can be linked with growth rates. Can a strong financial system permanently raise the output and capital?

- The labour force grows at a constant exogenous rate, l
- All savings are invested:

$$S = I = sY$$

The most commonly used neo-classical production function with constant returns to scale is the Cobb Douglas Production function.

$$Y = bK^\alpha L^{1-\alpha}$$

Where α is the elasticity of output with respect to capital and $1 - \alpha$ is the elasticity of output with respect to labour. Obviously, the sum of both equals to unity. This states that 1 percent increase in capital and labour will lead to 1 percent increase in output. This exhibits constant returns to scale. Solow's growth model suggests that in the long run, the economy converges to a steady state, and it grows

to an exogenous natural growth rate, which is the sum of population growth and rate of technological progress. The major weakness of this model is that it is unable to clarify sustained growth. Although the model presents a framework for studying short-run movements, it does not help in studying the long-run patterns of economic growth.

Technical Progress in Solow Growth Model

According to Solow's growth model, per-capita income cannot be sustained in a country without technical progress. In that case capital needs to grow faster than the population growth rate, but the diminishing returns hypothesis states that capital to output ratio must decline. This eventually compels a decline in growth rate of output and thereby in capital. If there is continuing development in technical progress, i.e. if production has an upward trend due to fresh knowledge and its application. Until this optimistic view overshadows the concept of diminishing returns, there is no reason why growth of per-capita cannot continue indefinitely.

Solow's growth model, broad speaking, considers two main factors, first, contemporary and advanced means of production, i.e. technical progress. This progress improves efficiency and productivity of labour, secondly regular expansion of machinery, plant, and other means of production. The model asserts that in the absence of the first factor, the second alone cannot keep sustaining levels of per-capita growth.

Convergence

A very strong prediction of Solow model is convergence. Suppose in the long run, countries do not have the tendency to show differences in rates of savings, technical progress, and capital depreciation. Then Solow's model assumes that capital to labour per efficiency unit will converge to a common value. It happens irrespective

of the beginning state of any of these countries, when measured for the initial level of their income per-capita. This concept is termed unconditional convergence⁷.

Baumol (1986) studied the growth rates of sixteen economies during the period of 1870-1979. A log of GDP per-capita in 1870 is plotted against the horizontal axis and per-capita income growth rates during 1870-1979 along the vertical axis. All countries included in the experiment had very different levels of income per-capita in the initial period but are among the richest nations today. The results strongly supported the unconditional convergence hypothesis. A slope value of -1 suggested that more or less all of initial gaps of income per-capita had been erased by 1979.

De Long (1988) examined the same countries starting from the poorest to the richest. The exercise was undertaken by plotting the log of income per-capita in 1870 on the horizontal axis and growth on the vertical axis. Countries appeared from poor to rich in the following manner- Japan, Finland, Sweden, Norway, Germany, Italy, Austria, France, Canada, Denmark, the United States, Netherlands, Switzerland, Belgium, the United Kingdom, and Australia. It is suggested that an accurate examination of convergence will be observed in countries that are ex-ante and possibly converge to high GDP per-capita levels that distinguish the richest economies after a number of decades. The results appeared in sharp contrast with Baumol's study as he added the countries in terms of richness of ex-post, i.e. countries with the same income per-capita level in 1979. A selection bias is observed in his study because only countries with success stories were included in the experiment to study convergence. These countries were rich in 1979 but were scattered in terms of income per-capita in 1870.

The prediction of unconditional convergence is based upon a weak link assuming that the saving rate, technical knowledge, population growth rates and depreciation rate are all same across countries. This concept flies in the face of the facts because

⁷Ray (1998) p.74.

countries differ in many of the features mentioned above if not all of them. Although Solow suggests that countries have to converge to a steady state, and this can be different across countries, therefore, two countries are not required to converge with each other. This weaker phenomenon is termed conditional convergence.

2.2.3 Endogenous Growth Theory

In mid 1980s it became apparent that the neo-classical growth model was theoretically insufficient to determine long-term growth. The model without technological change predicted that the economy would eventually converge to a steady state with zero per-capita growth because of diminishing returns to capital. The only way to deal with this problem was to broaden the concept of capital and include human components and then assume that diminishing returns did not apply to this.

The new endogenous growth theory was pioneered by Lucas (1988) and Romer (1986). The major inspiration behind the development of modern growth theory is the relation to the concept of diminishing returns to capital. It is stated that with constant and increasing returns, there can be no supposition of the convergence of per-capita incomes across the world, or individual countries reaching the long run steady state growth equilibrium at the natural rate. There are no diminishing returns to capital, investments are important for the long-term growth and growth is endogenous in this way. Positive externalities with the human capital formation are assumed in this model, e.g. education and training, research and development. This prevents the marginal product of capital from falling and the capital output ratio from rising. The model involves production function in capital;

$$Y = AK^\alpha$$

Here K is the composite measure of capital, Physical capital plus other types

of reproducible capital and $\alpha = 1$ which is the elasticity of output with respect to K . The absence of diminishing returns is the major property of this model. The new growth theory asserts that marginal product of capital does not decline. It denies the concept of neo-classical theory that poor countries grow faster than rich countries.

2.3 Extensions to the Basic Models

The theories explained in previous section leave some questions.

1. Technical progress alone can increase income per-capita in the long-run but the human factor is equally important in determining the technical progress rate. It is worth considering that new technologies travel very fast from country to country so what can be the consequences if this assumption is dropped?
2. Do labour and capital with smooth and unobstructed technical progress flow, define economic growth?
3. Solow's model offers modest forecasts so how can the large differences in income per-capita be reconciled?
4. In the end, do capital and labour with unobstructed technical knowhow complete the picture for economic production? If this were true, we would have observed enormous disparities in capital returns between poor and rich countries (poor countries having higher returns) and if this difference is not observed, this could be due to excessive capital flow from developed to poor countries. However, neither of the above conditions are observed. Are there various classes of labour that go through the production function in different ways and in turn affect the returns rate to physical capital?

2.3.1 Human Capital and Growth

Rich countries have access to physical capital in large stocks, and these countries invest in money and time in education⁸. It is possible for these countries to produce a great amount of human capital as well. These countries produce skilled workers for production, trained labour to operate state of the art machines, innovative people to generate new ideas and methods in economic activities. Developing countries lack this and have more unskilled workers.

If Solow's model is enhanced, and individuals are given the right to save in two different forms, first investment in physical holdings and second investment in education. This could increase the worth of labour and also future supply. These kinds of investments will directly promote households and individuals.

Uzawa (1965) formulated a model of growth where the development in technological knowledge is attained only by involving the scarce means in positive quantities, and considering the allocation pattern of scarce resources that cause optimum growth. The model is based upon aggregate economic growth⁹.

The economy is considered in terms of two factors of production, i.e. capital and labour. These are combined for the production of a homogenous output. The output may be accumulated as capital stock or consumed instantaneously. At each moment, the state of technical knowledge is encapsulated with aggregate production function. Any transformation in technical knowledge is explained by a change in production function. Technological knowledge represents labour in the model. Thus, any enhancement in efficiency of labour is not dependent on utilised capital.

The production function in aggregated terms can be written as:

⁸Ray (1998), p.100.

⁹Introduced by Solow and Swan (1956).

$$Y(t) = F[K(t), A(t)L_P(t)]$$

Where $Y(t)$ annual production output, $K(t)$ is the existing capital stock, $A(t)$ is labour efficiency and shows the state of technical knowledge at a given time t , and finally $L_P(t)$ represents the quantity of labour involved in production. It is believed that different activities in terms of education, construction, health, and maintenance in public goods that improves the labour efficiency $A(t)$ are combined together in the form of one sector i.e. termed as the education sector. It is postulated that labour are employed by education sector, and the effect of education sector activities is defused over economy uniformly. Therefore, the improvement rate in labour efficiency can be established by the ratio as the employed labour in the education sector to the total labour force.

2.3.2 Total Factor Productivity

In the previous section, the technical development in the growth model was studied, whereas this section discusses its measurement. Total factor productivity is considered as a measure of technical advancement¹⁰. The main idea behind this model is simple assuming all factors have rewarded their marginal products in production function therefore, the output increase can now be estimated. This increase has to be due to the accumulation of productive factors alone. If the growth of output (made through accumulation) is faster than predictions, this is the result of the growth of total factor productivity (*TFP*)s.

The growth of (*TFP*) is residual, that is the difference between real growth rate of production and factors growth rates weighted in their input in production.

¹⁰Ray (1998), p.117.

Calculation of (*TFP*) requires cautiousness; First of all, it should be noticed that input growth is taken into account. For instance, growth of labour does not mean only population growth rate but the participation rate of labour and composition of education of working people may change systematically over a period of time.

East Asian ‘Miracle’ and Total Factor Productivity

East Asia enjoyed magnificent rates of economic growth since 1965. The region showed faster growth than any other region in world history. Eight economies played a major role in reflecting these growth rates, including Japan, Korea, Hong Kong, Singapore Taiwan (from Asia), Indonesia, Malaysia and Thailand (from South-East Asia). The success rate was so high that economists turned to find the clues of achievements in these economies so that the same factors could be transplanted to other economies to attain higher results.

Key factors are highlighted with the main focus on accumulation of human and physical capital, and the pace of technical progress¹¹. These countries took enormous steps in the accumulation of human and physical capital. Saving rates in these economies were lower than in Latin America in 1965 while in 1990, they surfeited around twenty percentage points over Latin America. Above average investment rates and significant higher private investment were recorded in these countries during this period.

These economies became capital exporters compared to the rest of the developing countries. Human capital to per-capita income level was found to be very high. Singapore, Korea and Hong Kong accomplished their targets of education at universal primary standard and rates of secondary school enrolment started to increase.

According to the World Bank, around two-thirds of the observed increase in

¹¹Ray (1998), p.120.

growth can be credited to the accumulation of human capital, physical capital and also primary education¹². The rest of the growth was due to total factor productivity (TFP). It is suggested that TFP rate in these economies was very high as compared to other developing countries.

2.3.3 Money and Growth

The institutional aspect in monetary growth models is ignored in analysing the mechanism of money transmission. It is assumed that money is allocated by making transfer payments to economic units. Therefore, two functions are performed by money, first as a consumer good and second as a factor of production that brings an increase in the level of utility. The demand for money depends upon market rates of interest and the level of income. The aggregated demand for money and real capital are linked with the price level. The equilibrium of price is established by the supply and demand function of money.

Tobin (1965) introduced the role of government in this model that has fixed spending proportion to national income and generates finances either from taxes or through printing money. Therefore, the only function of government in this case is to inject money into the economy through transfer of payments or withdraw money through taxes. These taxes or payments are assumed to be independent of individual's holdings of money. Thereby, these payments do not affect the individual's decisions. The results of Tobin's effect model also report that inflation at a moderate level leads to high growth rates¹³.

The original form of Solow's growth model considers physical capital as the only mean of wealth while savings translate into accumulated physical capital. In terms

¹²Stiglitz (1993).

¹³Moderate inflation is considered an incentive for producers. Goods become expensive and producers get more profit and revenues. In case of inelastic demands of export in a country, imports do take place by trade partners even the price rises, and that brings a surplus of current account.

of Tobin's model money is suggested as an asset that is durable, as it yields a stream of services for its holder. Individuals choose between two alternatives, i.e. physical capital and money. The conclusion from Tobin's model in mathematical terms shows a steady state with lower capital to labour and output to labour ratio in existence of money. However, the rate of economic growth will be same in the long-run (similar to Solow's growth model). If there is an increase in return of capital comparative to money, this will raise capital to the money ratio in portfolios. The shift in the portfolio will bring an increase in capital accumulation. This will bring a rise in income per-capita obtained in a steady state and higher growth in transition from low to high capital to labour ratio.

Fisher's concept of interest rate parity suggests that the nominal interest rate is a combination of real interest rate and expected inflation (increase in level of price)¹⁴. Therefore, the soundness of monetary growth is supposed to be attached to the future expected price. If the speed of adjustment is relatively small so the steady state, monetary growth is dynamically stable. It is also suggested that a decline in an interest rate on money holdings can be observed in case of moderate inflation. This will cause capital deepening. An increase in short term growth drives the economy towards a steady state.

2.3.4 Does Fiscal Policy Make a Difference?

Fiscal policy refers to government taxation and spending to control the aggregate demand within the economy¹⁵. In "*expansionary*" fiscal policy; the government cuts down taxes and increases spending. Lower taxes bring an increase in consumer's disposable incomes. Expansionary fiscal policy can cause severe budget deficits. On the other hand, "*contractionary (tight)*" fiscal policy works in completely the

¹⁴Fisher and Barber (1907).

¹⁵Arnold (1998).

opposite manner. Taxes are raised, and cuts are levied on government spending. This policy helps to bring a decline in consumer spending and decreases aggregate demand, eventually this helps to improve budget deficits of governments.

If governments tend to borrow more (issuance of debt instruments) for their spending that raises the market interest rates. Governments are always capable of paying market rates, but the problem occurs when individuals and corporations cannot afford to borrow and the situation of crowding out emerges¹⁶. In another case, greater wealth will increase the consumption level that means increased demand for money in terms of bonds or other financial instruments. In both above cases, greater wealth will affect financial markets. It is suggested that fiscal policy act defiantly in unstable economic systems (Blinder and Solow 1973).

Stiglitz and Uy (1996) studied the public policies of the Asian 'tigers' of 1990s that resulted in booming growth rates. The countries included into the study were Hong Kong, Korea, Taiwan (China), Singapore, Malaysia, Thailand, and Indonesia. The growth rates in these economies are considered miracles, but actually, they were the outcome of well designed policies and programs by their governments. The governments of these countries intensively intervened in financial markets and financial institutions to help them become strong. Instruction had been provided for the issuance of credit to potential and export oriented businesses and heavily regulated the institutions. The main purpose of all this exercise by the governments of these countries was to mobilise savings, and efficient allocation of investments. However, the prolificacy of all these measures was seen far beyond financial markets because the scarce capital was allocated in terms of incentives for goods and export oriented businesses. Governments also showed flexibility in these countries, if at any stage, the program became unsuccessful due to the government intervention,

¹⁶In other words, a decline in private investment and consumption due to excessive public borrowing.

it was immediately stopped. Governments worked for two key agendas; first of all, to build strong financial institutions and financial markets, secondly to make sure that resource allocation was not misused. The governments adopted three main policies in this regard, including the creation of financial institutions and markets, implementation of appropriate regulations, and finally offered credit and subsidies to potential businesses. Financial regulation was imposed to influence the domestic savings rate. First of all, restrictions were imposed on consumption in terms of prevention from mortgage markets and any other means of consumer credit. When there was no consumer credit available at the market, consumers tended to save more to buy a house or other major purchases at full price, therefore, savings to income ratio increased rapidly. Secondly, prudential regulations in the banking sector reduced the probability of bank failures.

Hellmann et al. (1998) studied two different approaches that prevail in terms of government intervention in the financial sector. On one hand, government interference in the financial system is appreciated due to the pervasive nature of market failure and government intervention is very important in order to mobilise savings and regulate efficient allocation of resources to catch up with the technological promotion (Johnson 1982, Wade 1990). On the other hand, markets perform efficiently if an incompetent government stay away from the financial system (World Bank 1993).

Alesina et al. (2002) studied changes in fiscal policy that played quite a significant role for investment of private businesses in OECD countries. The major effects were noticed from changes made in government spending, particularly in the wage bills of government. Increments in public wages can put pressure on private sector for upward trend. In the competitive model of labour market, workers might respond to tax hikes by demanding, that transfers should be generous with high before tax real wages. This can lead to a decline in profits and thereby investment.

Hauner (2006) asserts that financial development is adversely affected by the continuous borrowings of public sector from domestic banks. A group of 73 countries was examined for this purpose and suggested that these countries had very good financial sectors but faced huge challenges due to this problem. When domestic borrowing is replaced with domestic debt that leads to certain issues, including, increased government interventions in the economy and financial sector, an increase in public sector banks in terms of government ownerships of banks, weaker property/creditors rights. Financial development can be harmed due to all these factors in terms of its effect on banking structure. Banks lending more to the public sector become inefficient in the long run by earning effortless profits and reduces client competition. This borrowing affects the liquidity of the banking sector and thereby negatively affects financial deepening and fiscal policy.

Gray et al. (2007) assert that if public spending is utilised on unproductive areas, e.g. public transfers and consumption that negatively affect growth rates. However, spending made on rewarding areas, e.g. investments and social sectors helps to improve growth rates. It is observed that fiscal policy works efficiently if taxes are collected in an effective and efficient manner, and spending is utilised in productive areas with good governance. On the other hand, countries with weak governance spend more on unproductive areas; higher taxes are their requirement which they cannot generate efficiently. Therefore, profitable areas suffer a lack of funds, and eventually growth is impaired in this way.

2.4 Why May Financial Development Matter?

This section surveys the direct relationship between finance and growth and the importance of financial institutions in economic growth. Is the relationship between financial development and growth positive? The present knowledge on this issue

suggests a positive correlation between the two but endogeneity has not proven yet. It is the responsibility of government to support and supervise financial sectors in achieving their effective policies. In this regard, the role of banks stock markets and insurance companies are very important. This section discusses the separate roles of banks, stock markets and insurance companies in an economy.

2.4.1 Banks

Banks, as financial intermediaries play a significant role in the economy. Finance is the main requirement of any industry in a country. Efficient provision of credit to potential businesses helps to promote innovation in an effective manner. Credit facility offered by banks works as an incentive to the producer to increase production. Banks can handle agency problems better than stock markets. Financial intermediaries provide complementary services to the issuer of a new equity such as underwriting. Thus, it is possible that the development of the stock market and banking system go together. The Importance of the banking sector has been critically and empirically examined by different researchers. Liberalisation along with strict property rights and legal restrictions in the banking sector increases the competition in domestic banks, which helps to increase the efficiency of the banking sector (Kunt et al 2008).

Cameron (1967) asserts the role of banking in the process of industrialisation. Seven economies, including those of England, Scotland, France, Belgium, Germany, Russia, and Japan are examined. It is suggested that banking system can play a positive 'growth inducing' role as well as respond passively to the demand for financial services.

The difference between the qualities of financial intermediation across countries can have huge implications for international capital flows and hence economic growth

rates (Boyd and Smith 1992).

Some studies have employed a larger set of countries to obtain more elaborate results in this regard. Levine et al (2000) examined the impact of the development of financial intermediaries on economic growth. Results were found to be positive for 71 countries from 1960 to 1995. The development of financial intermediaries is found to be associated with the national legal and accounting system. It is suggested that strong creditor rights accounting practices can enhance financial intermediation development. The development of financial intermediaries will lead to fast growth rates.

Arestis et al (2001) examine the impact of stock markets and bank on economic growth in five developed economies. The countries included the United States, Japan, Germany, the United Kingdom, and France. The Stock market and banks development is associated with each other. Vector autoregressive analysis (VAR) showed consistent results for causality in favour of the bank based financial system. Banks appeared to contribute more to long term growth than capital markets.

Hondroyiannis et al (2005) studied the role of banks and stock market in economic growth in Greece. The endogeneity of the relationship is examined through the vector error correction (VEC) model. The contribution of stock markets in economic growth was found to be smaller than that of the banks.

2.4.2 Stock Markets

Stock markets are accepted as an important component of the economy. These markets provide a platform to buyers and sellers to meet up and trade. The investments in return help traders to generate more funds and expand businesses, finally all this gives boost to the economic growth. Stock markets are considered as the key source to generate funds by the companies. Liquidity is the key factor that attracts

investors to invest in stock markets. Liquid Stock markets enable firms to acquire their required capital quickly (Adjasi and Biekpe 2006).

Atje and Jovanovic (1993) suggest that the impact of financial development over economic growth take place in two ways, which are either permanent or transitional. A strong impact of stock markets on economic growth with 40 countries is found. It is observed that many developing countries are not promoting their stock markets while they can, and they are still having bank oriented financial systems, and if they promote financial markets, they can improve their growth rates.

Levine and Zervos (1996) empirically examined the relationship between stock markets development and economic growth. An index for the stock market development is constructed. The index measured the development with reference to trading, liquidity, size, and liberalisation. Positive results are reported with 41 countries from 1976 to 1993. The development of stock markets is found an important factor in achieving high levels of growth.

Greenwood and Smith (1997) assert that markets promote growth. Therefore, in return growth promotes the formation of the markets.

Caporale et al (2004) assert that developed stock markets positively affect economic growth in the long run. Financial liberalisation is an important aspect in this regard. Based on seven countries with quarterly data from 1977 to 1998 it was found that well functioning stock markets help to boost economic growth.

2.4.3 Insurance Companies

Insurance companies are similar to capital markets and banks since they operate to serve the requirements of households and business entities. Access of insurance services is considered crucial to stabilise the economy and enables businesses to accept aggravated kind of risks. Insurance companies pool premiums and also establish

reserve funds by accepting claims. These companies play a vital role in the creation of large quantities of asset placement in capital markets thereby contributing to economic growth. The main function of the insurance sector on the customer side is the transfer of risk. Insured entity pays a premium value and then is secured for a particular uncertainty. In positive perspective, insurance may attract more investments, new services and products and thereby lead to economic development. On the other hand, critics of positive impact of insurances over economic growth believe that negative manipulation from insurance companies can make the policy maker change their behaviour (Haiss and Sumegi 2008).

Insurance companies grab their places as competitors to financial markets. These companies offer a variety of options for investments and diversification in investor's portfolios. Due to the indemnification for losses, the amount of precautionary savings held by companies and households is reduced. Insurance companies increase competition in the market and thereby increase market efficiency.

Blum et al. (2002) suggests the following five potential hypotheses for a causal link between insurance companies and real sector:

- Development of insurance companies reduces the economic volatility in the short term and leads to long- term economic growth. Investments made through insurance companies enhance economic growth (Supply leading).
- Economic growth can cause an increase in the demand for insurance. (Demand following).
- Negative causality between insurance companies and growth since the development in the insurance sector may cause an increase in moral hazard leading to higher volatility and less efficiency in the economic system.
- No causal link between developed insurance sector and economic growth.

- Interdependence of both i.e. different activities of insurance companies and their possible links with growth.

2.5 Transmission Channels

There are studies in which firm and industry level data are analysed in order to examine the relationship between financial development and economic growth, e.g. Maksimovic and Kunt (1998), King and Levine (1993) among others. This has helped to specify the transmission channels through which finance may affect long-term growth. Younger firms are more dependent on external financing. Easy access to external financing creates new and more professional technologies. In this way financial development improves productivity growth and –potentially– long term growth is sustained.

The new endogenous growth theory is more technology-centred. The theory suggests that technological changes contribute more than any other factor in achieving long term economic growth. Research and development is the main factors in this regard. The main issue is, whether the development of a strong financial system needs more creativity to increase productivity as the endogenous model of growth suggests.

Industrial sectors that rely more on external finance develop faster in developed financial markets. It is recommended that financial development has a significant impact on economic growth, and it works by dropping the cost of external finance to financially dependent firms (Rajan and Zingales 1998).

Gregorio (1999) asserts that borrowing constraints raise aggregate savings, and as a result it may enhance economic growth. It is stated that financial arrangements may facilitate borrowing for the accumulation of skills. If human capital accumulation is not inclined to diminishing returns on a social level, financial arrangements

that can ease human capital creation would help to accelerate economic growth.

Fratzscher and Bussiere (2008) studied the reasons for the existence of a time-varying association between openness and growth over time with 45 industrialised and emerging-market economies. It seems that countries have a propensity to grow in the short term instantly following the capital account liberalisation. These countries may not grow quicker in the medium to long term. Fast growth in the short run is due to the investment boom and a surge in portfolio and debt inflows. In contrast, the quality of domestic institutions, the size of FDI inflows, and the sequencing of the liberalisation process are found to be important driving forces for growth in the medium to the longer term.

2.6 The Evidence

This section aims to review the existing evidence on the relationship between finance and growth. The development of a financial sector was considered unproductive in the early 20th century, because the financial practice did not produce any real goods. Schumpeter (1911), Cameron (1967), Goldsmith (1969), McKinnon (1973), Levine (1993) et al found that well functioning financial systems have a positive impact on growth. Efficient financial sectors mobilise savings into productive investments, reduce transaction's costs and promote technological advancements.

Schumpeter (1911) emphasised the importance of financial development for the growth of an economy.¹⁷ *"The entrepreneur in principle and as a rule does need credit, in the sense of a temporary transfer to him of purchasing power, in order to produce at all, to be able to carry out his new combinations, to become an entrepreneur. He can only become an entrepreneur by previously becoming a debtor. The essential function of credit consists in enabling the entrepreneur to withdraw*

¹⁷Schumpeter (1911), p.44.

the producer's goods which he needs from their previous employments, by exercising a demand for them, and thereby to force the economic system into new channels. In development, which introduces the new agent capital into the economic process, there must be still a third market in which something interesting happens, the capital market".

In contrast to the above views, a few studies suggest that it is the high level of income, which creates the demand for a developed financial system. When income increases, the demand for better financial services also rises. Robinson (1952) suggested "*where enterprise leads finance follows*"¹⁸. It is asserted that economic development generates demand for financial systems. In addition to this, some economists doubt the importance of the relationship between finance and growth. Robert Lucas (1988) asserts that economists badly over-stress the role of a financial system in economic growth.

Goldsmith (1969) studied 35 countries, including 19 developed and 16 less-developed ones to examine the relationship between finance and growth. A positive relationship between financial sector and economic growth during the sample period of 1860-1963 was reported. The correlation reflected a two way causal relationship, and it was suggested that financial markets enhanced growth by raising the efficiency of investment.

McKinnon (1973) emphasised that developed capital markets monitors the efficiency and makes it possible to achieve increasing returns from capital stocks.

Gregorio and Guidotti (1995) found a negative impact of financial development on the growth of twelve Latin American economies and reported that it was due to the poor policies of financial liberalisation in these economies.

Levine (1997) asserts that the level of financial development can be a strong predictor of future rates of capital accumulation, technological change and economic

¹⁸Robinson (1952), p.80.

growth. Countries with developed banks and stock markets grow faster. The relationship between the initial levels of financial development and future levels of economic growth is also found to be very significant.

Arestis and Demetriades (1997) studied the importance of the financial system in growth and the extent to which the financial sector can contribute in achievement of growth rate targets. Secondly, can financial liberalisation help in stimulating growth and investment? The role of financial development over growth is examined in individual countries, and it is reported that results are highly different across countries. Countries have different institutional environmental and financial policies. "*Financial liberalisation*" and "*Repression*" are the two bounds; financial policy of individual countries moves between these two bounds. It is observed that the financial policy of developing countries moves slowly between these bounds. Some countries started their financial reforms in 1970s. Latin American countries faced a painful experience in this regard, undue risk-taking and high interest rates at around 20%; bad debts and bank failures brought these economies close to collapse.

Denizer et al. (2000) states that countries with good and sound financial systems face very low fluctuations in economic growth. They reported that the procedure by which a country develops its financial system is very important. The role of banks is significant in order to issue credit to the private sector, investment volatility, and consumption and investment.

2.7 Issues

There are certain issues related to the relationship between finance and growth that cannot be ignored. This part of the chapter highlights the main issues and concerns about this relationship.

2.7.1 Property Rights Financial Development and Growth

This section studies the importance and implementation of property rights, i.e. one of the major issues attached to the relationship between finance and growth. A few studies are discussed below in this regard. It is observed that developed economies strictly follow the rules for property rights, whether these are for tangible or intangible assets. In contrast, property rights in developing countries are weak. Therefore, investors do not feel confident investing in intangible assets and prefer to stick with investments in fixed assets such as land, etc.

Demsetz (1967) asserts that property rights identify the right to benefit or be detrimental to oneself or to others. Property rights identify how people may benefit or be harmed, who should pay whom for actions taken by people. It is noted *“Property rights are an instrument of society and derive their significance from the fact that they help a man form those expectations which he can reasonably hold in his dealings with others. These expectations find expression in the laws, customs, and moves of a society. An owner of property rights possesses the consent of fellowmen to allow him to act in particular ways. An owner expects the community to prevent others from interfering with his actions, provided that these actions are not prohibited in the specifications of his rights”*.

North (2009) argues that if the property rights are enforced and defined in the institutions, so uncertainty and transaction costs can be reduced. Therefore, the theory of institutions is important for theory of growth, otherwise the growth theory is incomplete. Financial systems are strong in countries with a strong legal structure. If external finances are increasingly available with strong legal system, that can improve growth rate in a country. (La Porta 1998).

In developed countries, the legal framework is designed in a way that investor's property rights are protected. The main difference between developing and de-

veloped countries is not just the markets but the legal system which exists there. (De Soto 1993).

Shleifer and Vishny (1997) suggest that the quality of shareholder rights can be a major determinant for the structure of firm and stock market development. Investors can acquire minority places in firms if shareholder protection is strong in the country instead of controlling stakes. As a result, firms can have dispersed owners as their shareholders and create liquid capital markets. On the other hand, investors compensate themselves by having control in stakes of the firm where shareholder protection is weak.

Asset structure in developing countries is very different from developed countries. In developing countries firms hold more of fixed and tangible assets as a percentage of total assets in contrast to developed countries (Kunt and Maksimovic 1999).

Claessens and Laeven (2003) asserted that firms enjoy fast growth in countries with secure property rights because of the protection available to them for the actions of competitors. Asset allocation greatly improves due to this. Financial access gets better in these countries due to financial development. Economic growth is enhanced in countries with established property rights and a developed legal structure. Well established property rights are important for secure returns of intangible assets. At firm level, property rights are considered as the level of protection on asset returns against competitors. Firms with weak property rights invest more in tangible or fixed assets compared to intangible assets because secure returns are considered more difficult from intangible assets¹⁹. Weak property rights protection can make it easy for competitors to copy them. On the other hand, it is considered hard to steal property rights of physical assets, e.g. land, machinery, etc. In general; firms allocate their resources in an optimal manner based on a country's property rights.

¹⁹Intangible assets can be patents (rights to inventors and technical advancements), copyrights (rights for artists, authors, and composers), trademarks (rights for commercial marks and symbols).

On a country level, less growth is recorded in countries with weak financial systems and lack of financial access that result in under investment. Firms under-invest in intangible assets in these countries.

Financial development is high in countries with a strong legal framework and better creditor's rights. Lenders are encouraged to collateralise loans and thereby finance the firms. Cross country, variation in financial development is mainly due to the difference in protection against private property rights and its primary endowments (Beck et al 2003).

De Soto (2003) writes "*Property, then is not mere paper but a mediating device that captures and stores most of the stuff required to make a market economy run. Property seeds the system by making people accountable and assets fungible, by tracking transactions, and also providing all the mechanisms required for the monetary and banking system to work and for investments to function. The connection between capital and modern money run through property.*"²⁰

The Property Rights Alliance (PRA) constructed its first "*International Property Rights Index*" in 2007. This index is considered a gauge for analysing the property rights in any part of the World²¹. The index intends to emphasise the relationship between strengthened property rights and the well-being of a country. It is suggested that much more is required to be done for the extension of property rights so that they are available to a maximum number of people, especially the poor. In the case of a free society, there is independence of private property rights, there is rule of law and citizens can enjoy economic independence. In developed economies, equity is considered private property; therefore the legal possession of property rights generates the collateral for the person who becomes the owner. For example, in the case of an agricultural society collateral can be utilised to get a loan from a

²⁰De Soto (2003), p.354.

²¹International Property Rights Index (IPRI, A Project of the Property Rights Alliance).

financial institution. Therefore, land can be utilised as collateral for the creation of new businesses or for the enhancement of existing businesses, and also for activities that can sustain and generate wealth in an economy. Exchange rates are settled among different economies under legal property rights therefore cross border business becomes possible. The index is based upon three main points,

- Legal and political environment
- Physical property rights
- Intellectual property rights

Legal and political environment includes judicial independence, political stability, rule of law, and the control of corruption. Physical property rights are based on the protection of physical property rights, registration of property and access to loans. Finally, intellectual property rights are based on the protection of intellectual property rights, patent protection, and copyright piracy. The index of property rights is based upon ten variables and a scale 0 to 10, where 10 refers to the strongest grade of property rights and 0 representing the non-existence of property rights. The standardisation formula applied for the construction of this index is;

$$IPRI = \frac{X_{max} - X_i}{X_{max} - X_{min}} * 10$$

Here X_i is the value for individual country factor, X_{max} and X_{min} are the maximum and minimum values of original data sets. Overall 115 countries from nine geographical regions around the world are examined. These regions are Latin America, Middle East, North Africa, Central and Eastern Europe, North America, Russia, Africa, Western Europe, Oceania and Asia. The top ten countries practicing strong property rights included Finland, Netherlands, Denmark, New Zealand,

Sweden, Germany, Norway, Switzerland, Australia and Austria. While the bottom ten countries with very weak or non-existence of property rights included Paraguay, Azerbaijan, Bosnia-Herzegovina, Chad, Venezuela, Guyana, Burundi, Zimbabwe, Angola and Bangladesh²².

2.7.2 Financial Liberalisation and Deregulation

A second and very important issue is financial globalisation and its impact on growth. A strong financial system is required to have high growth rates. To have a strong financial system, financial regulations are necessary to be made very carefully. The major focus is on deregulation and liberalisation of financial systems in this regard. Financial deregulations are basically an elimination of restrictions and controls that allow foreign banks and foreign stocks to enter the domestic market. One of the benefits of financial liberalisation is the increase in competition in the domestic economy and putting pressure on the government to create competitive policies.

The issue of financial deepening has divided the economists into two groups. One group follows Schumpeter (1911) who emphasised the importance of financial development for growth whereas the other group follows Robinson (1952) who asserted that growth is the prime mover behind financial development (Rousseau and Watchtel 2011).

Goldsmith (1969) and McKinnon (1973) blamed the deprived performance of growth and investments in developing countries for high reserve requirement, interest rate ceilings, and restrictions on the mechanism of credit allocation. Financial repression is caused by these restrictions mainly including low saving rates, credit rationing and low investments. Financial repression affects the efficiency channel that shifts savings into investments. Secondly, it also affects returns on savings.

²²Results of International Property Right Index (2009).

Marginal productivity of investments is not considered by bankers. Project allocations are made at the discretion of bankers. Due to low level of returns on bank deposits, savers retain their savings in unproductive modes of investments rather than in potential productive investments instruments. On the other hand, bank's lending supply is affected by higher reserve requirements. There are some policy implications attached to it, including interest rate ceilings, which need to be removed, a requirement of reserves to be reduced and credit programs to be abolished. It means liberalising the financial markets; therefore, markets should be left free to determine credit allocation.

Does financial deregulation contribute to achieve high growth rates? When there are strict financial regulations in a country, all loans are issued very carefully. Most of the loans are issued to the public sector companies and government-owned projects. General companies have very limited access to the loans. "Financial deregulation improves financial deepening; it increases the ratio of private domestic savings, investments and interest rates for savers" (Shaw 1973).

McKinnon (1973) suggests that fair allocation of credit is an important issue. In the case of financial regulations, some groups are left out or not properly catered in the case of credit allocation. Small borrowers or rural areas are omitted. Government misuses the resources to service their current accounts, and these groups become financially repressed.

Stiglitz and Weiss (1981) suggested that low reserve requirement will strengthen higher savings from the supply side of bank lending. Secondly, if directed credit allocation programs are abolished, more efficient credit allocations can become possible. Therefore, capital productivity can be stimulated.

Supporters of financial regulations suggest that it help to control market failures, banks crises, and financial instabilities, whereas others suggest that deregulation is very helpful in efficient allocation of resources. It helps in reducing costs and

increases the growth rates. It offers competition between different financial institutions and in this way the interest rate on investments increases. The spread between lending and borrowing rate is decreased. Capital is allocated to the most potential projects.

Rodrick (1987) suggests that successful real sector reforms are a prerequisite for financial reforms. It is encouraging to have financial repression in the first phase of economic liberalisation.

Sachs (1988) asserts that sequencing is important for liberalisation and domestic markets should be liberalised before the foreign markets.

The World Bank (1989) advises that in good times, authorities should take aggressive moves in financial reforms while moves should slow down in times of crises and negative shocks, e.g. recession and losses caused by terms of trade.

Gertler and Rose (1991) studied the role of financial sector on the growth by employing a non-structural model. The causal link between finance and growth has not explicitly identified in the study. During the period of 1950-1988, around 69 countries were examined. Two main financial indicators are utilised to proxy financial development; private credit and quasi money²³. Financial liberalisation along with financial and real development is necessary to achieve high levels of growth. Macro public finance and trade policies should also be considered to have good financial reforms.

Caprio and Summers (1993) suggest that in developing countries reforms management process is more important than the *Laissez-Faire* approach²⁴.

De Gregorio (1996) asserts that financial development has proven a double effect on economic growth; first by the development of domestic financial markets

²³Quasi money is not cash but these are highly liquid and can be converted to cash instantly, e.g. treasury bills, bank deposits etc.

²⁴French phrase; meaning leave alone; When government intervention in financial affairs is strictly condemned and opposed.

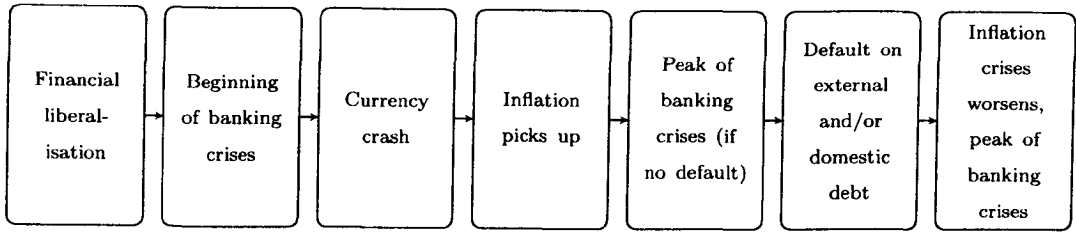


Figure 2.3: Kaminsky and Reinhart Twin Crises

which boost the efficiency of capital accumulation. Second, financial intermediation contributes in raising the savings and investment rate. Valuable effects of financial integration on economic growth can be achieved by promoting the development of the domestic financial system.

Kunt and Detragiache (1998) examined fifty three countries during the period of 1980-1994 and studied the reasons for the emergence of the banking crises. A multivariate logit econometric model suggests that financial liberalisation negatively affect the stability of banking systems.

Kaminsky and Reinhart (1999) present the evidence for a link between financial liberalisation and crises²⁵. It is reported that eighteen out of twenty six banking crises happened in those financial systems that were financially liberalised in the preceding five years or less. During 1980s and 1990s most of the financial crises were linked to liberalisation episodes. In figure 2.3 a vicious circle is portrayed that drags the economy into critical financial crises as the aftermath of financial liberalisation.

Claessens et al. (2001) studied the effect of foreign banks entries on the domestic banking in a cross country analysis with a sample of 80 countries from 1988 to 1995. It was found that foreign banks have higher interest margins, and profitability than domestic banks in developing countries and the opposite is true for developed countries. The relaxation on the foreign bank entries can be risky. To get the

²⁵Reinhart and Rogoff (2009), p.271.

benefits of foreign bank entry, policy makers need to pay more attention to ensure the adequate regulation and supervision.

Bird and Rajan (2001) state that liberalisation of the domestic banking sector should be kept gradual and sequenced to achieve higher efficiency as part of financial reforms. In the case of developing countries, capital account liberalisation should not be implemented until the domestic financial system is fully reformed.

Liberalising restrictions on flows of the international portfolio and entries of the foreign bank will enhance stock market liquidity and efficiency of the domestic banking system respectively. In turn, it will accelerate economic growth. Foreign entries directly carry new procedures, techniques, better skills, technologies, products, and training procedures to domestic market. Foreign banks may indirectly improve the domestic banking efficiency by stimulating competition in domestic financial markets (Levine 2001).

Edison et al. (2003) studied the capital account liberalisation in different economies. Industrial countries have liberalised their capital controls widely whereas most of the developing countries are still retaining control over the capital flows.

Prasad et al. (2004) found it difficult to determine a causal impact of financial globalisation and growth. Financial integration can be constructive under certain conditions. In case of developing countries, good governance, quality institutions and stable macroeconomic environment are required to make financial integration more productive. In general, fiscal discipline, stable growth and globalisation benefits are observed in countries with flexible exchange rate regimes. Financial integration in developing economies can work well through certain channels such as expansion in domestic savings, decreasing the cost of capital, technology transfer to developing countries from advanced economies. It is observed that average incomes per-capita growth rate in financially open (developing) economies are much better than those of less financially open economies. Cross countries variation in income per-capita

growth rate occurs not only because of capital labour output ratio but due to the total factor productivity that can be described in terms of rule of law and good governance. There are direct and indirect channels of financial liberalisation that can help to achieve enhanced growth rates in developing economies. Direct links include expansion of savings, reduced investment costs with enhanced global risk allocation, knowledge transfer in terms of managerial and technical skills, increased motivation of a domestic financial sector. Indirect channels of financial integration include support in specialisation, devotion for the enhanced economic policy framework. The reasons for the increased vulnerability to financial crises in developing countries include the sudden reversals and stops of international capital flows to developing countries. These countries heavily rely on international bank borrowing or foreign portfolio investments. The capital shock can come not from the domestic situations of the beneficiary country but from the macroeconomic instability of the industrial country.

Arestis (2005) studied the increased scepticism on financial liberalisation in past years. IMF and World Bank promoted the reform programs in developing countries, but the initial results were unexpected. Therefore, preconditions were imposed to make sure that the liberalisations will take place in a smooth manner. A precondition needed to be satisfied before the implementation of the program. Financial liberalisation needs sufficient supervision from the banking sector, and interventions are required to ensure the provision of a well-diversified portfolio of loans offered by banks for economic stability. Preconditions also included the stable or low rate of inflation and fiscal deficit in sustainable order.

Bekaert et al. (2005) assert that equity market liberalisation leads to 1% increase on average in annual real economic growth. The same effects of liberalisation are unlikely in all countries due to the quality of institution, comprehensiveness of reforms, legal environment, the investment conditions and the degree of financial

development. The real annual growth rate is more than 1% higher during the post liberalisation period. A difference of approximately 2.2% is reported between fully liberalised countries and those that have not experienced liberalisation. The non-liberalised countries showed lower secondary school enrolment, lower life expectancy, and higher population growth. It is reported that liberalisation is associated with increased growth.

Stallings and Studart (2006) assert that financial liberalisation open channels for foreign investments through domestic banks and financial markets. It also provides an additional source of capital to both corporations and governments. International rules and regulations in developing countries have great impacts on their domestic financial systems. In the case of Latin America, both financial markets and banks performed poorly. The access of capital is restrained from potential but small groups. Financial liberalisation on one hand resolved some of the issues in these economies but created some new concerns. Individual governments of each country are required to design specific policies that are compatible with their own specific financial and economic environment.

Nissanke and Thorbecke (2006) argue that substantial benefits can be achieved if countries get involved, strategically and actively, in the process of globalisation. However, these benefits are not guaranteed until the countries gain the benefits of high skill and high production activities from globalisation.

Mishkin (2007) asserts that effective working of the financial system is crucial for the success and growth within an economy. It is suggested that the financial system works like the brain of the economy since it allocates capital. If the capital goes into the wrong hands and does not flow accurately, the economy will operate inefficiently resulting in low growth rates. The importance of trade globalisation where the markets are open for the flow of foreign goods, and services are widely accepted and is not considered a controversial issue among economists. However, when it comes

to financial globalisation where markets are open for flow of foreign capital, this has become highly controversial to economists. When a Chinese investor buys a stock of IBM (USA) he moves capital from China to the United States, Similarly Citi Bank's loan to a Chinese shoe manufacturer is another example of financial globalisation. Financial globalisation has increased more than eightfold since 1975.

Chinn and Ito (2008) constructed an openness index that measures the openness in capital account transactions. The index is constructed upon the basis of 181 countries covering a period 1970 to 2005. It is based upon the *Annual Report on Exchange Arrangements and Exchange Restrictions* (International Monetary Fund) tabulation to determine the intensity of the capital controls. It was found that world is moving steadily towards greater financial openness. Industrialised countries have maintained a high level of financial openness over the period and steadily improved levels since the 1970s. Both less developed and emerging-market countries have accelerated financial opening since the 1990s. It is also reported that there is great variation between the pace and patterns in the different regions for financial openness.

Reinhart and Rogoff (2009) expressed their concern regarding financial liberalisation and noted "*Periods of high international capital mobility have repeatedly produced international banking crises, not only famously, as they did in 1990s, but historically*"²⁶.

2.7.3 Financial Structure

The issue of financial structure is also under discussion in different studies. In this section, the importance of financial structure in growth is studied. Financial structure analysis examines whether the country has a bank based or market based financial system. The discussion on the positive side of any one system has not been

²⁶Reinhart and Rogoff (2009), p.155.

resolved. Levine and Zervos (1998) report that stock market liquidity and banking development both positively predict growth.

Allen and Gale (2001) suggest that the advantage of financial markets is that it offers people with the same views to join and finance a project. Financial intermediation involves delegating decisions to managers. This involves the agency problem where the manager does not have similar priorities to those of the investor. This kind of delegation turns out to be optimal where the costs of making an opinion become high. In this regard, market based systems are considered to promote more innovation as compare to bank based system.

Kunt and Levine (2004) state that in the bank based financial system such as Germany and Japan, banks perform the leading role. In a market based financial system like USA and UK, the securities market and banks share the stage for performing financial services. A sample of 150 countries was examined to check the financial structure of different countries and their growth rates. It was found that higher income countries are more market oriented, and financial development is positively correlated with long term growth. However, financial structure is not significantly related to economic growth.

Wachtel (2004) asserts that underdeveloped economies rely more on the banking sector to provide the functions of intermediary, whereas developed economies have a broad range of market based institutions for the provision of intermediation. Banks and markets both have their importance in different ways. Resource allocation is done through financial intermediaries. Effective financial intermediaries increase the efficiency of the resource allocation.

Levine (1997) suggests that both financial intermediaries and markets matter for growth. Better and developed financial systems help to ease external financing. Carefully designed financial contracts help to increase investor's confidence. In return increased investments help to spur economic growth.

Arestis et al. (2004) examined time series data on financial structure for six countries Greece, India, South Korea, Philippines, South Africa and Taiwan. A long-term relationship between financial structure and economic growth using time series and dynamic heterogeneous panel methods was examined. Financial structure is found to explain significant economic growth in the majority of the sample countries.

In most of the studies, it was found that the market structure does not have a great impact on growth.

2.7.4 A Note on Causality

The causal impact of financial development over growth is a controversial issue among economists. This part of the chapter looks into the endogeneity issue of finance and growth relationship. Does “finance” lead or follow growth? The positive correlation between the two is observed in a few studies. However, the endogeneity issue is still under observation and has not yet been resolved. Does finance have a causal impact on growth? Is it financial development, which implies growth or its economic growth that implies financial development?

A few studies suggest that it is the high level of income, which creates the demand for a developed financial system. When income increases, the demand for better financial services also rises. Robinson (1952) suggests where enterprise leads finance follows”²⁷. It is asserted that economic development generates demand for financial systems. In addition to this, some economists doubt the importance of the relationship between finance and growth. Robert Lucas (1988) asserts that economists “badly over-stress” the role of financial system in economic growth²⁸.

Calderon and Liu (2003) examined the causal impact of financial development on growth in 109 developing and developed countries. It is reported that the relation-

²⁷Robinson (1952), p.86.

²⁸Lucas (1988), p.6.

ship is bi-directional. Financial development boosts growth and in return, economic growth enhances the financial sector.

Ang and McKibbin (2007) examined the relationship between financial development and growth during the period of 1960-2001. The main objective was to study, whether financial development leads or follows the growth of Malaysian economy during the sample period. The country is analysed due to its rich history of financial reforms in 1970s, when its whole financial system was restructured. The results of these reforms were very pleasant in the beginning; however, financial crisis of 1990s hit the Malaysian economy really hard. Domestic banking sector is considered one of the main factors that created mismanagement by adopting risky behaviour in lending policy. The results from different cointegration tests report that output, and finance are positively related in long-run. Trade openness and savings are positively associated with output but negatively with finance. Error correction mechanism (ECM) based cointegration tests further report that output growth causes financial development in long-run, not vice versa. The findings suggest that financial intermediaries could not cope efficiently to ameliorate the issues of asymmetric information, reduction of transaction costs, and resource allocation. Therefore, Robinson's (1952) argument that 'where enterprise leads finance follows' is supported in case of Malaysian economy during the sample period.

The current research is aimed at examining the endogeneity issue about the relationship between finance and growth by employing around 95 countries. It is attempted to capture the accurate results on the basis of large sample size. Table 2.1 summarises the major studies related to finance and growth relationship in chronological order.

2.8 Concluding Remarks

This chapter has reviewed main theories of growth, existing evidence of the relationship between finance and growth, the role of fiscal policy for the development of an economy and main issues attached to the relationship between finance and growth.

It is observed that almost all countries have liberalised their financial systems; some have liberalised extensively while others narrowly in the last three decades. Income disparity across different regions is huge (Ray 1998).

In the last century, economists were more concerned about the role of the real sector in growth. The debate over the importance of financial development in growth started with contemporary economics after the introduction of Solow's growth model. The idea was pioneered by Schumpeter in 1911. Some economists reported a positive link between finance and growth Goldsmith (1969), McKinnon (1973), Levine (1990). On the other hand, a few studies suggest that it is the high level of income that creates the demand for a developed financial system. When income increases, the demand for better financial services also rises. Robinson (1952) suggested "*where enterprise leads finance follows*"²⁹. It is asserted that economic development generates demand for a financial system. In addition to this, some economists doubt the importance of the relationship between finance and growth. Robert Lucas (1988) asserts that economists "*badly over-stress*" *the role of financial system in economic growth*.³⁰

The fiscal policy of a country is related to tax collection and government spending. Fiscal policy works best if the tax collection is made in an effective and efficient manner and if government spending is utilised in productive areas. Heavy borrowing by governments tends to increase the tax rate that makes corporations and general individuals incapable of affording loans. Therefore, the situation of crowding out

²⁹Robinson (1952), p.86.

³⁰Lucas (1988), p.6.

occurs.

There are some important issues attached to the relationship between finance and growth. First of all, there is the matter of implementation of property rights. Countries with strict property rights attract more investors because investors feel protected to invest even in intangible assets. On the other hand, investors in countries with weak property rights invest more in fixed assets such as building, land, machinery, etc.

Another important issue is the extent of liberalisation. The importance of trade globalisation where 'foreign goods and services can freely flow' is widely accepted phenomenon. However, when it comes to the free movement of capital across borders, it has divided the economists into two groups. The advocates of financial liberalisation believe that it has numerous advantages, including increased competition in domestic financial system, technical progress, etc., On the other hand, critics of financial globalisation argue that financial system works like a brain in an economy. It allocates capital; if capital goes into the wrong hands, so there are fair chances that the economy will collapse. Kaminsky and Reinhart (1999) presented the evidence of a link between financial liberalisation and financial crises.

As far as structure of the financial system is concerned, it has been observed that financial intermediaries and markets both are equally important, however, developed countries are more market oriented due to the practice of strong legal and property rights protection. There is no strong evidence found in favour of the only bank based or market based financial system.

Finally, the causal impact of financial development over growth is still unconfirmed and due to rapid financial globalisation and recent financial crises, economists are trying to find clues between financial deepening and financial crises.

Chapter 3 will discuss the measurement of financial development. It attempts to construct a financial development index on the basis of the main components of

financial development. It involves carefully selected elements from bank, stock markets and insurance companies. Before examining the relationship between financial development and growth, we need to know about the main factors of financial deepening and their importance with respect to financial development. In this regard, the main studies are discussed in detail in the next chapter.

Table 2.1: Summary List of the Empirical Literature

Authors	Date	Countries	Data Range	Frequency	Methodology	Main Findings
Goldsmith	1969	35	1860-1963	Annual	Panel regression	Two way causal relationship
Atje & Jovanovic	1993	40	1960-1985	Annual	GMM regressions	Positive and in favour of market based financial systems
Levine & Zervos	1996	41	1976-1993	Annual	Cross country regression	Positive and in favour of market based financial systems.
Ross Levine	1997	77	1960-1989	Annual	Fixed effect regression	Positive relationship between financial development and growth.
Rajan & Zingales	1998	41	1980-1990	Annual	Fixed effects regressions	Positive impact of financial development on growth.

Continued on next page

Table 2.1: Summary List of the Empirical Literature

Authors	Date	Countries	Data Range	Frequency	Methodology	Main Findings
Neussar & Kugler	1998	13	1970-91	Annual	Panel cointegration	Financial development and growth are found cointegrated in half of the countries.
Rousseau & Wachtel	1998	5	1870-1929	Annual	Johansen and VECM	Rapid growth in financial sector improves resource allocation and economic growth.
Ross Levine	1999	71	1960-1995	Annual	Cross country regression	financial development positively affect growth.
Claessens et al	2000	80	1988-1995	Annual	Cross country regressions	Financial liberalisation positively affect growth.

Continued on next page

Table 2.1: Summary List of the Empirical Literature

Authors	Date	Countries	Data Range	Frequency	Methodology	Main Findings
Arestis & Luintel	2001	5	1972-1999	Annual	Vector autoregressive (VAR)	Positive in favour of bank based financial system.
Carkovic & Levine	2002	40-54	1975-1988	Annual	Generalised method moments	Financial sector development has a strong impact on growth.
Calderon & Liu	2003	109	1960-1994	Annual	AR system & Granger causality	Bidirectional causality is found.

Continued on next page

Table 2.1: Summary List of the Empirical Literature

Authors	Date	Countries	Data Range	Frequency	Methodology	Main Findings
Rioja & Valev	2003	74	1966-95	Annual	Generalised method moments	Positive relationship in middle income countries but in high income countries tries the effect of financial development on growth diminishes.
Caporale et al	2004	7	1977-1998	Annual	Cross country regressions	Positive in favour of market based financial system.
Saci & Holden	2005	30	1988-2001	Annual	Generalised method moments	Impact of financial development over growth is positive.

Continued on next page

Table 2.1: Summary List of the Empirical Literature

Authors	Date	Countries	Data Range	Frequency	Methodology	Main Findings
Rousseau & Wachtel	2007	84	1960-2003	Annual	Two stage least square	Positive relationship between finance and growth disappeared during last fifteen years of sample period.
Gryay et al	2007	1	1986-2004	Annual	OLS & Granger causality tests	Reverse causality between financial development and growth is found in Cyprus.
P. J. Dawson	2008	58	1960-2002	Annual	Group means FMOLS	Cointegration found except in some very poor countries.
Kyung & Lee	2010	1	1960-1997	Annual	Descriptive analysis	Financial repression had negative impact on economic growth of Korea.

Continued on next page

Table 2.1: Summary List of the Empirical Literature

Authors	Date	Countries	Data Range	Frequency	Methodology	Main Findings
Campos et al	2010	1	1870-2003	Annual	Power method	Financial deepening in Brazil had positive impact over growth in long term period. However in late 1990s may caused financial crisis.

Measurement of Financial Development

3.1 Introduction

Financial development can be defined as policies, factors and institutions that lead to efficient intermediation and effective financial markets. Efficient financial systems mobilize savings and allocate them to high return projects. A strong financial system offers risk diversification and effective capital allocation (Levine 1993).

Financial development can be measured by a number of factors, including depth, size, access, and soundness of the financial system. It can also be measured by examining the performance and activities of the financial markets, banks, bond markets and financial institutions. Developed financial systems offer a wide range of financial services with higher returns and less risk.

Antzoulatos (2008) asserted that the degree of asymmetric information reduces with the development of a financial system. Developed financial systems offer spe-

cialised services and efficient operations that help to reduce information asymmetry in the market. Investors can trust and put more faith in the experienced forecasts of the financial intermediaries in developed financial systems. In this way, the value and trust of information raise and more investments can be attracted.

This chapter aims to measure financial development with maximum coverage from financial sector, including indicators of development from banks, stock markets and insurance companies. The method of principal component is utilised to extract a single financial development index "FIND". Principal component analysis is a modern tool of data analysis used to extract significant information from complex data sets. It helps to reveal the concealed structures in data sets (Shlens 2005).

The main purpose for the application of principal component analysis is to attain a meaningful index out of complex and multidimensional elements of financial development and to re-express the data with minimum noise and maximum extract so that a single measure of financial development can be achieved.

3.2 Determinants of Financial Development

The existing literature on the measurement of financial development comprises of two different lines of thought. The first group of studies measures financial development as the basis of the observed outcomes, i.e. size, access and depth of financial systems and second group includes proxies of a country's institutional, business, political environment and stability of the financial system.

This chapter attempts to measure financial development on the basis of observed outcomes of financial development because the measures adopted by the second group are highly time invariant. The characteristics and observed outcomes of a financial system are discussed below.

3.2.1 Institutional and Business Environment

Institutional Environment

Institutional environment involves policies, regulations, laws, and supervision of a financial system. Strong institutional environment boosts investor's confidence so that more investments can be attracted. Institutional environment can be strong and lawful under good governance. Developed economies have maintained strong institutional environment. Therefore, investors feel protected for their investments. On the other hand, in developing countries investors feel rather sceptical before investing due to the weak institutional environment. Investors in these economies may complain sometimes about the unclear and variable rules over time. However, advocates of host countries suggest that international investors want to gain maximum profits, and they flee at the first signs of a crisis. Sometimes, the distrust mounts to such an extent that business deals do not take place although this would benefit both parties.

Dysfunctional institutions are one of the main hurdles in financial development. Countries with strong institutional environment and investor's safeguards achieve high levels of financial development (La Porta and Silanes 1996).

Constant monitoring of the financial system with certified international audits is recommended to achieve high levels of financial development. It is suggested that banks should be rated on international standards and by international rating agencies. Many countries are following the Basel rule to strengthen their capital regulations¹. These measures can help to improve the financial strength of an economy (Barth et al 2008).

Contract enforcement is also considered one of the important elements of the

¹Basel rules are regulations of international banking and are created by Basel Committee (Switzerland). The regulations are applied for supervision and maintenance of capital for financial institution to decrease credit risks.

rule of law in any country, because it provides protection to both parties. Capital account liberalisation serves the countries better if the legal system is strong (De la Torre et al 2007).

Business Environment

A good business environment offers physical and technological infrastructure, availability of skilled workers, and low costs of doing business. These features strengthen financial systems and thereby boost financial development.

Availability of skilled workers helps to improve the quality of financial services. Outreville (1999) examined the relationship between the human development index and financial development in 57 countries and found that human capital and financial development are positively correlated. The degree of training, research and development, availability of good-quality management schools, as well as quality education in mathematics and science, all these factors are important in the production of skilled workers.

The cost of doing business is also one of the significant indicators, which measures the strength of the business environment in an economy. This measure also involves the cost of starting a business, as well as costs incurred to register the new business, and finally, the time involved to close a business (Beck and Levine 2005).

3.2.2 Financial Stability

Financial stability is the trade-off between risks and returns. The stability and soundness of a financial system are important for measuring financial development. Financial regulations are a key element in this regard. First of all, these regulations protect against systemic risks occurring from inter-dependencies and inter-linkages

in the financial system². In that case, the failure of one entity can lead to the failure of the whole financial system or market.

Secondly, financial regulations protect consumers from opportunist behaviours; this occurs when sellers try to benefit from their superior familiarity or knowledge and attempt to conceal information from buyers who can negatively affect their buying behaviour.

Financial soundness involve the risks related to the currency crises, systematic banking crises, and sovereign debt crises. A highly supervised and regulated financial system may be very stable; however, such a controlled system may equally hamper financial development and innovation (Herring 2003).

3.2.3 Banks and Non Banks

Banks are one of the key elements of the financial system and development. Many countries still prefer to rely completely on their banking sector rather than financial markets. Banks serve as a bridge between the savers and borrowers. They offer insurance to savers by providing diversified portfolios (offering lower risk with lower returns and higher risks with higher returns). Banks offer full insurance to their clients by offering long term investments against liquidity risk³ (Levine 1997).

In strong financial systems, banks offer low transaction and information costs. Credits are allocated efficiently. Effective and efficient allocation of credit to the private sector and potential businesses leads to an increase in industrial growth and enhances innovation in the country and increases the confidence of prospective businesses.

Non banks cannot be ignored for the measurement of financial development; these include brokers, dealers, asset managers, mortgage companies, investment

²These risks involve factors that have chained effects and can cause the collapse of a whole financial system. (The argument here is not related with the recent financial crisis.)

³Liquidity risk is that banks may sell its assets for loss to meet the cash demand.

banks, pension funds and insurance companies. Non bank financial institutions do not accept demand deposits but provide a number of financial services. Non banks and banks compete in strong financial systems, especially for lending opportunities. The competition between banks and non banks improve efficiency in both. This contributes further to the development of the financial system. Non banks also need to maintain excellent ratings for their operations (Diamond and Dybvig 1983).

3.2.4 Financial Markets

Financial markets are one of the most important elements of the financial sector. It includes four main types, bond markets, stock markets, foreign exchange, and derivatives markets. It is observed that countries with a developed financial system are more market oriented. One good reason for this can be the enforcement of property rights due to which investors feel protected even in intangible investments. Four types of financial markets are discussed below.

Bond markets trade is a place where investors lend money to a government or company in return for a pre-settled interest rate. There are two types of a bond market: primary bond market and secondary bond market. In primary markets, the bonds are traded for the first time after their issuance whereas in secondary markets, subsequent transactions of bonds are carried out.

Stock markets provide a platform for buyers and sellers to meet up and trade. The investments in turn help the traders to generate more funds and expand their businesses. Stock markets are considered the key source for generating funds by companies. Liquidity is the main factor that attracts investors to invest in stock markets. Liquid Stock markets enable firms to acquire much-needed capital quickly (Adjasi and Biekpe 2006).

The foreign exchange market is the place where trading of currencies takes place.

Usually trading in this market occurs over the counter. The relative values of currencies are also determined by this market and facilitate traders to exchange currencies. There are two types of exchange rate regimes; floating exchange rate and pegged exchange rate. In the case of the floating regime, the value of the currency can fluctuate with foreign exchange market, and countries are enabled to adjust for shocks. In the case of the pegged exchange rate regimes, the value of currency is matched with the value of another currency and sometimes with gold too.

Derivatives markets deal in swaps, forward contracts, options and future contracts. These instruments are derived from other assets, i.e. their values are based on some other assets. These can be stocks, currencies, commodities, bonds, etc. The trading is done over the counter as well as in the exchange traded derivatives market.

Size, Depth and Access

Size, depth and access reflect the output of the financial sector and measure how large and deep the financial system is. The size and depth of the financial system reflect the size of savings and investments in an economy. Large financial systems are expected to reduce the limitation on credit, improve the process of savings mobilisation and capital allocation and offer more services to its clients. Another important aspect of a strong financial system is access to financial services that refers to the greater availability to financial services.

3.3 Existing Measures of Financial Development

This section will discuss the main studies regarding the measurement of financial development. Different methodologies are used to examine the financial strength and stability of financial systems.

Neusser and Kugler (1998) employed pension funds, investment banks, loan and saving association, life and casualty insurance and banks to measure the depth in 13 OECD countries during the period of 1970 to 1991.

Demetriades and Hussein (1996) examined sixteen countries and proxy the ratio of bank deposit liabilities to GDP as a measure of financial development. It is suggested that the currency in circulation should be eliminated from the broad money stock to measure financial development, because an increase in the ratio of broad money to GDP shows the wide use of currency in circulation rather than an increase in the volume of bank stocks.

Rousseau and Wachtel (1998) studied the impact of financial development in five major industrial countries, including, United States, United Kingdom, Canada, Sweden and Norway during the period 1870 to 1929. The proxies for financial development included the assets of commercial banks, combined assets of commercial banks and saving institutions, savings institutions, insurance companies, and pension funds.

King and Levine (1993) used the ratio of liquid liabilities to GDP as a proxy of size of financial intermediaries and the credit to private enterprises to GDP as a proxy of activity of financial intermediaries.

Huang (2005) examined the main factors of financial development. A comparison of a number of countries is made to justify different roles of various factors of financial development. To capture the depth of the financial system, liquid liabilities, banks over head costs, net interest margins, are included. For the impact of a stock market on financial development, three variables are included, i.e. stock market capitalisation; total values traded, and the turnover ratio. The data is averaged over the period 1990-2001 and four indices are constructed including FD bank, FD stock, FD efficiency, and FD size to measure financial development.

The World Economic Forum introduced an annual financial development index

in their first financial development report of 2008. The index examined the financial strength of 55 financial systems in the world on the basis of annual data from 2007-08, and is constructed based on seven pillars of the financial system. These include institutional environment, business environment, financial stability, banks, non banks, financial markets, size, depth, and access. The method of standardisation is used to construct the index. The variables are re-scaled from 1 to 7, where 7 is ranked the most advantageous. The main objective behind the aggregation of all measures of financial development is to construct a unified measure of financial development. Therefore, different components of the index are weighted equally. The index is revised on annual basis by applying the same methodology. Table 3.1 reports the ranks, scores of financial development index for 2009. It can be observed from table 3.1 that high income countries have scored top places, including United States of America, United Kingdom, Germany, Japan, and Canada, whereas low income countries are at the bottom. The correlation between the pillars of FDI and FDI is reported in table 3.7.

Saci and Holden (2008) measured financial development by using principal component analysis. To measure the development of financial intermediaries ten proxies for the financial development are included. The proxies of the banking sector include the ratio of commercial bank assets to commercial plus central bank assets, credit issued to private sector to liquid liabilities, domestic credit to the private sector to GDP, and the ratio of liquid liabilities to GDP. To capture the impact of stock market development, stock market capitalisation to GDP, turnover ratio, value traded ratio, number of listed companies, have been added.

The main literature on empirical findings of financial development is reported in table 3.2.

Table 3.1: Financial Development Report Results (2009)

Country	Rank_2009	Rank_Score
United Kingdom	1	5.28
Australia	2	5.13
United States	3	5.12
Singapore	4	5.03
Hong Kong SAR	5	4.97
Canada	6	4.96
Switzerland	7	4.91
Netherlands	8	4.85
Japan	9	4.64
Denmark	10	4.64
France	11	4.57
Germany	12	4.54
Belgium	13	4.50
Sweden	14	4.48
Spain	15	4.40
Ireland	16	4.39
Norway	17	4.38
Austria	18	4.28
Finland	19	4.24
United Arab Emirates	20	4.21

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Table 3.1: Financial Development Report Results (2009)

Country	Rank_2009	Rank_Score
Italy	21	3.98
Malaysia	22	3.97
Korea, Rep.	23	3.91
Saudi Arabia	24	3.89
Jordan	25	3.89
China	26	3.87
Bahrain	27	3.85
Israel	28	3.69
Panama	29	3.63
Kuwait	30	3.62
Chile	31	3.60
South Africa	32	3.48
Czech Republic	33	3.48
Brazil	34	3.46
Thailand	35	3.35
Egypt	36	3.33
Slovak Republic	37	3.30
India	38	3.30
Poland	39	3.27
Russian Federation	40	3.16
Hungary	41	3.08

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Table 3.1: Financial Development Report Results (2009)

Country	Rank_2009	Rank_Score
Peru	42	3.07
Mexico	43	3.06
Turkey	44	3.03
Vietnam	45	3.00
Colombia	46	2.94
Kazakhstan	47	2.93
Indonesia	48	2.90
Pakistan	49	2.85
Philippines	50	2.84
Argentina	51	2.77
Nigeria	52	2.72
Ukraine	53	2.71
Bangladesh	54	2.57
Venezuela	55	2.52

Table 3.2: Measurement of Financial Development: Existing Literature

Authors	Date	Countries	Data Range	Frequency	Methodology	Main Findings
La Porta et al	1997	49	1970-93	Annual	Aggregated	Countries with French civil laws have weak investor's protections and least developed capital markets. Whereas countries with common laws are found with developed and big capital markets.
Bordo	2000	154	1974-99	Annual	Comparative study	Flexible exchange rate regimes should be applicable to attain the benefits of financial globalisation.

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Table 3.2: Measurement of Financial Development: Existing Literature

Authors	Date	Countries	Data Range	Frequency	Methodology	Main Findings
Yongfu Huang	2005	44	1990 - 99	Annual	Extreme bound analysis	Financial Development depends upon the quality of institutions, government policies, geographic conditions, income level, and cultural characteristics.
Chinn Ito	2005	108	1970-2000	Annual	Aggregated Index	Financial openness helps to achieve equity market development when the threshold level of the institutional and legal system is achieved.

Continued on next page

Table 3.2: Measurement of Financial Development: Existing Literature

Authors	Date	Countries	Data Range	Frequency	Methodology	Main Findings
Wei Huang	2006	35	1976-2003	Annual	Panel Dynamic fixed effects	Financial liberalisation is a key element of financial development.
Antzoulatos et al	2008	32	1990-2004	Annual	Panel dynamic OLS and cointegration	The degree of asymmetric information will decrease with the development of financial system.

The next section will discuss the main issues regarding the measurement of financial development. It includes legal and policy matters and also the impact of financial openness over financial development.

3.4 Measurement of Financial Development: Discussion

The major issues of financial development raise some important questions, i.e. Why do some countries have much bigger capital markets compared to others, e.g. why do United Kingdom and United States have huge financial markets. However, countries such as France and Germany have comparatively smaller ones? Why do Japan and Germany have enormous banking systems compared to other wealthy economies? There are some significant reasons for different levels of development in different countries.

3.4.1 Legal Matters

Legal matters are very important, especially when discussing monetary issues. Developed countries have maintained strong legal standards, however; developing nations are required to strengthen their legal systems so that investors feel protected and confident about their investments.

Legal origins matters in terms of differences in the abilities to adjust efficiently in developing socio-economic conditions. Countries with efficient adapting legal systems minimize the gap between the financial needs of the economy and the capabilities of the legal systems that help financial development to flourish. Private property rights are important to structure the foundation of financial systems (Beck et al, 2003).

La Porta et al, (1997) examined 49 economies and studied their investor protection rights. The quality of law enforcement and the character of legal laws were both studied in this regard. It is considered that countries with weak investor protection rights have small and narrow equity and debt markets. Countries with French civil laws have weak investor's protections and least-developed capital markets. In contrast, the situation is different in the case of countries with common laws, since these countries enjoy the developed and big capital markets.

3.4.2 Policy Matters

The role of government is very crucial in the implementation of effective financial policies. Governments are required to facilitate the improvement in institutional and business environment, provide the best mechanisms for the provision of efficient mobilisation of resources, and take responsibility for the implementation of sound prudential regulation, including appropriate accounting procedures and supervision. This can help a country to avoid financial crises and alleviate costs without increasing moral hazard.

Three main areas identified as being able to achieve strong and deep financial systems include: strong stock markets, financing small and medium enterprises, and defined contribution of the pension system. To achieve high levels of financial development, governments must focus upon flexible and shock proof exchange rates and a strong regulatory environment where the enforcement of contracts and operations of the contracts can flourish (De La Torre et al, 2007).

Financial globalisation unfolds in an environment where all major currencies are permitted to float freely against each other. It is recommended that flexible exchange rate regimes should be applied to attain the benefits of financial globalisation and cope with the risks and threats attached to it (Bordo et al 2001).

3.4.3 Financial Openness and Financial Development

Financial openness means capital account liberalisation and deregulation in domestic financial markets. There are mixed views in this regard. According to some studies, financial openness helps to build a strong financial system and to achieve higher targets of growth. On the other hand, it may incur a great deal of risk-taking and can increase macroeconomic volatility in an economy⁴.

The results of financial liberalisation in middle income and low income countries are quite different. Financial liberalisation has helped achieve high growth rates in middle income countries whereas in the case of low income countries, the results are opposite (Ranciere et al 2006).

Bekaert et al (2005) asserted that equity market liberalisation leads to 1% increase on average in annual real economic growth. The same effects of liberalisation are unlikely in all countries due to the quality of institutions, comprehensiveness of reforms, legal environment, the investment conditions and degree of financial development.

Capital account openness and domestic financial liberalisation play a significant role in increasing the depth of the financial system⁵. It also helps to increase intermediation between investors and savers. In turn, all this helps to increase the level of financial mobilisation in the economy (Fitzgerald 2006).

3.4.4 Indices of Financial Liberalisation: A Discussion

The controversial impact of financial liberalisation in financial development and growth is discussed in previous chapters. In this section, two main indices of financial liberalisation are presented. The first is constructed by Chinn and Ito in 2005, while

⁴Detailed discussion is in section 2.7.2.

⁵Financial depth refers to the accessibility to money in any form, i.e. cash or assets, mutual funds, bonds, etc.

second index is constructed by the International Monetary fund in 2008 as part of new data base of financial reforms.

Chinn and Ito constructed an index in 2005 that measures openness in capital account transactions. The index is constructed based on 181 countries from 1970 to 2005. KAOPEN index is based on the International Monetary Fund Annual Report on AREAER tabulation that determines the intensity of capital controls⁶. AREAER presents information regarding rules and regulations for external account transactions in different countries. It is found that the world is steadily moving towards greater financial openness. Industrialised countries maintained high level of financial openness over the whole period and steadily improved their standard since 1970s. Developing countries have accelerated financial liberalisation since 1990s. It is also reported that there is great variation between the pace and patterns in the different regions for financial openness.

Abiad et al. (2008) studied the effect of financial liberalisation on financial development⁷. The main questions addressed to relate to the effective use of financial policy and whether financial liberalisation has helped in financial development and financial stability. A graded index is constructed in which score of liberalisation for each of the categories is combined, and then it is normalised. The index is constructed based on 91 countries covering the period from 1973-2005. It captures the effects of financial policy in seven directions, including reserve requirements and controls on credit, entry barriers, control on interest rate, ownership of state, policies of securities market, bank regulations and capital account restrictions. A brief overview of all seven elements of this index is given below.

Credit Control and Excessive Reserve Requirement Governments may impose a high limit of reserves for prudential purposes, e.g. in Argentina the gov-

⁶ Annual Report on Exchange Arrangements and Exchange Restrictions.

⁷ International Monetary Fund ; A New Database of Financial Reforms.

ernment forced the bank to deposit all of their financial savings in central banks as part of the Deposit Nationalisation Law 1973. There are many countries that allocate funds to some particular sector (e.g. agricultural sector, small enterprises, etc.) for which they offer subsidies and usually governments do not impose ceilings on these credits issued by banks. For the construction of this index 20% is considered the threshold for the reserve requirement; therefore, excessive or moderate rate of reserve is determined by that.

Interest Rate Control

Controlling interest rate is the most common type of financial repression e.g. sometimes governments employ interest rate controls. These rates can be fully liberalised when bands, floors and ceilings are removed. Interest rate controls are considered strict when both deposit and lending rates are specified by the government. It is considered moderate when the interest rate can move within the premises of the band. For the construction of this index, the control on interest rate is observed in sample countries considering whether the interest rate is strict, moderate or liberalised.

Entry Barriers

Governments control credit allocation by imposing entry barriers in financial systems. This can be in the form of restriction over the entry of a new domestic bank or its competitors, e.g. non banks or international banks in the financial system. The restrictions can also be in the form of foreign bank participation, in different geographic locations where these banks operate. To construct this pillar, a country's licensing policy is considered in terms of being strict or soft.

State Ownership in Banking Sector

The direct form of credit allocation is most commonly undertaken by controlling the banks - that means public sector ownership of the banking sector. For the construction of this aspect in the index, ownership of bank assets by the public

banks is considered. Thresholds are also set for this including 50 percent, 25 percent and 10 percent to distinguish between repression and liberalisation.

Capital Account Restrictions

The flow of credit and exchange rate is normally controlled by imposing restrictions over international financial transactions within the economy by the governments. There are multiple exchange rates for different transactions, taxes on transactions, absolute restrictions over outflows and inflows of financial credits.

Prudential Regulations

In this case, government intervention is regarded as reform. Has the country adopted risky capital ratio such as the Basel I capital accord? Do executives influence the supervisory agency of banks? Is exemption available for supervisory oversights to certain financial institutions?

Securities Market Policy

Different policies are included to construct this pillar and include whether governments support securities market development, auctioning of government securities, securities and debt markets establishments, tax incentives, openness of foreign investors in securities market.

All these measures are graded from 0 to 3, where 0 reflects higher repression and 3 shows full liberalisation. If the index is observed with all seven components and the sum of the individual components (0 to 3) are taken into consideration, the score is between 0 to 21.

It is observed that during the past thirty years all countries have liberalised, although high income countries have liberalised more than low income ones. Five of the OECD countries, including Canada, Netherlands, United States, Germany, and United Kingdom liberalised their financial sector in the beginning phase of liberalisation, whereas other OECD countries remained a little repressed during the start period, but now they are fully liberalised. East Asian economies remained

quite repressed in early 1980s and liberalised in a gradual manner during 1980s. It took around a decade in some cases for the whole reform to take place. In 1990s Sub-Saharan African economies accelerated to liberalise. It is concluded that financial development alone cannot help growth unless policies to promote financial development are adopted.

3.5 “FIND” the Gaps

The index “FIND” constructed in this chapter has attempted to fill some gaps in previously constructed indices⁸.

- The World Bank index of financial development is an annual index based upon annual observations whereas “FIND” is constructed by using the most updated and recent data sets covering the period from 1988-2009 (the details of data are given in the next section).
- The index constructed by Huang (2005) is based only upon indicators of banks and stock markets covering the time period from 1990-2001 whereas the “FIND” index has covered development indicators from banks, stock markets and insurance companies with an extensive time period.
- Indices discussed in section 3.4.4 are constructed to study the impact of financial liberalisation. As mentioned earlier in this chapter, “FIND” is constructed on the basis of observed outcomes of financial development because the financial indicators based on characteristics (such as liberalisation indices) are highly time invariant.
- Saci and Holden (2008) constructed an index of financial development with ten financial indicators of banks and stock markets over the time period from

⁸Previously constructed indices are discussed in sections 3.3 and 3.4.4.

1988 to 2001.

- The financial index “FIND” constructed in this chapter, is in line with Saci and Holden (2008) but more indicators of financial development have been included in it. In total, thirteen components of financial sector development are included from banks stock markets and insurance companies. As already mentioned “FIND” is constructed on the basis of most-recent data sets extracted from reliable sources covering the time period from 1988 to 2009 and 22 annual observations. Another important difference between the two indices is that Saci has included 30 countries to construct the index while “FIND” included 41 countries. “FIND” is a composite index that captures size, structure, activities and efficiency measures of banking sector, stock market and insurance companies. The impact of the “FIND” index on growth is examined in the next chapter.

The next section explains the data and statistics of our financial development index. The detail of all indicators, including the definitions, data range and their importance is discussed below.

3.6 Data

A well structured financial system is important for boosting the economy, but the main question is how to measure financial development. Some of the prominent issues regarding the measurement of financial development are discussed within the literature. Pill and Pradhan (1995) asserted that the standard measures of financial development such as real interest rates and ratios such as broad money to GDP can lead to misleading results. These indicators overlook the figures of public borrowing that are made from domestic financial systems.

All the elements of financial development, including banking sector, stock markets, bond markets and insurance companies have been considered. These measures are important because they represent the size, efficiency and activity measures of the financial sector. The data is obtained from the International financial statistics, World Bank development indicators, and Beck et al, data set⁹. The analysis started with 210 countries with data ranging from 1960 to 2009, but due to missing entries in the data, it was not possible to include all the countries in our analysis. Considering the availability of data, 41 economies with annual observations from 1988-2009 are included for the construction of financial development index by using principal component analysis. The definition of the indicators of financial development is reported in tables 3.3 and 3.4. To measure the financial development accurately in a large number of countries, thirteen very important and relevant financial indicators have been included.

⁹A New Database on Financial Development and Structure, Beck et al (2000).

Table 3.3: Banking Development Indicators

Bank Indicators	Importance
Liquid liabilities to GDP	Measure the size of financial intermediaries.
Private credit by domestic money bank to GDP	Measures the level of financial services, Distinguishes the credit issued to private or public sector.
Private credit by deposit money banks and other financial institutions to GDP	Measures the level of financial services, It indicates the credit issued on merit and also the promotion of innovation, research and development in an economy.
Commercial bank assets to commercial plus central bank assets	Measures the extent to which commercial banks are allocating capital in economy against the central banks.
Bank's concentration	Measures the banking structure, as the ratio of the three biggest banks assets to the assets of all commercial banks in the system.
Net interest margins	Measure the efficiency of banking sector, the accounting value of the bank's net interest revenue as a share of its total assets.
The overhead costs	Measure the efficiency of banking sector, the accounting value of the bank's overhead costs as a share of total assets.
Foreign direct investment to GDP	Measures the strength of FDI based upon productivity due to the technological transmission and new skills of management in the economy.

Sources: International Monetary Fund's International Financial Statistics and World Bank development Indicators.

Table 3.4: Stock Market and Insurance Companies Development Indicators

Stock Market Indicators	Importance
Stock market capitalisation to GDP	Measures the size of stock market. It is equal to the value of listed shares to GDP.
Value traded ratio	Measures the activity of the stock market, it is equal to the total value of shares traded on a country's stock exchanges to GDP.
Turnover ratio	Measures the efficiency of stock market, it is equal to the total value of shares traded on country's stock exchange to stock market capitalization.
Insurance companies indicators	Importance
Life insurance premium	Measures the activities of financial institutions. It is equal to the life insurance premium volume as a share of GDP.
Non life insurance premium	Measures the activities of financial institution It is equal to the non life insurance premium volume as a share of GDP.

Sources: International Monetary Fund's International Financial Statistics and World Bank development Indicators.

The “FIND” index of financial development is constructed by using eight indicators of banks, three indicators of stock markets and two indicators of insurance companies. The details of all these are given below.

3.6.1 Bank Indicators

To measure the size of financial intermediaries, the ratio of liquid liabilities to GDP (M3 to GDP) is employed (e.g. Goldsmith 1969, Levine 1993, and Wachtel 2000). The ratio of liquid liabilities to GDP is also called depth, and it captures the overall size of the financial sector as a percentage of GDP (Beck et al. 1999). This ratio is an indicator of liquidity provision in an economy. The only weakness of this indicator is that it does not show savings allocation. Therefore, activities of financial intermediaries might not be captured accurately. It is thus decided to include more measures of activities of the banking sector for the construction of the “FIND” index.

Two additional measures of the activities of financial intermediaries include: the ratio of private credit by deposit money banks to GDP (Levine and Zervos 1998) and the ratio of credit issued to the private sector by deposit money banks and other financial institutions to GDP (Levine 1993, Beck 1999). These measures distinguish the credit issued by money banks or financial institutions compared to central banks. These indicators are helpful in finding the difference between credits issued to the private sector or public sector. It indicates the credit issued on merit and also the promotion of innovation research and development in an economy. The higher values of these ratios are recommended and refer to low transaction and information costs and the higher level of financial intermediation and financial development.

The expansion of the financial sector is an important aspect of financial development that is measured by including the ratio of commercial bank assets to com-

mercial plus central bank assets (Levine 1997; Rioja and Velve, 2004). This ratio measures the extent to which commercial banks are allocating savings in economy compared to central banks. Commercial banks are expected to be more efficient and effective in allocating savings in productive and profitable projects compared to central banks. Commercial banks are likely to monitor the management, and increase savings mobilisation in an economy. Higher values of this ratio are recommended for the expansion of the financial sector and financial development.

An important aspect of the banking sector is its structure. A bank's concentration is included to measure the banking structure. This measure is used to present the concentration of commercial banks. It can be defined as the ratio of the three biggest banks assets to the assets of all commercial banks in the system. A high value of this ratio show increased concentration in commercial banking that shows a lack of competitive pressure, which is necessary to attract savings and process them effectively to the investors.

The efficiency of the banking sector cannot be denied in order to measure financial development. The main function of the financial intermediaries is to serve as a bridge between savers and investors. In this regard, two ratios are included and these are net interest margins and overhead costs. Net interest margins are defined as the accounting value of a bank's net interest revenue as a share of its total assets. The second ratio, i.e. the overhead costs can be defined as the accounting value of the bank's overhead costs as a share of total assets. Large overhead costs reflect cost inefficiency (Levine et al., 2005). They are also associated with small banks that do not have substantial income from fee-based activities and operate in a restrictive environment (Kunt et al., 2004).

Net Interest Margin equals the difference between bank interest income and interest expenses, divided by total assets. A lower value of overhead costs and net interest margin is frequently interpreted as an indication of greater competition and

efficiency (Huang 2005).

Yao (2006) asserted that foreign direct investment is important because it helps to increase the total level of investments in the economy. Foreign direct investment cannot be ignored especially in the case of developing countries, because it plays a significant role in the economic growth of these economies. It boosts the level of productivity due to the technological transmission and new skills of management in the host economy.

3.6.2 Stock Market Indicators

To capture accurate and maximum effects of the stock market over financial development three main indicators are included. These indicators are the size, activities, and efficiency of stock markets. The size of the stock market can be measured by using the ratio of “stock market capitalisation as a percentage of GDP”. It can be defined as the value of listed shares divided by GDP.

The activity of the stock market is measured by using the “ratio of stock market value traded as a percentage of GDP”. Value traded ratio equals the total value of shares traded on a country’s stock exchanges divided by GDP (the value of listed shares on the country’s exchanges). It measures the trading relative to the size of the economy.

The efficiency of stock markets is measured by using the “stock market turnover ratio”; Turnover ratio equals to the total value of shares traded on country’s stock exchange divided by the stock market capitalisation. It is the value of listed shares traded on a country’s stock exchange. The turnover ratio measures trading relative to the size of the market. It also exhibits substantial cross-country variability. The turnover ratio may differ from the value traded ratio because a small, liquid market will have high turnover ratio but a small value traded ratio. This measure tries to

find the liquidity on a macroeconomic scale; the objective is to find the degree to which agents can cheaply, quickly, and confidently trade ownership claims of a large percentage of the economy's productive technologies.

3.6.3 Insurance Companies Indicators

The contribution of insurance companies in financial development is captured by including two of its activity ratios, which include: "life insurance premium" and "non life insurance premium". The first ratio is important because of the life insurance sector with respect to the economy. It is defined as the life insurance premium volume as a share of GDP.

The second ratio is defined as the non life insurance premium volume as a share of GDP. It includes all types of insurances except life insurance. These can be property insurance, automobile insurance, or casualty insurance, etc.

3.7 Methodology and Results

3.7.1 Principal Component Analysis

The "FIND" index is constructed by using the method of principal component analysis. Its main objective is to decrease the dimensionality in data. It is a technique that attempts to retain all the variation available in data even when dealing with a large set of variables. It transforms the data into new variables, i.e. the principal components, and they are not correlated. The maximum variation of the original variables is contained in first few principal components (Jolliffe, 2002).

Principal component analysis is normally applied as a method of variable reduction or for the detection of structure of relationship between the included variables. The information available in a group of variables is summarised by a number of mu-

tually independent principal components. Each principal is basically the weighted average of the underlying variables. The first principal component always has the maximum variance for any of the combinations. If more than one principal component is generated, they are uncorrelated. In this instance, the first principal components are employed as an aggregate measure of financial development. The main strength for the construction of financial development index by using principal component analysis is that the weight of the index is based upon the inner correlation of all the individual measures. The main drawback of this kind of measure is that if there are excessive missing entries for individual indicators so it can produce sampling bias in the results. Principal component analysis can be considered as the trade-off between achieving a precise estimate and losing some of the variation in the data and information. The new components of financial development were constructed for 41 countries, because for most of the developing countries, complete data are not available.

Jackson (2003) asserted that principal component analysis is the technique of the data analysis used to obtain linear transformation of a group correlated variables until the achievement of certain optimal conditions, the most important of which is the achievement of uncorrelated transformed variables. Those transformed variables are called principal components.

Construction of “FIND” index

First of all, principal component analysis (PCA) is applied to all to four categories of financial development, i.e. banks, stock market indicators, bond market indicators, and insurance companies. The results could not be obtained for all the countries due to the issue of missing values in the data sets. To deal accurately with this issue principal component analysis is applied to each group of financial indicators individually. Results for only 27 countries are achieved when PCA is applied to all

four categories. In second step, PCA is applied to all individual groups to point out problematic variables that have more missing entries and cause a problem in obtaining results for more countries. PCA results for individual groups are quite different and are as follows; PCA bank results for 58 countries, PCA Stock market results for 50 countries, PCA bond market results for only 27 countries and PCA insurance companies results for 53 countries. It is observed that bond market indicators have a maximum number of missing entries, and this reduces the number of countries drastically. In the final step, PCA is applied again to all financial indicators together except “bond market indicators” the results of principal components are achieved for 41 countries; the index is named as “FIND” Index. Only countries with at least 70% of observations available in data set are included in the construction of the index. Every effort is made to include the maximum number of relevant variables so that a significant index could be achieved. The “FIND” index retains maximum variation and information available in variables because it is based on the method of Principal component analysis.

Individual indices are also constructed for each of these 41 countries based on banks, i.e. “BAEAN ”, stock market index named as “STEAN” and insurance company’s index is named “INEAN”. These indices are utilised in the next section to make a comparative analysis of financial structure in different countries.

3.7.2 Descriptive Statistics

This section will discuss the descriptive statistics of the “FIND” index reported in table 3.5 and make a comparison between “FIND” index and the ranking of financial development index of 2009 (see table 3.1). It is observed that top five countries with highest mean values of “FIND” index includes Switzerland, Japan, United Kingdom, Netherlands and United States. A comparison between the financial development

index of 2009 and the “FIND” index reports very similar results. Almost the same countries scored top and bottom position. There are some main differences between the “FIND” index and FDI-09 (financial development index 2009). First of all, the “FIND” index is based upon annual observations for 22 years from 1988 to 2009, whereas the FDI-09 is constructed every year since 2008 and only one-year observations are included for its construction. Secondly, Principal component analysis is used to construct the “FIND” index whereas FDI-09 is based upon the method of standardisation. An overview of the countries included in principal component analysis is discussed below¹⁰.

Switzerland stands at the top position in the “FIND” index with highest score and maximum value for the index. The economy of Switzerland is based on highly developed financial services and the manufacturing industry. The contribution of services sector to the Swiss economy is 71.2% with major part of GDP. The GDP per capita is \$42900, whereas the real GDP is \$522.4 billion, and the growth rate is 2.7%. The inflation rate is considerably low that is 0.7%. Germany, US, France and Netherlands are its main import partners. The financial crisis of 2007 also affected the Swiss economy. An analysis of the individual statistics of “BAEAN”, “STEAN”, and “INEAN” are reported in tables A.1 , A.2 and A.3. It is noticed that the Swiss financial sector is market based because it scores maximum value in “STEAN” index whereas it stands second in “BAEAN” and third in “INEAN”. Switzerland is also found in the top ten strong financial economies according to the financial development annual index 2009 reported in table 3.1. A comparison of all indices is shown in Appendix A.

United Kingdom and United States also stand among the top five strong financial systems in the “FIND” index. United Kingdom has a very strong financial system and trading economy and offers vast financial services that contribute to a greater

¹⁰According to World Fact Book 2010.

proportion to its GDP. After recovering from 1992s financial crisis, the UK economy managed to expand significantly. However, the recent financial crisis of 2007 hit its economy really badly causing a decline in home prices and an increase in the economic slowdown. The UK government took considerable measures to stabilise their financial system. It has planned to cut the budget deficit through austerity plans in the next five years from 10% to 1%. The real GDP growth rate of UK is 3%. According to the “FIND” index, the UK stands third highest out of 41 countries, whereas if individual indices are examined, It scores top position in “INEAN” index i.e. based upon insurance companies. It shows that the UK is offering strong services through its insurance sector. It appears fourth in banking index “BAEAN”. Our results are again quite similar to the financial development annual index 2009 reported in table 3.1, United Kingdom has grabbed first place in FDI-09 during the period from 2008 to 2009.

United States is the most powerful economy in the world with GDP per capita of \$47400. It has a Real GDP of \$14.62 trillion, with GDP growth rate of 2.7%. 76.7% of its GDP is composed of the service sector, and it has a strong financial system. The global financial crisis affected US markets in 2008. To stabilise this situation, the US government introduced a \$700 billion programme i.e. TARP (Troubled Asset Relief Programmes) to purchase equity in some of the US banks. Statistics in the “FIND” index for the United States place it fifth among the 41 countries during the period from 1988 to 2009. It is observed that financial structure of the US is more market based than the bank based because it stands second after Switzerland in our “STEAN” index and fourth in “INAEN” index.

Table 3.5: Descriptive Statistics for “FIND” Index

Sample: 1988 – 2009

Included observations: 751

Rank	Country	Mean	Max	Min.	Std. Dev.	Obs.
1	Switzerland	5.07	8.48	2.71	1.57	19
2	Japan	3.79	4.92	2.72	0.64	21
3	United Kingdom	3.42	6.90	2.09	1.31	18
4	Netherlands	3.02	6.09	1.51	1.31	17
5	United States	2.55	5.24	0.87	1.26	18
6	Malaysia	2.32	3.36	1.69	0.54	15
7	Korea, Rep.	2.16	4.43	0.61	1.17	19
8	South Africa	2.05	4.10	0.48	0.95	17
9	Canada	1.81	3.94	0.32	1.18	21
10	Spain	1.68	6.38	-0.47	2.05	18
11	Germany	1.52	2.34	0.59	0.56	19
12	France	1.27	3.17	0.25	0.87	19
13	Australia	1.15	2.72	0.14	0.69	15
14	Finland	1.08	2.78	0.08	0.85	20
15	Belgium	1.00	2.87	-0.81	1.12	19
16	Austria	0.91	1.69	0.57	0.32	19
17	Denmark	0.71	4.67	-1.10	1.87	21
18	Portugal	0.67	2.95	-1.19	1.32	19

Continued on next page

Table 3.5: Descriptive Statistics for “FIND” Index

Sample: 1988 – 2009

Included observations: 751

Rank	Country	Mean	Max	Min.	Std. Dev.	Obs.
19	Thailand	0.64	1.64	-0.87	0.63	22
20	Israel	0.44	1.43	-0.36	0.64	17
21	Italy	0.06	3.66	-1.32	1.34	21
22	Norway	0.04	0.51	-0.28	0.24	15
24	Czech Republic	-0.57	-0.06	-1.06	0.26	15
25	Tunisia	-1.01	-0.84	-1.28	0.15	18
26	Morocco	-1.10	0.26	-1.94	0.61	15
27	India	-1.11	1.60	-2.47	1.14	18
28	Chile	-1.22	0.85	-2.66	0.92	22
29	Greece	-1.28	0.89	-2.35	1.19	18
30	Egypt, Arab Rep.	-1.69	-0.91	-2.63	0.49	20
31	Pakistan	-1.85	-0.72	-2.66	0.68	15
32	Poland	-1.85	-0.26	-2.80	0.74	18
33	Philippines	-2.00	-1.26	-2.67	0.43	19
34	Indonesia	-2.13	-1.04	-2.70	0.50	18
35	Hungary	-2.14	-0.95	-3.31	0.79	18
36	Kenya	-2.35	-2.08	-2.60	0.17	15
37	Colombia	-2.47	-1.40	-3.04	0.48	19
38	Peru	-2.72	-1.62	-3.95	0.57	18

Continued on next page

Table 3.5: Descriptive Statistics for “FIND” Index

Sample: 1988 – 2009

Included observations: 751

Rank	Country	Mean	Max	Min.	Std. Dev.	Obs.
39	Turkey	-2.79	-1.32	-4.39	0.78	22
40	Brazil	-3.01	-2.36	-4.15	0.51	16
41	Argentina	-3.09	-2.50	-3.96	0.39	19
42	Venezuela, RB	-3.74	-2.06	-5.09	0.93	19

3.7.3 Results

Principal component analysis is the method that models the structure of the variance for the set of variables. It is utilised to generate a single measure of financial development, i.e. the “FIND” index. It aims to construct a new index based on the main elements of financial development. Principal components are achieved by computing the eigen value of the variance matrix. The first principal component in a given set of variable is the unit length linear combination of these variables, and it has a maximum variance. After that, all the other principal components actually maximise the variance between the unit length combination and these are orthogonal to the preceding components (Johnson and Wichtern 1992). After the first principal component, each principal component is a linear combination of total variables that captures the different aspects of the data (Huang 2005).

The results for the proportion of variance explained by the principal components, and their accumulated values are reported in table 3.6. As mentioned earlier, due to data limitation, principal component analysis is applied to 41 countries with 13 carefully selected financial development variables. The first principal component explained the maximum variation for all the countries. Cumulative proportion of the variance given by the first three principal components is 62.8%, whereas the first four principal components contain 70% of the variation. Each of the components from 5 to 13 after that explains less than 7% of variation. Therefore, they are considered relatively unimportant considering that useful information is captured by the first four principal components.

The positive coefficients for the first principal component PC1 in table 3.6 mean that it represents the overall measure for financial development. Most of the bank development indicators report positive values even in PC2 that represents more banking sector development. The maximum weight is for Bank concentration in the

third principal component PC3, which suggests that there is a strong influence of this variable in this component. Stock market turnover ratio contains the maximum positive weight in PC4 and is an efficiency measure of stock markets whereas “Deposit Money Bank Assets to (Deposit Money + Central) Bank Assets” show the largest negative weights in PC4, i.e. the efficiency measure of banks. It may suggest that this component has a strong influence on stock market indicators.

As mentioned earlier, individual indices are constructed based on banks, stock markets and insurance companies of 41 countries. Higher weights for some variables reflect the structure of the principal component, e.g. if in some country, there are positive values for the bank indicators and negative ones for the stock market indicator for first principal component (PC1), it means that the financial development in that particular country is due to banking sector development (Saci and Holden 2008).

The results of these principal components are reported graphically in appendix A. Almost all the countries have shown an increasing and upward trend in financial development. It means that it is accepted globally that financial development is an important aspect for the strength of an economy. Some countries are targeting their banking sector to improve, whereas others are more concerned about the development of their financial markets.

Palley (2007) asserts that the modern financial system attains more importance compared to the economic policies and outcomes. It promotes the importance of the financial sector over the real sector. It also transfers the savings and income from the real sector to the financial sector.

In table 3.7 the correlation between indicators of financial development, GDP per capita and first four principal components are shown. It can be seen that all of the financial development indicators and GDP per capita are positively correlated with the “FIND” index, i.e. PC1 in table 3.7.

Table 3.6: Principal Component Analysis (1988 – 2009)

Obs.: 751	Com1	Com2	Com3	Com4	Com5	Com6	Com7	Com8	Com9	Com10	Com11	Com12	Com13
Eigenvalue	5.456	1.508	1.200	0.936	0.922	0.821	0.608	0.498	0.407	0.269	0.204	0.098	0.074
Var. Prop	0.420	0.116	0.092	0.072	0.071	0.063	0.047	0.038	0.031	0.021	0.016	0.008	0.006
Cumul. Prop.	0.420	0.536	0.628	0.700	0.771	0.834	0.881	0.919	0.950	0.971	0.987	0.994	1.000
Variable	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8	PC 9	PC 10	PC 11	PC 12	PC 13
BC	0.036	0.173	0.574	0.421	-0.606	0.013	0.258	0.068	0.029	0.106	0.062	0.018	0.083
BO	0.197	0.540	-0.273	0.293	0.061	-0.027	-0.318	-0.126	-0.138	0.597	0.095	-0.012	-0.056
BA	0.240	0.038	0.212	-0.298	-0.024	0.664	-0.338	0.465	0.007	0.060	0.165	-0.035	0.055
IM	0.276	0.465	-0.072	0.248	0.040	0.155	-0.127	-0.138	-0.032	-0.736	-0.191	0.019	0.013
FI	0.033	-0.071	0.539	0.333	0.753	0.060	0.040	-0.068	0.065	0.092	-0.032	-0.029	0.024
LJ	0.324	-0.128	0.112	-0.109	-0.131	-0.130	-0.306	-0.381	0.718	0.016	0.109	-0.221	-0.068
LL	0.322	0.226	-0.116	-0.116	0.184	-0.267	0.429	0.265	0.147	-0.096	0.617	0.045	0.213
NL	0.312	-0.135	0.178	-0.259	-0.051	0.162	0.113	-0.618	-0.495	0.005	0.285	0.159	-0.101
CR2	0.393	-0.018	-0.012	-0.194	0.002	-0.052	0.164	-0.040	-0.041	0.193	-0.543	-0.042	0.664
CR1	0.378	0.106	0.047	-0.182	0.031	-0.061	0.351	0.200	0.045	0.118	-0.378	-0.026	-0.695
SC	0.305	-0.262	0.122	0.106	-0.044	-0.452	-0.437	0.266	-0.148	-0.075	-0.019	0.562	-0.033
ST	0.189	-0.361	-0.397	0.430	-0.018	0.446	0.254	-0.051	0.253	0.081	0.010	0.392	-0.008
SV	0.306	-0.399	-0.150	0.340	-0.053	-0.081	-0.060	0.163	-0.320	-0.078	0.100	-0.670	-0.035

Com: Component; PC: Principal Component; BC: Bank Concentration; BO: Bank Overhead Costs to Total Assets; BA: Deposit Money Bank Assets to (Deposit Money + Central) Bank Assets; IM: Net Interest Margin; FI: Foreign Direct Investment (Net Inflow) to GDP; LJ: Life Insurance Premium to GDP; LL: Liquid Liabilities to GDP; NL: Non Life Insurance Premium to GDP; SC: Stock Market Capitalisation to GDP; ST: Stock Market Turnover Ratio to GDP; SV: Stock Market Total Value Traded to GDP; CR2: Private Credit By Deposit Money Banks and Other Financial Institutions to GDP; CR1: Private Credit by Deposit Money Banks to GDP.

Table 3.7: Correlation between Indicators of Financial Development and Principal Components

	PC1	PC2	PC3	PC4
BA	0.547	0.013	0.239	-0.309
BC	0.059	0.195	0.639	0.387
BO	0.425	0.649	-0.318	0.269
CR1	0.877	0.104	0.051	-0.193
CR2	0.914	-0.061	-0.016	-0.199
FI	0.076	-0.089	0.592	0.325
IM	0.636	0.557	-0.079	0.238
LI	0.760	-0.185	0.122	-0.125
LL	0.736	0.258	-0.133	-0.124
NL	0.722	-0.196	0.201	-0.251
SC	0.713	-0.339	0.132	0.109
ST	0.437	-0.473	-0.443	0.410
SV	0.716	-0.520	-0.169	0.328
GD	0.720	-0.035	0.090	-0.116

Notes: PC1-PC4: First Four Principal Components; BA: Deposit Money Bank Assets to (Deposit Money + Central) Bank Assets; BC: Bank Concentration; BO: Bank Overhead Costs to Total Assets; CR2: Private Credit by Deposit Money Banks and Other Financial Institutions to GDP; CR1: Private Credit By Deposit Money Banks to GDP; FI: Foreign Direct Investment (Net Inflow) to GDP; IM: Net Interest Margin; LI: Life Insurance Premium to GDP; LL: Liquid Liabilities to GDP; NL: Non Life Insurance Premium to GDP; SC: Stock Market Capitalisation to GDP; ST: Stock Market Turnover Ratio to GDP; SV: Stock Market Total Value Traded to GDP; GD: GDP per capita (constant 2000 US\$)

3.8 Concluding Remarks

Financial development refers to the policies, factors, and institutions that lead to efficient intermediation and effective financial markets. An attempt has been made to measure financial development by utilising thirteen variables of financial development. These proxies are from three different groups of the financial system, i.e. the banking sector, stock market, and financial institutions. Almost all the countries have shown an increasing and upward trend in their financial sectors. Some countries are more focused towards their banking sector, whereas others are more concerned about the development of financial markets.

Financial development can be measured by a number of factors, including the depth, size, access, and soundness of the financial system. It can be measured by examining the performance and activities of the financial markets, banks, bond markets and financial institutions. It has been observed that the higher the degree of financial development in a country, the wider will be the availability of financial services.

Financial stability can be considered as the trade-off between risks and returns. The stability and soundness of the financial system are important for measuring financial development. Financial regulations are a key element in this regard. Financial soundness involves the risk related to the currency crises, systemic crises, and sovereign debt crises (Herring 2003).

A composite index "FIND" is constructed in this chapter by employing principal component analysis, which models the structure of variance for a set of variables. It generates a single variable by combining the useful information available from a set of variables. It retains the maximum variation available in data. Principal component analysis is used to construct the "FIND" index, which is based on 13 variables from banks, stock markets and insurance companies. The countries, in-

cluding Switzerland, United Kingdom, and United States appear in top 5 strongest financial economies according to the “FIND” index. The results are in line with the World Bank financial index (2009) therefore, the “FIND” index is a composite index that portrays a significant picture of financial development in 41 economies.

Based on the very recent financial crises, it is difficult to know whether shifting savings from real sector to the financial sector benefits the economies or can lead to failure? Do too much financial globalisation, financial deepening and integration lead to development or can they also become reasons for the collapse of developed economies? Should more importance be given to the financial sector over the real sector? The next chapter gives an in-depth theoretical and empirical analysis of the relationship between finance and growth, while the issue of financial deepening and its relationship with financial crises is discussed in detail in chapter 6.

Financial Development and Growth: A Large Sample Analysis

4.1 Introduction

A country's economic growth is represented by the improvement in living standards.¹ It can be measured by the production of goods and services of a country. Real gross domestic product (GDP) or real GDP per person are considered the main yardsticks to enable comparisons of economic growth across countries. Even though there are well-defined theoretical frameworks to understand the long term process of economic growth –reviewed in Chapter 2– there is more ambiguity as to the empirical determinants of growth. Advocates of financial development argue that a well-developed financial system enables economies to grow faster.

This chapter uses up-to-date data to study the potential effects of financial development on growth. The choice of relevant variables is informed by the relevant

¹Broader definitions would look into human development, too. For example, see the United Nations Human Development Index.

literature; other than the use of a new data set the contribution comes from the use of the financial development index described in the previous chapter. The process of data collection has been quite challenging because a number of sources had to be used, and great care had to be taken for the construction of a consistent and informative data set.

Data on banks and stock market development indicators are employed to proxy financial development and the effects of inflation, trade to GDP, government spending, and exchange rate regimes are controlled for. The countries are divided into four different groups based on the World Bank's income groups classifications. The groups are, low income countries, lower middle income countries, upper middle income countries and high income countries. The details of income groups are discussed below in section 4.3.1, whereas the complete list of countries can be found in appendix A.1 to A.4.

To examine the stationarity of variables panel unit root tests are applied. Static and dynamic panel data specifications are used to address the research question. A comparison between the *pooled OLS* model and *fixed effects* model has been made for the static analysis. The dynamic model is estimated, as is common, with the generalised method of moments (GMM) method. Finally, to address the issue of causality between financial development and growth, the two stage least squares method is employed.

In the next section, the differences in real GDP (and real GDP per capita) growth rates across countries will be examined covering the period from 1960 to 2009.

4.2 Economic Growth: The Experience

4.2.1 Real GDP

In this section countries differences in average annual real GDP growth rates (this subsection) and average annual per capita GDP growth rates (next subsection) are discussed for the period 1960 to 2009. Figures 4.1 to 4.4 illustrate the average annual real GDP growth for all four income groups.

Figure 4.1 shows the average annual real GDP growth for the low income group. There is obvious variation across countries during the sample period. Tajikistan has experienced a shrinking economy. According to the World Bank, country reviews Tajikistan is the poorest among the post-Soviet republics. It had less than \$300 per capita income in 2001 and around 80% of the population is below the poverty line. The recent Economic Freedom Index of 2011 has reported that growth has been adversely affected due to political interference in the business industry. Foreign investments are also affected for the same reason cited in addition to excessive bureaucratic regulations. The limited ability of Tajikistan's banking sector to offer the financial intermediation required for an efficient allocation of resources has hindered the development of a more dynamic private sector.

Ghana, on the other hand, has had the highest real GDP growth during the period from 1960 to 2009. According to the Economic Freedom Index of 2011 Ghana has shown good progress in difficult times. It aims to half its poverty by 2015. New legislation was passed in Ghana in 2008 to strengthen non-banks and the micro-finance industry. The stock market's capitalisation has increased substantially as a result.

Cambodia has reported the second highest average annual real GDP growth rate. According to the World Bank's country reports the country has shown remarkable achievement in growth during the past decade. It also has important prospects in

sustainable management of natural resources, investing in its future, and regional integration. In 2001, there was nearly zero inflation. The budgetary performance improved in 2001, with a modest increase in revenue and also a modest reorientation of public spending towards the critical social sectors. The 2011 report of Economic Freedom Index reports that its financial sector is now more market oriented, and the credit issued to its private sector has increased by 10% of its GDP.

Figure 4.2 depicts the average annual real GDP growth rate of lower middle income countries. China, Vietnam and Thailand have among the highest growing trends while Moldova and Ukraine have shown shrinking trends on average. Possible reasons for such different growth experiences are discussed below.

During the past 30 years China moved from a centrally planned system (which was largely closed to international trade) to a more market-oriented economy. China has a much more diversified banking system now compared to the past. Furthermore, it has more developed stock markets, and is more open to foreign trade and investment. Following extensive reforms, China's economy has grown tenfold since 1978.

Vietnam has also shown high annual real GDP growth. According to the CIA's world fact book, the commitment of the Vietnamese authorities to economic liberalisation and international integration has boosted the economy. They have implemented the structural reforms required to modernise the economy and to create more competitive export driven industries.

Thailand is one of East Asia's best performing economies. It has pro investment policies that have helped achieve high growth rates (World fact books, CIA).

The economy of Turkmenistan experienced several years of economic decline after independence in 1991. One of the main reasons for this was economic mismanagement. The economy of Turkmenistan was hit hard in 1997 when non payments by the Commonwealth of Independent States countries forced a suspension of virtually

all natural-gas exports (World Bank).

Ukraine also has had the worst average growth rates during the sample period. The Asian Financial crisis of 1990s is the main reason for the economic decline of the Ukrainian economy. Domestic prices went up, and GDP declined and currency devalued by 60%. The country needs to develop its capital markets to move forward and compete globally.

Moldova's economy has also shrunk on average. It is a trade-dependent economy, and its major exports include agriculture. Moldova was badly hit by a number of shocks since 1990s. These included floods and droughts that caused a decline of 35% in GDP during the 1990s.

Figure 4.3 shows the real GDP of all upper middle income countries Bosnia and Herzegovina faced an interethnic war during early 1990s that caused an 80% reduction in production ². Output growth recovered in the late 1990s as reconstruction began. During the period of 2003 - 2008, the country managed to achieve growth rates of 5% per annum or higher. However, after the recent global financial crisis of 2007, the country experienced a decline in its growth rates.

²World Fact Book 2011.

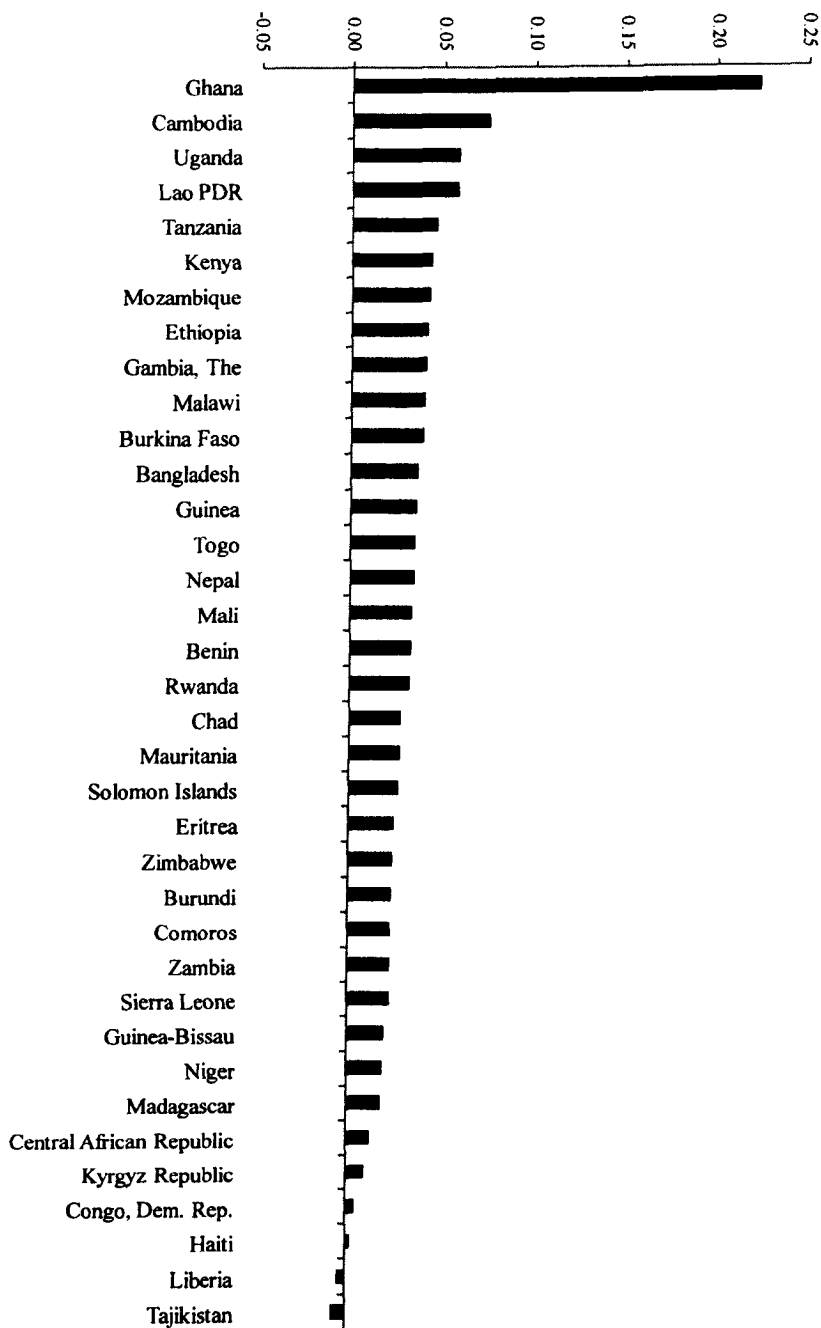


Figure 4.1: Average Annual Real GDP Growth Rates –Low Income Countries (1960 – 2009)

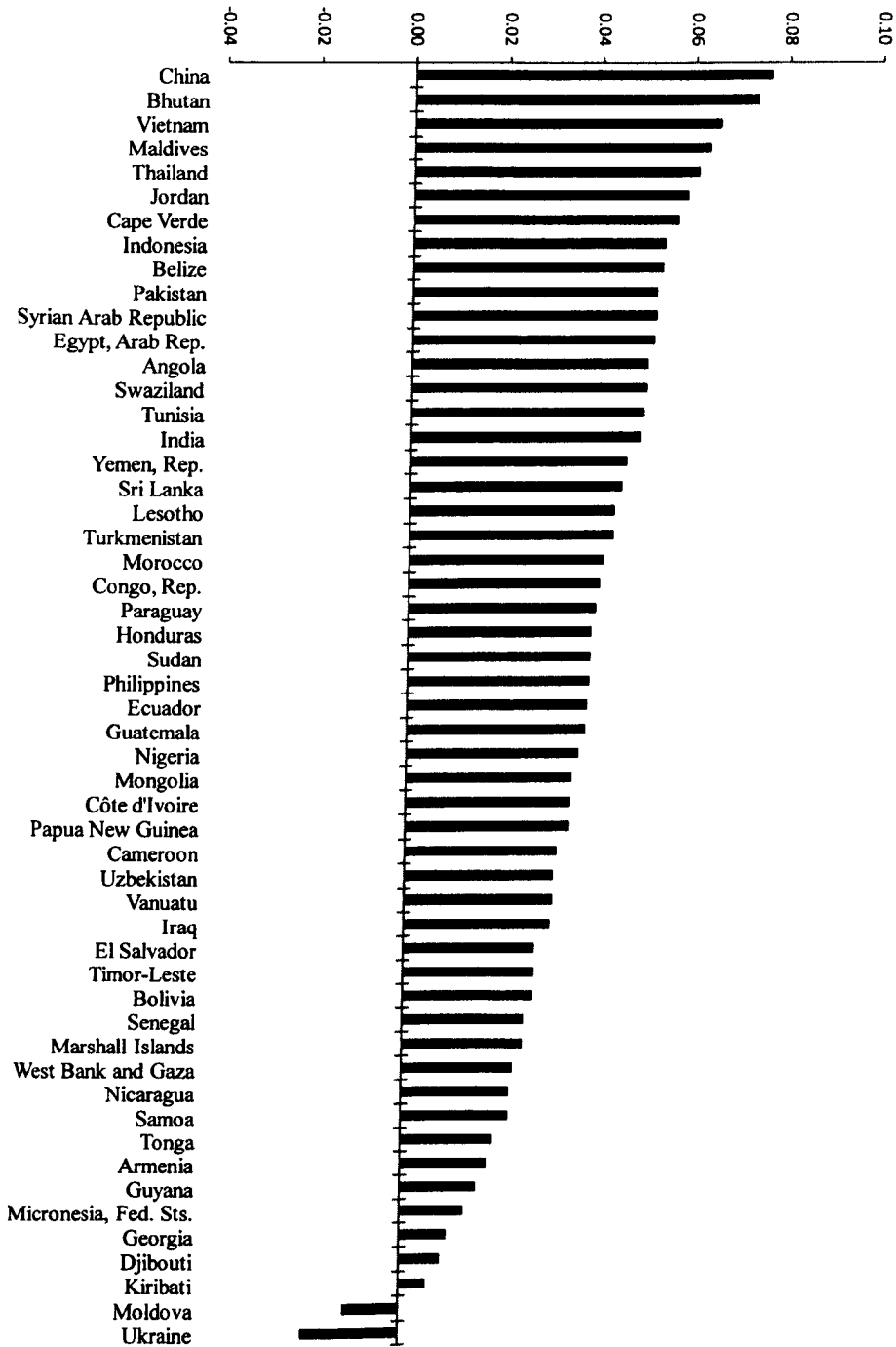


Figure 4.2: Average Annual Real GDP Growth Rates –Lower Middle Income Countries (1960 – 2009)

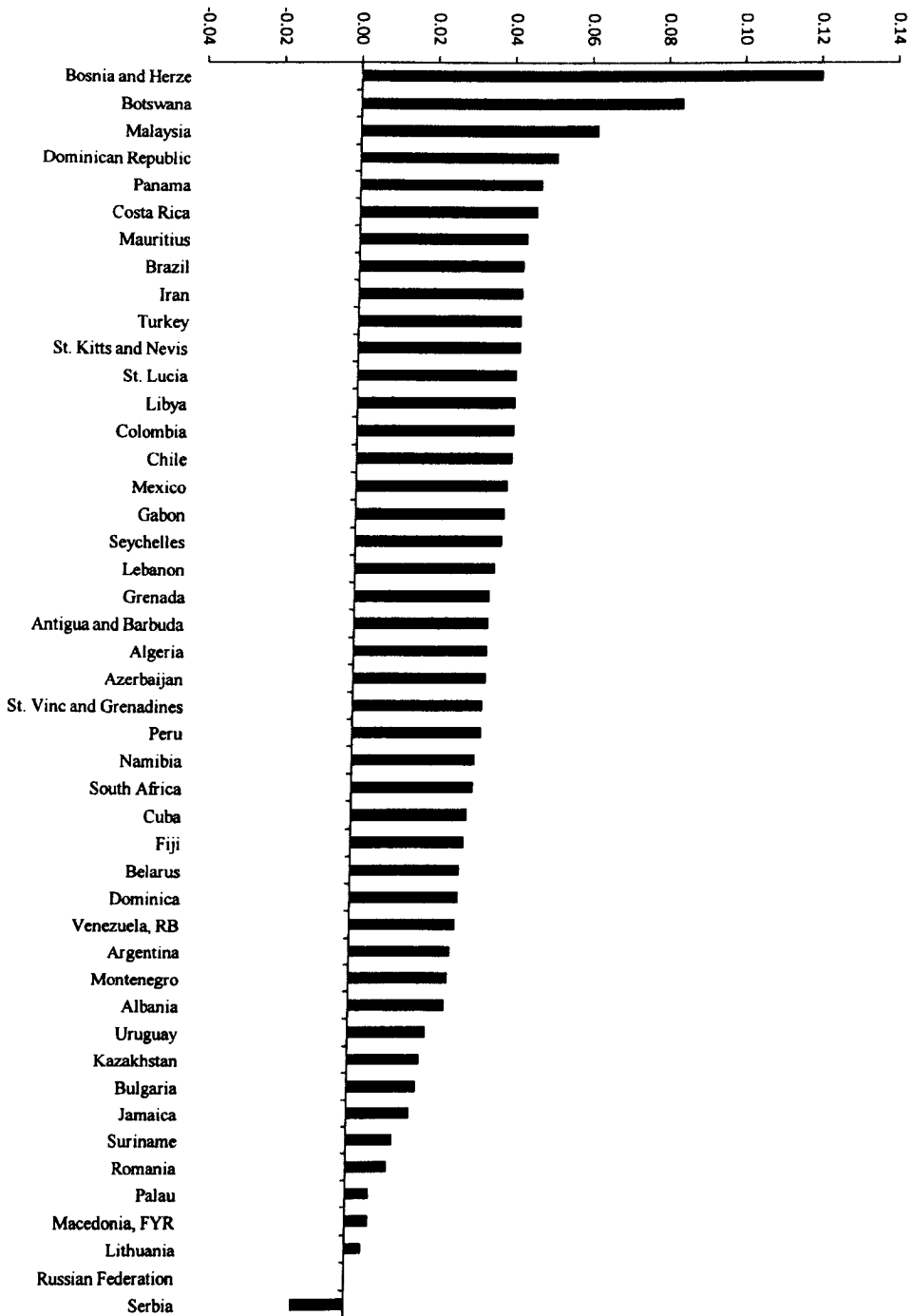


Figure 4.3: Average Annual Real GDP Growth Rates –Upper Middle Income Countries (1960 – 2009)

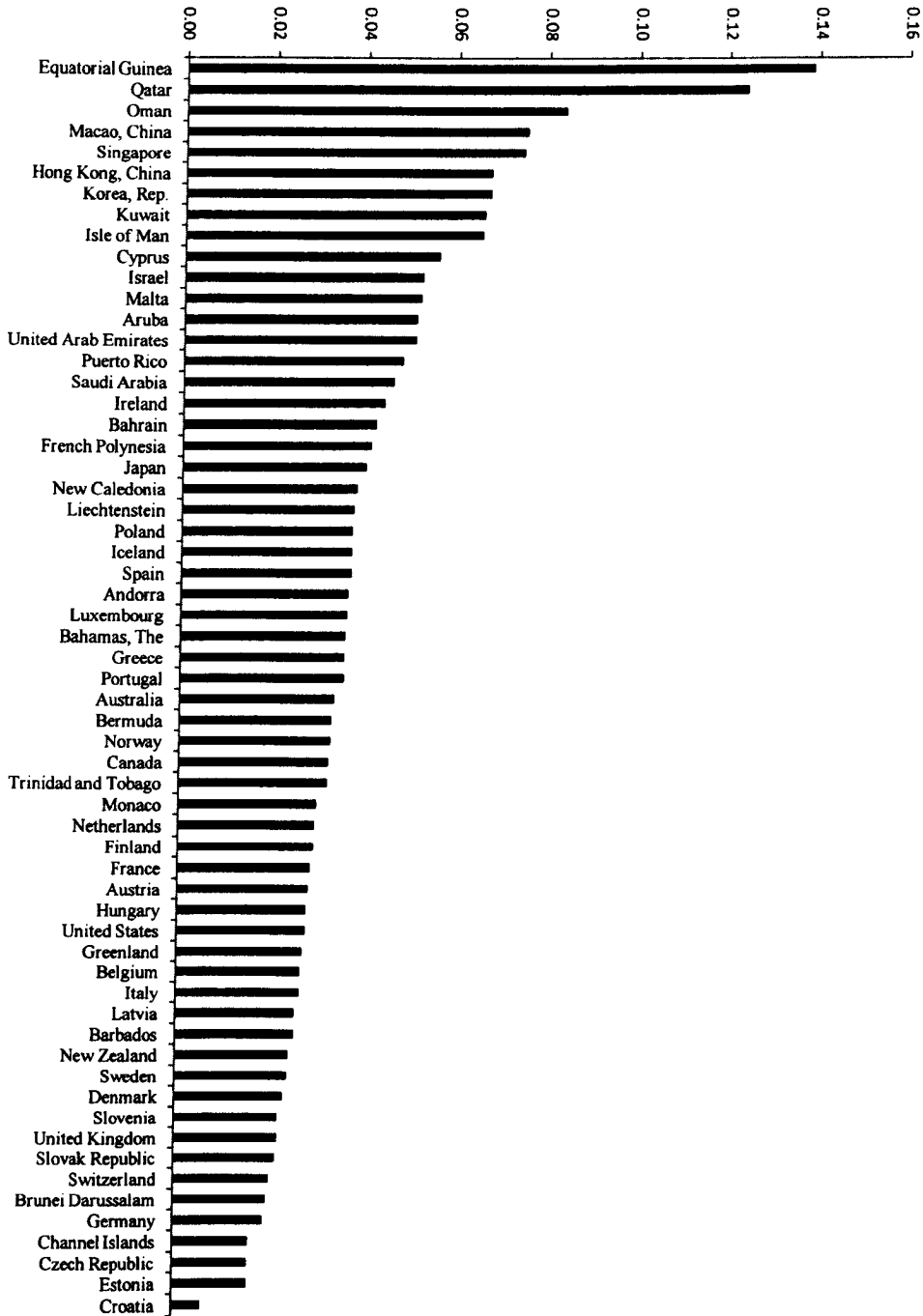


Figure 4.4: Average Annual Real GDP Growth Rates –High Income Countries (1960 – 2009)

Botswana has shown the second highest average annual GDP growth among upper middle income countries. The country is giving considerable importance to its financial sector, and its competitive banking system is one of most advanced in Africa. Generally adhering to global standards in transparency of financial policies and banking supervision, the financial sector provides ample access to credit for entrepreneurs. Credit is allocated on market terms, although the government provides subsidised loans. In 2009 ABN AMRO, i.e. one of the leading Dutch banks started to operate in the country, whereas the stock market of a country is also showing growing trends³.

Russian economy has faced several ups and downs after the disintegration of the Soviet Union. Most of its industrial sector has been privatised since 1990⁴. Russia's GDP has shown faster trends of growth since 2000. The Russian economy was hit hard by the recent financial crises of 2007. During the period of 2007-2009 oil prices plunged⁵. Due to extensive international financial integration, Russian firms and banks had been relying on foreign capital that dried up as an aftermath of recent financial crises.

Serbia's GDP growth rate has been negative during the period 1960-2009. It is struggling to improve its banking sector offering a wide range of financial instruments but still the level of financial intermediation in the economy is low. Capital markets are also not very developed, and the insurance sector is under the dominance of the government's own insurers.

Fig 4.4 shows the growth profiles of high income (OECD and non-OECD) countries. All these countries in our data set have shown positive trends in their growth during the period from 1960 to 2009. Singapore, Korea, Taiwan and Hong Kong have shown considerably faster growth rates compared to other countries of their

³Economic Freedom Index, 2011.

⁴World Fact Book 2011.

⁵Russia is the second biggest exporter of oil.

group.

Singapore has a highly developed economy. The country is highly dependent on electronics exports. At the same time, it is making efforts to make Singapore south Asia's financial hub. Singapore's financial sector is competitive and very sophisticated⁶. In 2010 there were, in total, 120 commercial banks, out of which 113 were foreign owned. The banks extensively use derivative instruments for hedging and risk management. In addition to a competitive banking sector, the stock markets are also efficient.

Korea has achieved high levels of GDP growth because their government encourages saving and investment over consumption. Korea was badly hit by the financial crisis of 1997-98, but the government adopted strong measures to fight against future crises. It introduced reforms, including greater openness to foreign investments and imports, which took the country out of crisis and led to high levels of GDP growth.

The economy of Hong Kong is highly dependent on finance and international trade. It is also a premier stock market for Chinese firms seeking to list abroad.

Oman is basically an oil producing country. The government of Oman generates around 80% of its revenues through oil and gas. However, it is now to achieve foreign investments to have diversification, privatisation and industrialisation. The country has 17 commercial banks out of which 10 are foreign owned. The securities market of Oman, i.e. Muscat Securities is open to foreign investors.

Overall, countries in the high income group are more focused towards financial development. They are more involved in the advancement of their stock markets and banking sectors compared to other income groups.

⁶Economic Freedom Index 2011.

4.2.2 Real GDP per Capita

According to the CIA's world fact book "GDP per capita growth is defined as the GDP on a purchasing power parity basis divided by population as of July for the same year." Figures 4.5 to 4.8 show the average annual GDP per capita growth during the period 1960 to 2009 in the four income groups.

Low income countries are shown in figure 4.5. The Central African Republic (CAR) has shown a negative average GDP per capita growth rate. The economy is based on agriculture and forestry. The agricultural sector generates more than half of GDP. Important constraints to economic development include the CAR's landlocked position, a largely unskilled work force, a poor transportation system, and a legacy of misdirected macroeconomic policies. Distribution of income is extremely unequal. Grants from France and the international community can only partially meet humanitarian needs. The population growth rate is 2.14% per year, which is high for such a country (World Factbook, 2011).

Congo Dem. Republic is in the top five countries with the highest population growth rate of 4.21% per annum. The conflict of 1998 resulted in a dramatically reduced national output and government revenues, increased external debt, and the deaths of more than 3.5 million people from violence, famine, and disease. Foreign businesses curtailed operations due to uncertainty about the outcome of the conflict, lack of infrastructure, and the difficult operating environment (World Factbook 2009).

Haiti is the poorest country in the Western Hemisphere, but still the population growth rate is 1.83% yearly, with 80% of the population living below the poverty line and 54% in abject poverty. Two-thirds of all Haitians depend on the agricultural sector.

Niger has a population growth rate of 4.67% (the second in the world, 2009).

It is one of the poorest countries in the world, ranking near last on the United Nations index of human development. It is a landlocked, Sub-Saharan nation; whose economy focuses on subsistence crops, livestock, and some of the world's largest uranium deposits. Drought cycles, desertification, and strong population growth have undercut the economy.

Ghana and Cambodia are the two highest GDP per capita growth countries in the low income group of countries. Ghana, as discussed previously, constantly struggled to improve its economic conditions and has 1.8% population growth rate. Cambodia also has good prospects in sustainable management of natural resources, investing in its future, and regional integration. Its population growth rate is estimated to be around 1.7% per year.

Figure 4.6 depicts the annual growth rate of GDP per capita in lower middle income group countries. In addition to Ukraine and Moldova (that were seen to have a negative average annual real GDP growth rate) there are more countries in this group with deteriorating living standards.

The West Bank and Gaza have a high population density and a population growth rate of 3.35 %. The country has limited land access and strict internal and external security controls. The beginning of the second intifada in September 2000 sparked an economic downturn, largely the result of Israeli closure policies; these policies, which were imposed to address security concerns in Israel, disrupted labour and trade access to and from the Gaza Strip.

Kiribati is an isolated country of 33 scattered islands with 2.23 % population growth rate. Economic development is constrained by a shortage of skilled workers, weak infrastructure, and remoteness from international markets.

Djibouti's per-capita consumption dropped an estimated 35% between 1999 and 2006 because of recession, civil war, and a high population growth rate (including immigrants and refugees). Recent estimates show 1.93% annual growth in popula-

tion. Faced with a multitude of economic difficulties, the government has fallen in arrears on long-term external debt and has been struggling to meet the stipulations of foreign aid donors.

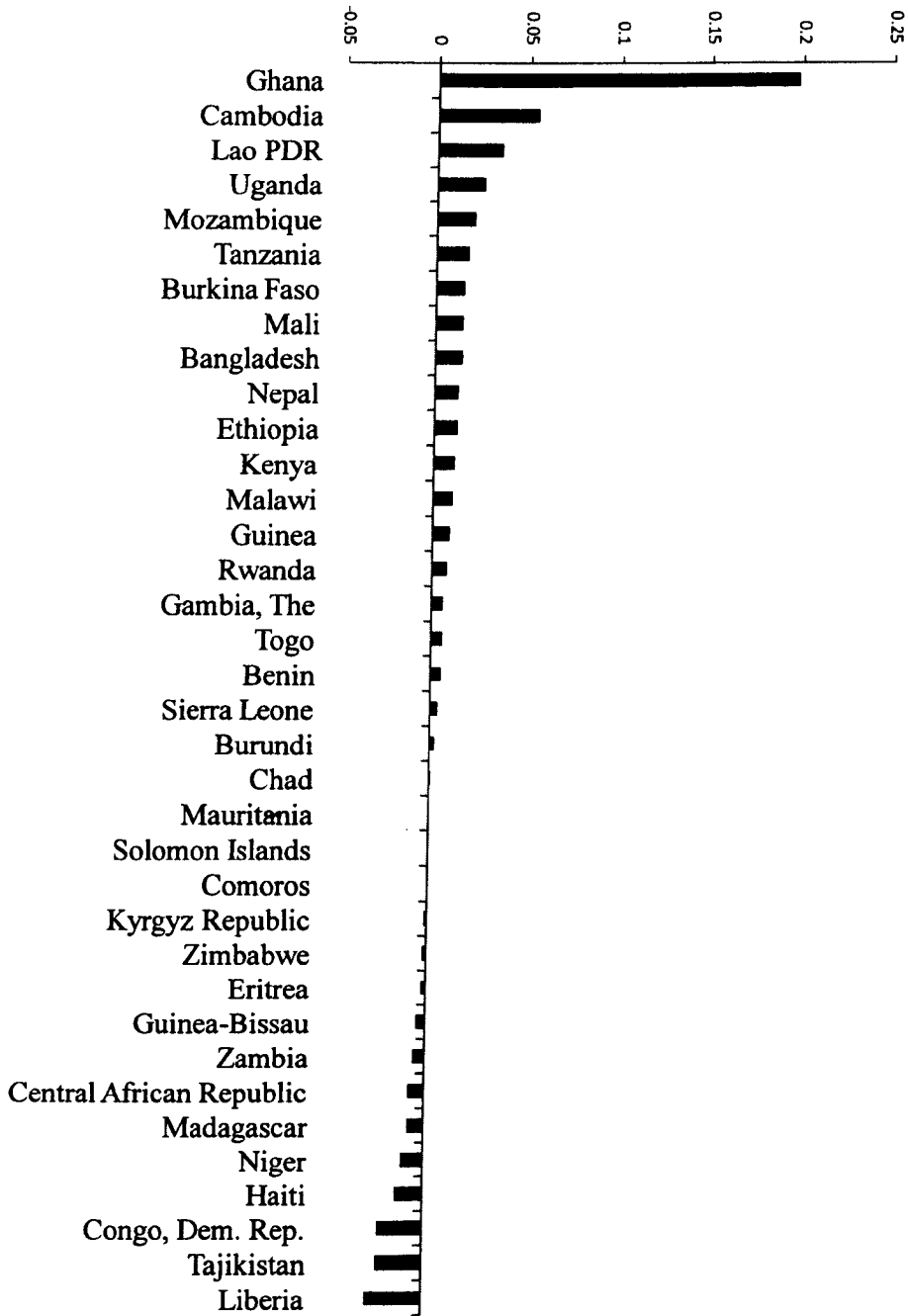


Figure 4.5: Average Real GDP per Capita Growth –Low Income Countries (1960 – 2009)

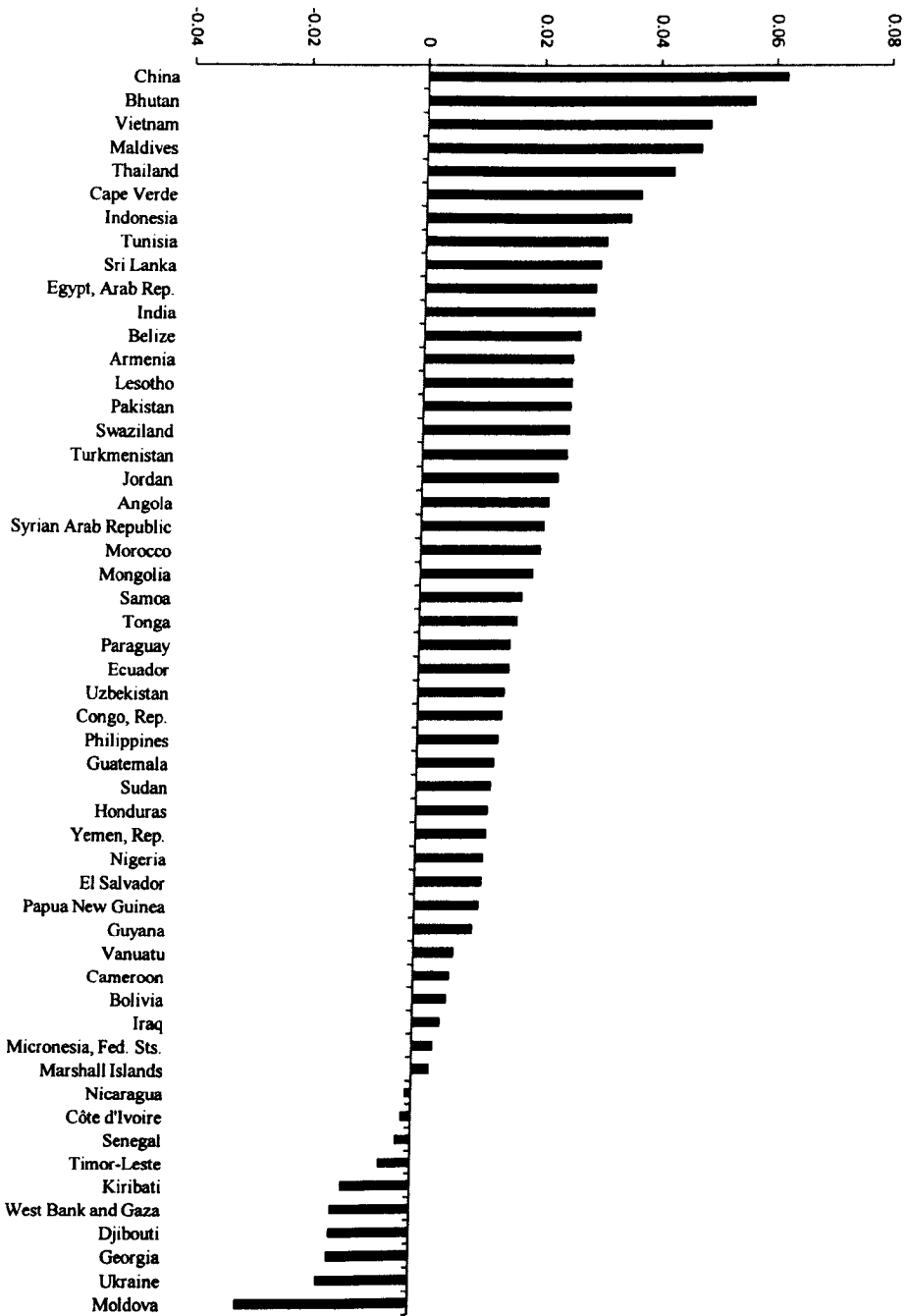


Figure 4.6: Average Real GDP per Capita Growth –Lower Middle Income Countries (1960 – 2009)

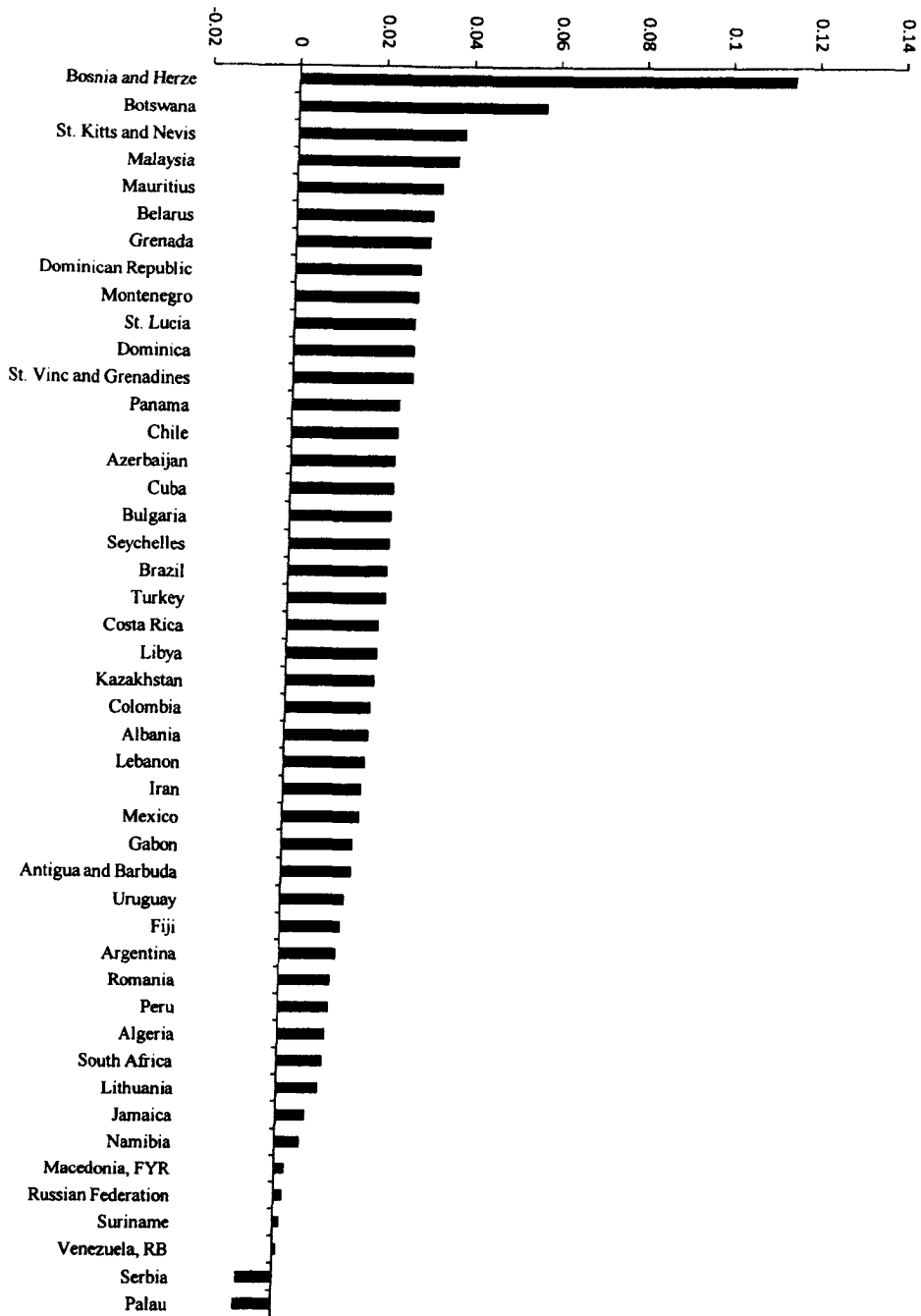


Figure 4.7: Average Real GDP per Capita Growth -Upper Middle Income Countries (1960 - 2009)

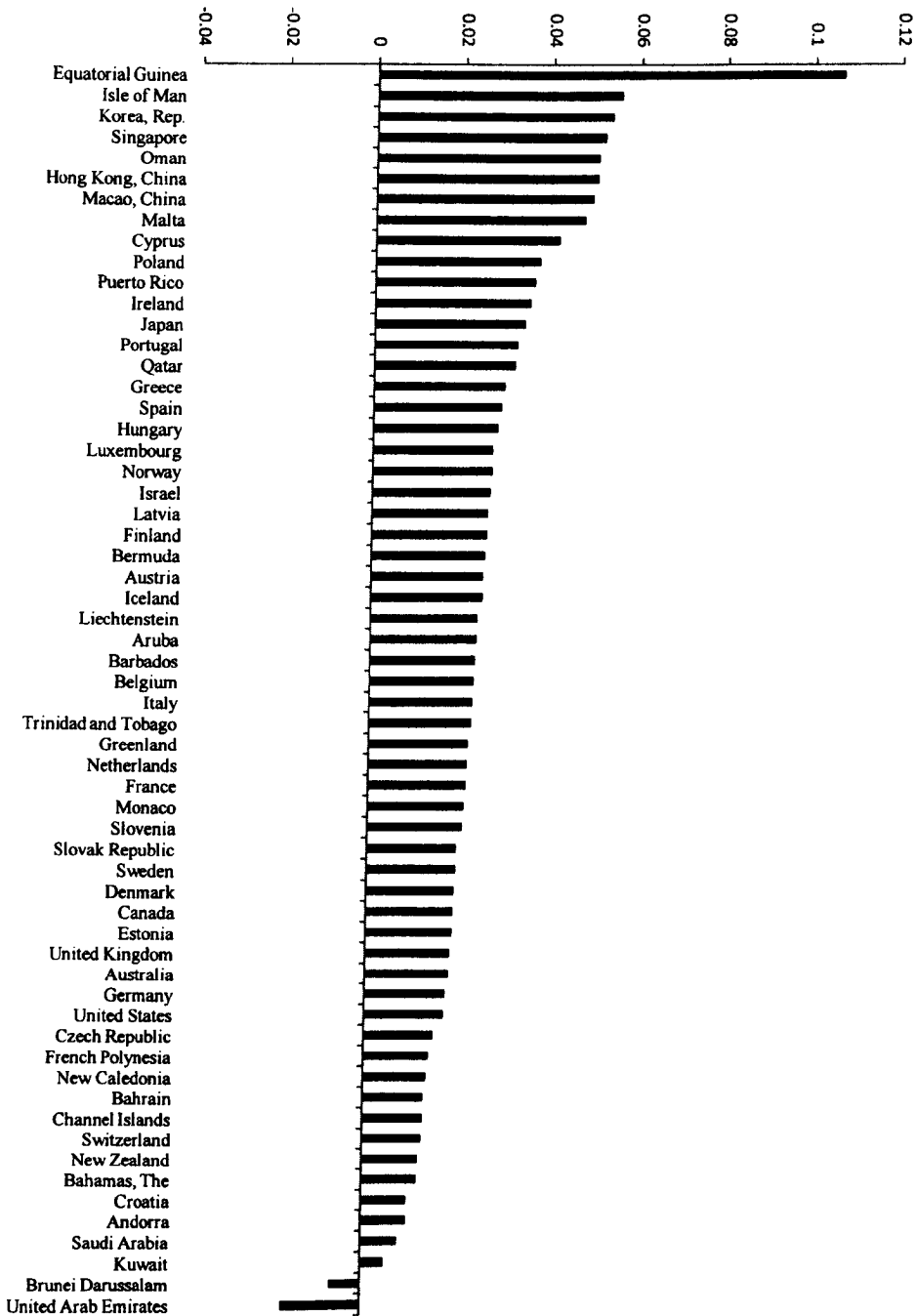


Figure 4.8: Average Real GDP per Capita Growth –High Income Countries (1960 – 2009)

It is observed in this group that countries with high real GDP growth rates clearly show a difference in their population growth rates compared to others. China, Maldives and Thailand have the highest GDP per capita. These countries have maintained very low population growth rates: China with 0.65%, Maldives with – 0.17%, and Thailand with 0.62%.

As discussed in the previous subsection, the commitment of the Vietnamese authorities to economic liberalisation and international integration has boosted the economy; however, along with that they have also maintained a low population growth rate (0.97% per annum), which is also contributing to higher levels of GDP growth.

Figure 4.7 shows the group of upper middle income countries. Consistent with the previous analysis concentrating on real GDP, Serbia and Palau are the only countries with a negative growth rate. Bosnia and Herzegovina, Malaysia and Botswana are the countries with the highest GDP per capita growth rates in this group. Bosnia and Herzegovina has an extremely low population growth rate (0.008%), Malaysia has 1.57%, and Botswana reports a 1.65% population growth rate.

Figure 4.8 shows GDP per capita growth rates for high income countries. These countries have very low population growth rates compared to the other groups, e.g. Belgium has 0.094, Hong Kong 0.50, Korea 0.26, United Kingdom 0.27, United States 0.97 and Singapore 0.99 percent per annum. Only Brunei Darussalam and the United Arab Emirates show negative GDP per capita in this group. Brunei Darussalam has 1.71% and United Arab Emirates 3.28% population growth rates.

Following this brief overview of the growth experiences of countries belonging in the four World Bank income groups, a description of the data used in the empirical analysis will now be considered.

4.3 Data

This research employs the most-recent data for investigating the relationship between financial development and economic growth. The sources of the data of the variables are reported in appendix A.4.

4.3.1 Income Groups

The World Bank classifies countries based on GNI per capita. Every economy is classified as low income, middle income (subdivided into lower middle and upper middle), or high income, based on GNI per capita. The low and middle income countries are also called developing economies. Economies are divided according to the Atlas method. Using 2009 thresholds the groups are:

Low income countries	\$995 or less
Lower Middle income countries	\$996 - \$3,945
Upper Middle income countries	\$3,946 - \$12,195
High income countries	\$12,195 or more

The initial sample consists of 211 countries. However, due to unavailability of some data on all the variables for all the cross sections, it was not possible to include the whole set of countries. Panel estimation involved 95 cross sections with annual observations from 1960 to 2009.

Table 4.1: Variable Abbreviations

Abbr.	Variables
BA	Deposit Money Bank Assets to (Deposit Money + Central Bank) Assets
CR2	Private Credit by Deposit Money Banks and Other Financial Inst. to GDP
LL	Liquid liabilities to GDP
SC	Stock Market Capitalization to GDP
ST	Stock Market Turnover ratio to Capitalisation
SV	Stock Market Total value Traded to GDP
RGD	Real GDP (constant 2000 US\$)
GD	GDP per capita (constant 2000 US\$)
TR	Trade to GDP Ratio
FIS	Government Expenditures to GDP
XRR	Exchange Rate Regimes
INF	Inflation
FIND	Financial Index

4.3.2 Variables and Abbreviations

Table 4.1 reports the variables with their abbreviations. These abbreviations are also used in the methodology section. In what follows, all the variables that are part of this empirical chapter will be defined, along with a discussion of their relevance to economic growth.

Bank Ratio

Bank ratio measures the relative importance of financial institutions. It is calculated as the ratio of bank assets divided by bank assets plus central bank domestic assets. In other words, it is the ratio of deposit money bank claims on domestic nonfinancial real sector to the sum of deposit money bank and Central Bank claims on domestic nonfinancial real sector⁷.

⁷A New Database on Financial Development and Structure, Beck et al., 1999.

Commercial banks are more likely to provide most of the financial services compared to central banks. There are some limitations of this measure. Firstly, banks may not be the only financial intermediaries to provide all valuable financial functions and secondly banks may simply lend to public enterprises or the government so this measure does not show the credit break up i.e. whether the credit is issued to the private or public sector⁸. Therefore, other measures of financial intermediation are included in the analysis to attain maximum coverage of financial development indicators.

Liquid liabilities to GDP

This indicator measures the size of financial intermediaries and is equal to the liquid liabilities of the financial system to GDP. It can be calculated as currency, demand and interest bearing liabilities of banks and nonbank financial intermediaries divided by GDP. It is considered as the broadest measure of financial intermediation due to its coverage of demand deposits, currency and all interest-bearing liabilities of central bank, money banks, and financial institutions.

Credit Ratio Banks and Other Financial Institutions

This refers to allocated credit to private enterprises by deposit money banks and other financial institutions divided by GDP. The main idea behind this measure is that financial systems that allocate more credit to private firms are more involved in researching firms, exerting corporate control, providing risk management services, mobilising savings, and facilitating transactions than financial systems that simply funnel credit to the government or state-owned enterprises.

⁸See Levine (1993).

Stock Market Capitalisation to GDP Ratio

Stock Market capitalisation depicts the size of stock markets with respect to the size of the economy. It is measured as the value of shares listed with domestic stock divided by GDP. It is considered to be an important indicator of market development⁹.

Stock Market Turnover Ratio

The turnover ratio equals the total value of shares traded on the country's stock exchange divided by the stock market capitalisation. It is basically the value of listed shares traded on the country's stock exchange. The turnover ratio measures trading relative to the size of the market. It also exhibits substantial cross-country variability. The turnover ratio may differ from the value traded ratio because a small, liquid market will have high turnover ratio but a small value traded ratio. This measure captures liquidity on a macroeconomic scale; the objective is to find the degree to which agents can cheaply, quickly, and confidently trade ownership claims of a large percentage of the economy's productive technologies.

Stock Market Value Traded to GDP Ratio

The value traded ratio is a measure of market liquidity. It equals the total value of shares traded on a country's stock exchange divided by GDP. It actually measures the trading relative to the size of the economy. It captures the trading volume with respect to national output. The difference between turnover ratio and value traded ratio is that the former captures the trading relative with respect to the size of market whereas the latter reflects the trading relative to the size of economy.

To analyse the intensity of the independent link between financial development and growth, a number of other growth determinants are controlled. These include

⁹Levine and Zervos (1996).

inflation, trade to GDP ratio, exchange rate regimes, and government expenditures.

Inflation

Inflation is measured by the consumer price index (CPI)¹⁰. It is the annual change in percentage, i.e. the cost incurred by an average consumer for obtaining a fixed basket of services and goods. The basket can be changed or fixed for specified time intervals, e.g. yearly. In general, the increase or upward trend in prices of services and goods in economy is termed inflation. Over time, when the cost increases for goods and services, the value of currency declines because more money is required to buy the same basket of goods.

Trade to GDP Ratio

“Trade is the sum of exports and imports of goods, and services measured as a share of gross domestic product”.¹¹ The ratio of trade to GDP is considered one of the most significant economic indicators. The trade to GDP ratio is calculated by adding imports and exports and then dividing them by the gross domestic product.

Government Expenditure

Government expenditure refers to a government's final consumption expenditure to GDP¹². It also includes most expenditure on national defence and security, but excludes government military expenditure that is considered part of government capital formation. The data is in terms of constant US dollars (2000). In other words, it is what governments spend to attain their targeted budget. It is observed that substantial government expenditure can lead to high growth rates¹³.

¹⁰Source: International Monetary Fund.

¹¹World Bank National Accounts and OECD National Accounts Data Files.

¹²World Bank National Accounts and OECD National Accounts Data Files.

¹³See Andros (2009).

Real GDP

This is the gross domestic product in constant 2000 dollars. It can be defined as the national output adjusted for the effects of inflation.

Real GDP per Capita

Real GDP per capita is the gross domestic product divided by midyear population (data is in constant US dollars).

4.4 Preliminary Analysis

4.4.1 Descriptive Statistics

Table 4.2 and 4.3 depict the average annual growth of all the variables from 1960 to 2009. The world economies have shown a growth rate of 3.7% during the sample period. Low income countries have grown by 3.5%, low middle income countries by 3.8%, upper middle income countries 3.5% and high income countries 3.9% during the sample period.

Countries in the low income group have reported low GDP per capita growth during the period from 1960-2009. A gradual increase is recorded when moving from low income to high income countries. Overall, an increase of 2% GDP per capita growth is found in world economies. There is 1% increase of GDP per capita growth in the low income group, 1.7% growth in low middle countries, whereas in upper middle countries it is found 2.1%. Finally, the maximum growth of GDP per capita is recorded in high income countries i.e. 2.7% during the period from 1960-2009.

As mentioned above BA (bank ratio) represents the relative importance of financial institutions. The ratio has reported mix results as the maximum growth in this ratio has been observed in lower middle income countries. The reason can be that in

financially developed countries, banks may not be the only financial intermediaries to provide all valuable financial services but low and low middle income countries have more bank based financial structures.

LL (liquid liabilities) measures the size of financial intermediaries. An overall increase in the size of 2.12% is recorded in world economies during the sample period. The maximum increase is found in the low income group with 2.84% and the minimum increase in the high income group, i.e. 1.78%.

CR2 is an efficiency measure of the banking sector. CR2 is the credit ratio of banks and other financial institutions. It can be observed that those financial systems that allocate more credit to their private sector are promoting growth in terms of innovation and promoting new and potential businesses. It is found that all the income groups have shown growth of 3%-3.4% during the period from 1960-2009. Maximum growth in private credit allocation is found in upper middle income countries i.e. 3.4%.

ST (turnover ratio) is the total value of shares traded on the country's stock exchange divided by stock market capitalisation. The ratio may vary in cross sections because a small, liquid market can have a high turnover ratio. It is observed that the turnover ratio has varied considerably in different income groups during the period from 1960 to 2009.

Table 4.2: Descriptive Statistics of Financial Development Indicators and Growth Variables (1960 – 2009)

Variable	All Countries					Low Income Countries					Low Middle Income Countries				
	Mean	Max	Min	Std.Dev		Mean	Max	Min	Std.Dev		Mean	Max	Min	Std.Dev	
GD	2.0	9.47	-0.69	12.6		1.00	9.474	-0.694	26.30		1.70	0.36	-0.61	6.30	
RGD	3.70	9.50	-0.71	12.6		3.50	9.499	-0.714	26.30		3.80	0.38	-0.60	6.30	
BA	0.6	2.71	-2.31	14.4		0.40	2.00	-2.219	21		1.10	2.71	-2.31	17	
CR2	3.2	1.65	-4.58	16.2		3.30	1.64	-0.72	18.5		3	1.23	-4.58	20.2	
LL	2.12	1.27	-5.56	14.95		2.84	1.27	-0.66	13.07		2.21	0.60	-4.68	16.92	
SC	11.9	4.55	-2.28	34.9		14.90	0	-0.907	38.60		14.60	2.74	-1.07	35.30	
ST	5.1	5.73	-4.13	67.9		8.30	3.419	-3.193	86.90		2.60	4.58	-4.13	80.30	
SV	16.7	4.82	-3.97	75.3		20	3.12	-3.29	93.8		17.9	4.82	-3.97	89.40	
FIS	0.51	2.00	-2.37	13.92		0.56	1.53	-1.43	18.27		0.39	2.00	-2.37	15.06	
TR	0.90	1.43	-1.19	14.18		0.72	1.43	-1.08	18.95		12.64	1.14	-0.90	14.01	
INF	12.42	550.17	-24.43	30.14		15.0	550	-14.2	34.7		12.00	477.5	-10.57	29.30	

Notes: For variable abbreviations see Table 4.1.

Table 4.3: Descriptive Statistics of Financial Development Indicators and Growth Variables (1960 – 2009)

Variable	Upper Middle Income Countries				High Income Countries			
	Mean	Max	Min	Std.Dev	Mean	Max	Min	Std.Dev
GD	2.10	0.64	-0.56	6.40	2.70	0.57	-0.38	5.00
RGD	3.50	0.64	-0.55	6.40	3.90	0.60	-0.39	5.10
BA	0.60	1.42	-0.69	10.50	0.40	0.86	-1.13	5.70
CR2	3.40	0.86	-1.31	15.80	3.10	0.90	-1.17	10.90
LL	1.91	0.50	-5.56	19.73	1.78	0.98	-0.77	8.62
SC	13.0	4.55	-2.28	44.7	9.20	2.06	-1.23	25.70
ST	5.10	5.73	-4.10	76.20	6.0	3.79	-2.41	49.9
SV	16.4	4.47	-2.97	79.1	15.60	4.45	-2.37	59.5
FIS	0.24	1.51	-1.41	13.01	0.79	0.92	-0.95	9.60
TR	0.58	1.43	-1.02	14.38	0.95	1.40	-1.19	9.22
INF	18.67	432.8	-12.43	39.93	6.80	277.3	-24.43	15.06

Notes: For variable abbreviations see Table 4.1.

SV (value traded ratio) is the total value of shares traded on a country's stock exchanges divided by GDP. It measures a value of stock transaction in relation to the size of the economy. A growth rate of 20%, 17.9%, 16.4% and 15.6% are found in low income, low middle income, upper middle income, and high income countries respectively during the period from 1960 to 2009.

FIS (government expenditure) can have a positive impact on growth if the government spends in productive areas. Higher spending in a productive manner can lead to higher levels of growth (Gray 2007).

INF (inflation) has a negative relationship to growth as the higher growth rates of inflation can hamper economic development. Overall inflation has increased by around 12.4% in the whole world during the period from 1960-2009. The rise of inflation is found 15% in the low income group of countries, 12% in the lower middle income group, 18.6% in the upper middle income group and 6.8% in the high income countries. The maximum increase in inflation is found in the upper middle income countries, whereas the growth rate of inflation in high income countries is found quite low.

4.4.2 Correlations

In this section, the correlations between the level of financial indicators of the level of GDP per capita, and the growth rates of financial indicators with the growth rates of real GDP per capita are reported. The results from the correlations between levels of GDP per capita and levels of financial indicators are reported in table 4.4 to 4.8. The results from the correlations between growth rates of financial development indicators and GDP per capita growth rates are reported in table 4.9 to 4.13.

In table 4.4 it is observed that all indicators of financial development, including bank and stock market development indicators are found positively correlated with

GDP per capita.

In table 4.5 again the relationship between bank development indicators and GDP per capita during the sample period in low income countries is found positive. The higher correlation of GDP per capita in this group is found with CR2.

Similarly, table 4.6 reports the correlation results for the lower middle income countries. It is observed that financial development and GDP per capita are positively associated with each other except for the one stock market indicator. ST is found negatively correlated with GDP per capita in this income group.

In the upper middle income countries group, the relationship between ST, SV and GDP per capita are found negative in table 4.7; the rest of the financial development indicators are positively associated with GDP per capita during the sample period. The results in table 4.8 show that all the indicators of financial development and economic growth are positively correlated with each other in high income countries.

Correlation coefficients between growth rates of financial development indicators and growth rates of GDP per capita are reported in tables 4.9 to 4.13. In the all-countries sample in table 4.9 the growth rates of all financial development indicators are found correlated with GDP per capita growth. The growth of LL (depth) in low income and lower middle income countries is found negatively correlated with the growth of GDP per capita in table 4.10 and 4.11. In the case of upper middle countries; growth of financial development indicators is positively correlated with the growth of GDP per capita (reported in table 4.12). Finally, in the case of high income countries; the growth of LL and ST are negatively correlated with GDP per capita (see table 4.13).

Table 4.4: Correlation between Real GDP per Capita and Financial Development Indicators (All Countries)

Variables	GD	BA	CR2	LL	SC	ST	SV	FIS	TR	XRR	INF
GD	1.00										
BA	0.47	1.00									
CR2	0.68	0.54	1.00								
LL	0.54	0.39	0.83	1.00							
SC	0.52	0.37	0.64	0.61	1.00						
ST	0.37	0.22	0.36	0.25	0.30	1.00					
SV	0.54	0.36	0.60	0.51	0.77	0.84	1.00				
FIS	0.49	0.25	0.38	0.34	0.35	0.11	0.28	1.00			
TR	0.06	0.13	0.13	0.22	0.19	-0.21	-0.03	0.23	1.00		
XRR	-0.02	-0.21	-0.12	-0.17	-0.05	0.12	0.05	-0.12	-0.31	1.00	
INF	-0.11	-0.18	-0.29	-0.33	-0.23	-0.00	-0.13	-0.24	-0.23	0.29	1.00

All variables are in terms of natural logs.

Table 4.5: Correlation between Real GDP per Capita and Financial Development Indicators (Low Income Countries)

Variables	GD	BA	CR2	LL	SC	ST	SV	FIS	TR	XRR	INF
GD	1.00										
BA	0.19	1.00									
CR2	0.30	0.65	1.00								
LL	0.21	0.65	0.95	1.00							
SC	0.10	0.07	0.43	0.45	1.00						
ST	0.16	0.19	0.07	0.00	-0.46	1.00					
SV	0.24	0.26	0.39	0.35	0.27	0.72	1.00				
FIS	0.17	-0.29	-0.37	-0.37	0.04	-0.24	-0.21	1.00			
TR	-0.07	-0.41	-0.29	-0.30	0.22	-0.00	0.17	0.54	1.00		
XRR	0.11	-0.70	-0.30	-0.32	0.29	-0.36	-0.17	0.18	0.30	1.00	
INF	-0.04	-0.58	-0.25	-0.25	0.35	-0.35	-0.10	0.22	0.41	0.74	1.00

All variables are in terms of natural logs.

Table 4.6: Correlation between Real GDP per Capita and Financial Development Indicators (Lower Middle Income Countries)

Variables	GD	BA	CR2	LL	SC	ST	SV	FIS	TR	XRR	INF
GD	1.00										
BA	0.38	1.00									
CR2	0.55	0.44	1.00								
LL	0.40	0.24	0.82	1.00							
SC	0.32	0.21	0.49	0.62	1.00						
ST	-0.18	0.02	0.26	0.36	0.23	1.00					
SV	0.04	0.12	0.45	0.60	0.70	0.85	1.00				
FIS	0.30	0.14	0.27	0.37	0.31	-0.22	0.00	1.00			
TR	0.53	0.29	0.13	0.11	0.23	-0.36	-0.14	0.37	1.00		
XRR	-0.15	-0.21	-0.10	-0.12	-0.13	0.20	0.08	-0.19	-0.10	1.00	
INF	-0.18	-0.27	-0.20	-0.27	-0.18	-0.00	-0.10	-0.16	-0.05	0.32	1.00

All variables are in terms of natural logs.

Table 4.7: Correlation between Real GDP per Capita and Financial Development Indicators (Upper Middle Income Countries)

Variables	GD	BA	CR2	LL	SC	ST	SV	FIS	TR	XRR	INF
GD	1.00										
BA	0.01	1.00									
CR2	0.15	0.37	1.00								
LL	0.17	0.24	0.82	1.00							
SC	0.09	0.39	0.60	0.54	1.00						
ST	-0.09	0.01	-0.14	-0.21	0.06	1.00					
SV	-0.01	0.30	0.31	0.23	0.73	0.71	1.00				
FIS	-0.21	0.20	0.30	0.26	0.28	-0.07	0.15	1.00			
TR	-0.13	0.26	0.42	0.58	0.29	-0.23	0.05	0.28	1.00		
XRR	-0.13	-0.20	-0.23	-0.29	-0.10	0.22	0.07	-0.16	-0.38	1.00	
INF	0.01	-0.20	-0.31	-0.38	-0.27	0.20	-0.04	-0.35	-0.36	0.39	1.00

All variables are in terms of natural logs.

Table 4.8: Correlation between Real GDP per Capita and Financial Development Indicators (High Income Countries)

variables	GD	BA	CR2	LL	SC	ST	SV	FIS	TR	XRR	INF
GD	1.00										
BA	0.35	1.00									
CR2	0.73	0.38	1.00								
LL	0.59	0.18	0.63	1.00							
SC	0.67	0.44	0.60	0.44	1.00						
ST	0.29	0.15	0.37	0.00	0.33	1.00					
SV	0.57	0.35	0.57	0.25	0.79	0.83	1.00				
FIS	0.23	0.33	-0.03	-0.08	0.04	0.06	0.06	1.00			
TR	-0.22	0.14	-0.24	-0.07	0.01	-0.27	-0.16	-0.02	1.00		
XRR	0.05	-0.10	0.10	0.00	0.02	0.16	0.12	-0.10	-0.38	1.00	
INF	-0.52	-0.63	-0.48	-0.33	-0.69	-0.22	-0.55	-0.21	-0.06	0.10	1.00

All variables are in terms of natural logs.

Table 4.9: Correlation between Growth Rates in Real GDP per Capita and Growth Rates in Financial Development Indicators (All Countries)

variables	Δ GD	Δ BA	Δ CR2	Δ LL	Δ SC	Δ ST	Δ SV	Δ FIS	Δ TR	Δ XRR	Δ INF
Δ GD	1.00										
Δ BA	0.14	1.00									
Δ CR2	0.15	0.13	1.00								
Δ LL	0.02	0.03	0.53	1.00							
Δ SC	0.12	0.04	0.08	0.12	1.00						
Δ ST	0.08	0.05	-0.02	0.00	-0.04	1.00					
Δ SV	0.10	0.08	-0.01	0.06	0.40	0.82	1.00				
Δ FIS	-0.02	0.10	0.15	0.23	0.00	-0.01	-0.02	1.00			
Δ TR	-0.03	0.04	-0.03	0.00	0.11	0.07	0.10	-0.03	1.00		
Δ XRR	-0.19	-0.15	0.06	0.05	-0.03	-0.01	-0.02	-0.10	0.13	1.00	
Δ INF	-0.16	0.09	-0.02	-0.10	0.10	-0.04	0.02	-0.07	0.01	-0.03	1.00

All variables are in terms of growth rates i.e. the first difference of natural logs.

Table 4.10: Correlation between Growth Rates in Real GDP per Capita and Growth Rates in Financial Development Indicators (Low Income Countries)

Variables	Δ GD	Δ BA	Δ CR2	Δ LL	Δ SC	Δ ST	Δ SV	Δ FIS	Δ TR	Δ XRR	Δ INF
Δ GD	1.00										
Δ BA	0.17	1.00									
Δ CR2	0.25	0.07	1.00								
Δ LL	-0.06	-0.08	0.52	1.00							
Δ SC	0.01	-0.06	0.00	0.12	1.00						
Δ ST	0.08	0.19	0.08	0.04	-0.13	1.00					
Δ SV	0.08	0.19	0.03	0.08	0.33	0.85	1.00				
Δ FIS	0.11	0.11	0.04	0.04	0.04	0.11	0.05	1.00			
Δ TR	0.07	0.06	0.23	0.21	0.13	0.21	0.20	0.23	1.00		
Δ XRR	-0.03	-0.34	0.11	0.05	0.24	-0.11	-0.01	-0.07	0.16	1.00	
Δ INF	-0.34	0.19	-0.16	-0.13	0.14	-0.01	0.03	-0.20	0.15	-0.10	1.00

All variables are in terms of growth rates i.e. the first difference of natural logs.

Table 4.11: Correlation between Growth Rates in Real GDP per Capita and Growth Rates in Financial Development Indicators (Low Middle Income Countries)

Variables	Δ GD	Δ BA	Δ CR2	Δ LL	Δ SC	Δ ST	Δ SV	Δ FIS	Δ TR	Δ XRR	Δ INF
Δ GD	1.00										
Δ BA	0.18	1.00									
Δ CR2	0.12	0.15	1.00								
Δ LL	-0.05	0.06	0.54	1.00							
Δ SC	0.21	0.10	0.07	0.12	1.00						
Δ ST	0.01	0.00	-0.01	0.05	0.07	1.00					
Δ SV	0.05	0.03	-0.00	0.07	0.43	0.88	1.00				
Δ FIS	0.02	0.14	0.13	0.27	0.05	-0.03	-0.04	1.00			
Δ TR	-0.09	0.11	0.02	0.14	0.05	0.08	0.07	-0.01	1.00		
Δ XRR	-0.20	-0.26	0.10	0.15	-0.04	0.08	0.05	-0.08	0.04	1.00	
Δ INF	-0.25	0.03	-0.06	-0.09	-0.07	-0.15	-0.11	-0.19	0.15	-0.12	1.00

All variables are in terms of growth rates i.e. the first difference of natural logs.

Table 4.12: Correlation between Growth Rates in Real GDP per Capita and Growth Rates in Financial Development Indicators (Upper Middle Countries)

Variables	Δ GD	Δ BA	Δ CR2	Δ LL	Δ SC	Δ ST	Δ SV	Δ FIS	Δ TR	Δ XRR	Δ INF
Δ GD	1.00										
Δ BA	0.25	1.00									
Δ CR2	0.24	0.26	1.00								
Δ LL	0.13	0.11	0.58	1.00							
Δ SC	0.01	0.12	0.19	0.15	1.00						
Δ ST	0.24	0.05	-0.05	-0.04	-0.19	1.00					
Δ SV	0.24	0.14	0.02	0.08	0.28	0.77	1.00				
Δ FIS	0.04	0.16	0.21	0.29	0.05	-0.05	0.00	1.00			
Δ TR	-0.05	-0.02	-0.13	-0.11	0.09	-0.01	0.04	-0.08	1.00		
Δ XRR	-0.27	-0.10	0.01	0.03	-0.07	-0.07	-0.10	-0.15	0.22	1.00	
Δ INF	-0.22	0.15	-0.05	-0.18	0.14	-0.03	0.07	-0.07	-0.01	-0.03	1.00

All variables are in terms of growth rates i.e. the first difference of natural logs.

Table 4.13: Correlation between Growth Rates in Real GDP per Capita and Growth Rates in Financial Development Indicators (High Income Countries)

Variables	Δ GD	Δ BA	Δ CR2	Δ LL	Δ SC	Δ ST	Δ SV	Δ FIS	Δ TR	Δ XRR	Δ INF
Δ GD	1.00										
Δ BA	0.18	1.00									
Δ CR2	0.06	0.08	1.00								
Δ LL	-0.05	-0.05	0.46	1.00							
Δ SC	0.22	0.03	-0.05	0.05	1.00						
Δ ST	-0.03	-0.04	-0.03	0.01	0.12	1.00					
Δ SV	0.01	-0.05	-0.08	0.04	0.60	0.79	1.00				
Δ FIS	-0.29	0.05	0.09	0.16	-0.23	0.03	-0.08	1.00			
Δ TR	0.06	0.00	-0.02	-0.03	0.21	0.12	0.16	-0.15	1.00		
Δ XRR	-0.08	-0.02	0.09	-0.01	-0.05	-0.03	-0.03	0.03	0.09	1.00	
Δ INF	-0.02	0.14	-0.03	-0.02	0.09	0.02	0.06	-0.01	0.02	0.01	1.00

All variables are in terms of growth rates i.e. the first difference of natural logs.

4.5 Methodology and Empirical Findings

This section examines the relationship between financial development and economic growth empirically by using panel data techniques. Panel data represents the pooling of observations of cross sections (in this case countries) over a number of time periods. Panel data is multi dimensional because it contains multiple observations over multiple time periods.

To assess the relationship between financial development and its impact on economic growth, panel data techniques are utilised, because of the large data set with 95 cross sections over the period from 1960 to 2009. Panel data gives more information, more degrees of freedom, less collinearity among the variables, more variability, and more efficiency.¹⁴ The main model for the current research is

$$G_{it} = \alpha_i + \beta F_{it} + \gamma' X_{it} + \mu_{it},$$

with $i = 1, \dots, N$ and $t = 1, \dots, T$. G is the log of GDP per capita, i subscript denotes the cross-section of countries, t subscript denotes the time period, α is the intercept and is a scalar, β is a $K \times 1$ vector containing the slope coefficients. F is a matrix containing financial development indicators, including bank and stock market indicators. X contains the set of control variables, including the log of inflation, the log of trade to GDP ratio, government expenditures to GDP, and exchange rate regimes. The error term is μ_{it} . Panel data employs a range of estimators and models. Our regression has been examined by using the pooled regressions and fixed effects method.

¹⁴Baltagi (1997).

4.5.1 Pooled Regression

It is the basic method of regression and ignores the structure and special effects of panel data. In this case, the coefficients are constant for both intercepts and slopes. Therefore, the model is known as the pooled regression model. In this method of panel data estimation, the simple ordinary least square regression (OLS) can be used. The model is in the form,

$$G_{i,t} = \beta_0 + \beta_1 F_{1,it} + \beta_2 F_{2,it} + \dots + \beta_k F_{k,it} + \gamma' X_{it} + \xi_{it}.$$

The pooled regression results are reported in tables 4.16 and in table 4.18.

4.5.2 Fixed Effects Model

To assess the relationship between financial development and its impact on economic growth, a panel fixed effects model is used along with pooled regression so that a comparison of the results can be made. This method is also known as the least square dummy variables method (LSDV).

The standard assumption behind this model is that β is constant for all i and t , but not the intercept. This means that the effects of a change in F are same for all periods and cross sections. However, the average level of i th cross section may be different from j th cross section. Thus α_i captures the effects of those variables which are peculiar to the i th cross section and that is constant overtime. In standard cases, μ_{it} is the independent and identically distributed over cross sections and time, with zero mean and σ^2 as its variance. If α_i is treated as N fixed unknown parameters, so the above model is referred to as the fixed effects model. It is a linear regression model where the intercept terms vary over the individual units i , i.e.

$$G_{it} = \alpha_i + \beta F'_{it} + \mu_{it},$$

where $\mu \sim \text{IID}(0, \sigma^2)$. It is usually assumed that all F_{it} are independent of all u_{it} . The same model can be written in the usual regression form by including a dummy variable for each i in the model. That is

$$G_{it} = \sum_{j=1}^N \alpha_j d_{ij} + \beta F'_{it} + \mu_{it} \quad (4.1)$$

where $d_{ij} = 1$ if $i=j$ and 0 otherwise. Thus, the model features a set of dummy variables. The parameters $\alpha_1, \dots, \alpha_N$ and β can be estimated by ordinary least squares in equation 4.1. The implied estimator for β is referred to as the least square dummy variable (LSDV) estimator. It may numerically be unattractive to have a regression model with so many regressors. Fortunately, one can compute the estimator for β in a simpler way. It can be shown that exactly the same estimator for β is obtained if the regression is performed in deviations from individual means. Essentially this implies that the individual effects of α_i are eliminated by transforming the data¹⁵.

In the case of the fixed effects model the μ_i are taken as fixed parameters to be estimated and the remainder disturbances stochastic with v_{it} independent and identically distributed with $\text{IID}(0, \sigma^2)$. In this case F'_{it} are assumed independent of the v_{it} for all i and t . The fixed effects model is thought to be an appropriate specification if we are focusing upon a set of fixed cross sections. Inference, in this case, will then be conditional upon the particular cross sections. The impact of individual indicators over growth using fixed effect method are reported in tables 4.17 and 4.19.

¹⁵Verbeek (2004).

To overcome the problem of biased estimates of β changes of variables have been employed rather than involving levels of financial and economic indicators. In this way, the factors that are unchanged from time can be controlled.

4.5.3 Unit Roots

If the true model engages in independent random walks with and without drift for $T \rightarrow \infty$ and N finite, the ‘nonsense regression’ phenomenon holds for spurious fixed effects models and inference based upon values can be highly ambiguous (Entorf 1997).

The stationarity of variables is examined to check for the possibility of spurious regressions. There are various unit root tests in econometrics literature. The method of Im, Pesaran and Shin (IPS) W-stat (1997) unit root test has been found to have higher power to analyse long-run relationships in panel data¹⁶. In the case of IPS tests, heterogeneous panels are estimated with t-tests in unit roots. It helps to identify the common time effects, individual time effects and trends. It is based upon the mean values of Dicky Fuller t-statistics for each unit in panel¹⁷. This test is used in the current research. The method of IPS works really well with dynamic heterogeneous panels and is based upon the mean of individual statistics of unit roots. The t-statistics of this method are based upon the ADF (Augmented Dicky Fuller) statistics and are averaged across groups. The statistic of IPS tests converges to the standard normal variate in probability. It allows for the independent effects of common time effects and time trends. The results for unit root tests are reported in table 4.14.

¹⁶Hoang and McNown (2006).

¹⁷Bornhorst and Baum (2001).

Table 4.14: IPS: Pesaran and Shin Statistics (1960 – 2009)

Variable	IPS Stats	Variable	IPS Stats
BA	-6.58*	Δ BA	-60.99*
CR2	7.33	Δ CR2	-29.66*
LL	8.19	Δ LL	36.02*
SC	3.36	Δ SC	-17.92*
ST	-5.46*	Δ ST	-36.51*
SV	-0.88	Δ SV	-29.09*
GD	5.55	Δ GD	-44.25*
FIND	-2.03**	Δ FIND	-10.35*

Notes: Variables in the first column are in terms of natural logs. In the third column Δ represents log with first difference. * 1% level of significance, ** 5% level of significance.

Consider the following model,

$$Y_{it} = \rho Y_{i,t-1} + Z'_{it}\gamma + \mu_{it}, \quad (4.2)$$

where $i = 1, \dots, N$ and $t = 1, \dots, N$. Z_{it} is the deterministic component and u_{it} it is a stationary process. Z_{it} could be zero, one, the fixed effect, μ_i , or fixed effect as well as a time trend, t . The IPS test allows for heterogeneous coefficient of Y_i , $t - 1$ and propose a testing procedure based on averaging individual unit test statistics.

Im, Pesaran and Shin W-stat tests are utilised to test the null of stationarity for all the variables. The results proved five out of eight variables with unit roots. According to the results in table 4.14 CR2, LL, SC, SV and GD are found with unit roots. They are integrated of order one because they are non stationary in levels but stationary at first difference. However, the other three variables, including BA, ST, and "FIND" are found stationary at levels.

Table 4.15: Expected Signs of Variables

Variable	Expected Sign
BA	+
LL	+
CR2	+
SC	+
ST	+
SV	+
FIS	+ / -
TR	+
XRR	-
INF	-

4.5.4 Static Panel Estimation Results

In this section, the results achieved from pooled regression and fixed effects model are explained and reported in tables 4.16 to 4.19. The expected signs of all financial development indicators and control variables over growth are shown in table 4.15.

It is assumed that the development of all these indicators will raise growth. Therefore, the signs for financial development indicators, including BA, LL, CR2, SC, ST and SV are expected to be positive. In table 4.16 two out of three banking indicators (BA and CR2) are significant for all countries with the expected positive signs. It reflects that the growth of BA and CR2 has a positive impact over GDP per capita during the period from 1960-2009 in our sample of 95 countries.

BA as mentioned earlier represents the relative importance of financial institutions. It is positive and significant in almost all income groups except low income countries in 4.16. Our results suggest that increase in BA can lead to an increase in growth as well. The positive and significant impact of BA is reported even when the country-specific effects are fixed as seen in table 4.17.

The ratio of CR2 is significant for almost all income groups in 4.16. CR2 is the ratio of credit issued to private enterprises by deposit money banks and other financial institutions to GDP. The positive values and significant coefficients reflect the

Table 4.16: Pool Regression -All Variables

	All	Low	Lower Middle	Upper Middle	High
BA	0.056*	0.016	0.094**	0.131*	0.190*
CR2	0.049*	0.064**	0.048*	0.067*	0.024
LL	-0.041**	-0.077*	-0.104**	-0.036	-0.02
SC	0.02*	0.007	0.035*	-0.004	0.047*
ST	0.009**	0.002	0.009	0.005	0.02*
SV	-0.006	-0.001	-0.011	0.01	-0.026*
INF	-0.028*	-0.054	-0.133*	-0.022**	-0.034
FIS	-0.02	-0.013	-0.017	-0.013	-0.139*
XRR	-0.005*	-0.018**	-0.002	-0.013*	-0.001
TR	-0.019	0.029	-0.026	-0.005	-0.013
R^2	0.104	0.292	0.173	0.242	0.185
Adjusted R^2	0.097	0.194	0.149	0.217	0.17
F-Statistics	14.764	2.969	7.160	9.683	11.867
Prob(F-Statistic)	0.000	0.003	0.000	0.000	0.000
countries	95	9	24	25	37

Notes: *1% level of significance, ** 5% level of significance, *** 10% level of significance.

importance of this ratio in economic growth. It suggests that more credit is issued to private firms and potential businesses in the economy to promote competition and innovation that lead to growth. In table 4.17, where the country-specific effects are fixed; CR2 is again significant in the main sample of countries and also in low income countries.

The coefficients of the ratio of liquid liabilities LL is negative in all income groups in both tables 4.16 and 4.17. The ratio of LL measures the size of financial intermediaries with respect to the economy and the impact of LL on growth is expected positive. In our results, the size of the financial system is not found positively

significant with respect to the growth of the economy. LL does not represent the effectiveness or efficiency of financial intermediaries. Therefore, it cannot proxy for the well functioning of financial intermediaries (Beck et al. 2008). Our results are also in line with Pierre (2007). It is suggested that development of financial intermediaries excluding financial depth are associated with macro-economic development and economic technical efficiency. If the development of credit to private sector and relative importance of commercial banks providing the financial services in the economy is found significant, then financial depth (LL to GDP) does not affect it.

The stock market indicators include SC, ST and SV. In table 4.16 with pooled OLS and 4.17 with the country fixed effects, SC is positively significant in lower middle income, high income and whole sample of countries. As mentioned earlier, SC is considered as one of the important measures of stock market development, and it also measures the size of financial development. It has been found that the growth of SC has led to a positive change in growth during the period from 1960-2009.

ST is the stock market turn over to GDP ratio. The coefficients of ST are found significant and positive in both high income, and the whole sample of countries results reported in tables 4.16 and 4.17. The higher values of this ratio suggest low transaction costs with high efficiency.

SV is stock market value traded to GDP ratio. Unlike the previous findings, SV is found negative and insignificant. There are two main pitfalls with this ratio, firstly, it does not help to measure market liquidity. It represents trading with respect to the size of the economy. Secondly, since stock markets are forward looking, if e.g. the price of some stocks rises for any reason, SV will also increase. The problem arises when SV rises without an increase in the number of transactions.

Inflation is expected to have a negative relationship on GDP growth. Barro (1994) asserts that if inflation increases by ten percentage points per year on average, it will lead to lower GDP per capita by 0.2 to 0.3 percentage points per year.

In the long run, a small change in average growth rate has a significant impact on the standard of living. Fischer (1993) and Levine(1999) support the negative relationship between inflation and growth. Inflation reduces growth by decreasing investments and productivity growth; it reduces savings and capital accumulation. The results for inflation were as expected and can be seen in 4.16 and 4.17. Inflation is found negative and significant in almost all groups and also in the main sample of countries. Inflation has proven negative and has had a significant impact on growth during the period from 1960-2009.

Trade is expected to exert a positive effect on GDP growth. Trade promotes growth positively through technology transfers, economies of scale, and comparative advantage (Yanikkaya 2003). Unlike these findings, trade is found negative and insignificant in our results with pooled regressions (see table 4.16) as well as after controlling for the country fixed effects (see table 4.17).

FIS variable represents government expenditure to GDP ratio. It can have a positive impact on growth if the government spends in productive areas. Countries with good governance can collect taxes in an efficient and effective manner; therefore, higher spending in a productive manner can lead to higher levels of growth (Gray et al 2007). On the other hand, if the income accounting perspective is considered, then increased spending could occur at the cost of private consumption or investment in conventional capital. Government growth can hurt economic growth. At the same time, it is worth considering the fact that government spending might increase public and economic welfare but decrease GDP per capita¹⁸. Negative and significant results in the case of high income countries with pooled and fixed country effects have been found. This group has the maximum number of countries in our analysis, and the results suggest that an increase in government expenditure can cause a negative effect on growth. The impact of FIS on GDP per capita growth is also found negative

¹⁸Daniel (1985).

Table 4.17: Fixed Effects Regression -All Variables

	All	Low	Lower Middle	Upper Middle	High
BA	0.05*	0.007	0.07**	0.133*	0.138**
CR2	0.025**	0.068***	0.02	0.038	0.007
LL	-0.082*	-0.151*	-0.17*	-0.066**	-0.054**
SC	0.015*	0.017	0.03**	-0.007	0.04*
ST	0.009**	0.006	0.01	0.005	0.023*
SV	-0.005	-0.004	-0.01	0.009	-0.026*
INF	-0.025*	0.007	-0.18*	-0.022*	-0.127*
FIS	-0.017	-0.021	-0.04***	0.004	-0.115*
XRR	-0.017*	-0.045*	-0.03*	-0.009	-0.003
TR	-0.023	0.029	-0.01	-0.025	-0.012
R^2	0.384	0.602	0.51	0.367	0.552
Adjusted R^2	0.329	0.491	0.46	0.29	0.51
F-statistic	7.059	5.388	10.163	4.771	13.037
Prob(F-statistic)	0.000	0.000	0.000	0.000	0.000
Countries	95	9	24	25	37

Notes: *1% level of significance, ** 5% level of significance, *** 10% level of significance.

in the case of lower middle income countries when the country effects are fixed.

The exchange rate regime can influence economic growth by increased productivity and investment. Pegged exchange rate regimes have higher investment while floating exchange rate regimes have faster productivity growth. On net, per-capita GDP growth is considered slightly faster under floating regimes (Ghosh et al., 1997). Huang and Malhotra (2005) assert that “the importance of exchange rate regime choice for economic growth depends on the level of development of an economy. However, regime choice does not affect the rate of economic growth for the advanced European countries, though more flexible regimes are associated with slightly

higher growth rates on average.” Low rate of inflation and undistorted exchange rate markets are conducive to economic growth. Inflation decreases the growth rate by reducing investments. Secondly, undistorted exchange rate markets have also proven helpful in achieving high levels of growth (Fischer, 1993).

It is also observed that overall model fitness R^2 has been improved after applying the country fixed effects. The value of R^2 is 0.104 with pool estimations (see table 4.16) whereas it improved a great deal after the country fixed effects estimations and is reported at 0.384 (see table 4.17).

The effect of our financial development index (constructed in Chapter 3) over growth has been examined. The results are reported in table 4.18 and 4.19. The low income countries group were dropped in this case because of missing observations in low income countries. In the case of pool regression in table 4.18 it can be seen that the effect of financial index over growth is found significant with expected positive signs for the whole sample of, 21 countries. The impact of inflation, fiscal (Government spending), exchange rate regimes, and trade to GDP are controlled. It is observed that fiscal to GDP is found significant in all countries groups, but it has shown a negative effect over growth.

In table 4.19 when country effects are fixed, again financial index “FIND” is significant and positive, reflecting a positive impact of financial development on growth during the period 1960-2009. Inflation, as expected, shows a significant negative impact on growth when country effects are fixed. Government expenditure shows a significant negative impact on growth even after controlling for country effects. Similarly, the impact of floating exchange rate regimes is significantly negative in the case of the all-country sample. The value of R^2 has improved in this case as well, after applying the country effects. R^2 reported in table 4.18 is 0.147 for pool regression results, whereas it is improved with fixed country effects results, i.e. 0.418 reported in table 4.19.

Table 4.18: Pool Regression incl. Financial Index

	All	Lower Middle	Upper Middle	High
FIND	0.007*	-0.004	0.039	0.003
INF	-0.111	-1.48***	-0.182	0.038
FIS	-0.267*	-0.129	-0.063	-0.388*
XRR	-0.001	-0.056	-0.022	0.002
TR	-0.02	-0.086	0.014	-0.023
R^2	0.147	0.523	0.233	0.287
Adjusted R^2	0.131	0.285	0.059	0.271
F-statistic	9.384	2.192	1.336	18.436
Prob(F-statistic)	0.000	0.136	0.285	0.000
Countries	21	1	2	18

Notes: *1% level of significance, ** 5% level of significance, *** 10% level of significance.

Table 4.19: Fixed Effects Regression incl. Financial Index

	All	Lower Middle	Upper Middle	High
FIND	0.009**	-0.004	0.032	0.006
INF	-0.453*	-1.480***	-0.302	-0.243***
FIS	-0.299*	-0.129	-0.118	-0.420*
XRR	-0.018**	-0.056	-0.040	-0.007
TR	-0.029	-0.086	0.024	-0.035
R^2	0.418	0.523	0.275	0.552
Adjusted R^2	0.361	0.285	0.068	0.506
F-statistic	7.274	2.193	1.329	11.879
Prob(F-statistic)	0.000	0.136	0.288	0.000
Cross sections	21	1	2	18

Notes: *1% level of significance, ** 5% level of significance, *** 10% level of significance.

4.5.5 Endogeneity Issues

A key problem in this type of model is the possibility of obtaining inconsistent parameters due to the presence of potentially endogenous regressors in the model. OLS regressions provide estimates of the magnitude of the relationship between the variables, but do not give the direction of causality. A standard OLS regression model states

$$Y = \beta x + u,$$

where u is the error term and is supposed to be uncorrelated with regressors i.e. there should be no relationship between x and the error term u . In some cases, it is possible to find some kind of association between the regressors and error terms. As an example, consider the regression of earnings Y on the number of years of education. In this case u involve all other factors than education that can cause a change in earnings, e.g. competence or ability. It is possible that the person is highly qualified due to his competence and abilities and therefore, earning high income. In this case, the error term is associated with regressor x . In this case Y will obtain direct and indirect effects; the direct effect will come from the β estimator whereas the indirect impact will be coming from error term u . The aim of the estimation is to measure the direct effect, not the indirect one. The inconsistent estimates are due to the issue of endogeneity of the regressor x .

There can be three solutions to deal with all these problems¹⁹.

1. Measuring the omitted or unobserved variables, which is very difficult.
2. Trying to find proxies for the omitted variables, which is also very difficult.
3. Finding an instrument variable for the endogenous variables, which is more

¹⁹Jaffery (2009).

straightforward.

Instrumental variables are considered the solution to be utilised in two stage least squares method to examine the direction of causality. A good instrument (z) needs to satisfy two conditions.

- Instrument variables and error terms should not be correlated i.e. $cov(z, u) = 0$
- Endogenous variables and instrument should be correlated i.e. $cov(z, x) \neq 0$

This part of the chapter looks into the empirical aspect of endogeneity issue of finance and growth relationship. Does “finance” lead or follow growth? The positive relationship between the two is accepted in many studies. However, the endogeneity issue will always be present. Does finance have a causal impact on growth? Or is the direction of causality the opposite? A few studies suggest that it is the high level of income which creates the demand for a developed financial system. When income increases, the demand for better financial services also rises. Schumpeter (1934) focused on financial development determining economic growth. Robinson (1952) wrote that “Where enterprise leads finance follows”.²⁰

To deal with the issue of endogeneity, the method of two stages least square is used. The lagged values of growth, and financial indicators are added as instruments. The results for two stage least square are reported in table 4.20. A causal impact of financial development on growth could not be established since the estimated coefficient is insignificant. Our results are in line with those of Zang and Kim (2007). They employed Levine Beck and Loyza (2000) financial indicators over a large panel of countries and reported a sharp contrast with the results of Levine et al. (2000) because a unidirectional causality could not be proven.

²⁰p.80.

Table 4.20: Two Stage Least Squares -All Financial Indicators

Variable	Coefficient	t-Statistic	Probability
C	0.022	1.112	0.266
BA	-0.090	-1.108	0.268
CR2	0.021	0.652	0.514
LL	0.020	0.264	0.792
SC	0.051**	2.424	0.016
SV	0.038	0.189	0.850
ST	-0.039	-0.202	0.840
INF	-0.024**	-2.164	0.031
FIS	-0.023	-0.880	0.379
XRR	-0.004	-1.173	0.241
TR	-0.045	-1.215	0.225
R-squared	-0.50	F-statistic	13.65
Adjusted R-squared	-0.51	Prob(F-statistic)	0.0000
S.E. of regression	0.04	Instrument rank	11

Notes: *1% level of significance, ** 5% level of significance, *** 10% level of significance.

4.5.6 Dynamic Panel Estimation

Dynamic panel estimation is an effective method used to exploit time series variation of the data. It also avoids biased results due to the country-specific effects and allows inclusion of a lagged dependent variable as a regressor so that the endogeneity of all explanatory variables can be controlled (Beck et al. 1999).

The research has employed the Arellano, and Bond (1991) generalised method of moments technique. To avoid the country effects in estimates, the first difference of the dependent variable is taken and included in the specification as a regressor. This helps to eliminate the problem of omitted variables bias. In that case, the regression equation takes the form of,

$$G_{i,t} - G_{i,t-1} = (\alpha - 1)G_{i,t-1} + \beta' F_{i,t} + \eta_i + \xi_{i,t}.$$

In this equation $G_{i,t}$ represents the dependent variable of the model i.e. log of real GDP per capita, $F_{i,t}$ represents the explanatory variables and these are the indicators of financial development. η takes into account the unobserved country-specific effect, and finally ξ is the error term. GMM addresses and resolves the problem of endogeneity. However, sometimes it introduces another problem, which is the correlation between error terms ($\xi_{i,t} - \xi_{i,t-1}$) and the dependent variables ($Y_{i,t} - Y_{i,t-1}$). To eliminate this problem from the estimates, Arellano and Bond (1991) suggested employing the lagged values of the explanatory variables in levels as the instruments for the current differences of the endogenous variables. Arellano and Bond assumed no serial correlation between the error terms of ξ and the explanatory variables. In that case, the moment conditions can be employed into the regressions.

Arellano and Bond (1991) suggested a two-step GMM difference estimator. In this procedure, there are two steps as the name suggests. In the first step, the error terms are considered independent and homoskedastic, both over time and across countries. In the second step, the residuals obtained from the first step are utilised in the construction of consistent estimates for the variance and covariance matrix.

Blundell and Bond (2000) have shown that by including the level regressions in estimation, can reduce the possible biases in the finite sample and also the asymptotic imprecision related to the difference estimator. Estimating the regressions in levels cannot directly get rid of country-specific effects. The differences of the lagged explanatory variables can be used as instruments for the levels for the endogenous explanatory variables. It should be assumed that the correlation between country-specific effects, and the levels of the explanatory variables should remain constant over time.

The reliability of the GMM estimators will further depend on some factors: first, the validity of the instruments, and second the lack of serial correlation in the error term. The results of GMM panel estimations by Arellano and Bond are (1991) are

Table 4.21: Generalized Method of Moments

Variable	Coefficient
GD(-1)	0.1803*
BA	0.0410***
CR2	0.0045
LL	-0.0845*
SC	0.0153**
ST	0.0074***
SV	-0.0037
INF	-0.0186
FIS	-0.0140
XRR	-0.0234*
TR	-0.0284
J-statistic	1027.730
Instrument rank	787

reported in table 4.21.

The consistency of results of GMM estimators relies upon the validity of the instruments. Sargan's test (1988) is employed to examine the null of valid over-identifying restrictions. The J-statistic reported in table 4.21 is the value for the Sargan statistic. Since the instrument rank (787) is greater than the estimated coefficient (11) the Sargan test can be constructed to examine the over-identifying restrictions. The statistic is distributed as,

$$\chi(p - k)$$

Where the number of estimated coefficients are represented by k, the instrument rank is denoted by p. The p-value can be calculated as

$$p - value = \chi^2(1027.730, 776)$$

This gives the result as

$$p - value = 0.0000$$

Since the p-value is 0 the null hypothesis of valid instruments is rejected.

4.6 Concluding Remarks

The relationship between financial development and growth is deeply studied theoretically and empirically in this chapter. Every effort has been made to carefully select the indicators of financial development so that the relationship between financial development and growth can be investigated with most-recent data set covering a period from 1960 to 2009. Countries are divided into four income groups based on World Bank GNI method. The analysis started with 211 economies but due to data limitations, only 95 cross sections were included in this research. Six financial development indicators from the banking sector and stock markets (three each) were included to proxy the efficiency, depth and activity of financial sector and the effect of trade, government expenditure, exchange rate regimes, and inflation were controlled.

An analysis of real GDP growth for all income groups is undertaken in the first section of this chapter. It is observed that countries in high income group are more focused towards financial development and are more intend on developing their stock markets and banking sector compared to countries in other income groups.

The analysis of average annual GDP per capita in the same section suggests that high income countries have maintained a very low level of annual population growth rates, e.g. Belgium 0.094%, United Kingdom 0.27% , United States 0.97%, and Singapore 0.99%. On the other hand, countries in the low income group have

high annual population growth rates, e.g. Niger 4.67% and Congo 4.21%.

Average annual growth rates of all variables were also studied (see table 4.2 and 4.3). It is observed that the global economy has grown 3.71%, low income economies 3.5%, lower middle income countries 3.8%, upper middle income countries 3.5% and high income countries 3.9% during 1960 - 2009.

The impact of financial development over growth is expected to have a positive impact over growth. Therefore, positive and significant coefficients were expected in the results. After the analysis through pool and fixed effect regressions, it is suggested that development of financial intermediaries excluding financial depth are associated with macro-economic development and economic technical efficiency. If development of credit to private sector and relative importance of commercial banks providing the financial services in the economy are found significant, then the financial depth (LL to GDP) does not affect it. In the case of stock market development indicators, SC is considered one of the important measures of stock market development, and it measures the size of financial development. The growth of SC has led to a positive change in growth during the period from 1960-2009. The coefficients of ST were also found significant and positive in high income and whole sample of countries in both results suggesting low transaction costs with high efficiency. SV is negative and insignificant. However, there are two shortcomings of this ratio, firstly, it does not help to measure market liquidity, secondly since stock markets are forward looking, if e.g. the price of some stocks rises due to any reason, then SV will also increase. The problem arises when SV rises without an increase in the number of transactions.

The index of financial development "FIND" (constructed in chapter 3) is also included in the analysis to capture its impact over growth. The main intention to include "FIND" in this analysis is that the results achieved from this index can portray the overall impact of financial development (based upon numerous financial

indicators from banks, stock markets and insurance companies) over growth during the sample period. It is observed that the effect of financial index over growth is found significant with expected positive signs in the case of the whole sample of 21 countries.

The method of Im, Pesaran and Shin (IPS) W-stat (2003) unit root test due to its higher power to analyse long-run relationships in panel data is employed to examine the stationarity of all variables, and it appears that five out of eight variables are non stationary at levels and stationary at first difference (see table 4.14).

As mentioned in chapter two, the causal impact of financial development over growth is still not resolved. An attempt is made to re-examine the endogeneity of finance and growth relationship by employing the two stage least square method. A causal impact of financial development on growth could not be established since the estimated coefficient is insignificant. Our results are in line with those of Zang and Kim (2007).

Finally, the dynamic panel estimations were utilised since this is an effective way of exploiting the time-series variations in data. Arellano and Bond's (1991) technique of generalised method of moment is used. The first difference of dependent variable is included to eliminate the problem of omitted variable bias. The reliability of GMM estimator depends upon the validity of instruments and lack of serial correlation in error term. Sargan tests (1988) were used to examine the null valid over identification; however, the results reported the rejection of null hypothesis of valid instruments.

The results of this research are in line with Favara's (2003), who reported a strong association between domestic credit by banks and other financial institutions as a percentage of GDP and economic growth, the effects of inflation, black market premium, trade openness to GDP and secondary school enrolment are controlled. Around 85, countries were examined over a period from 1960-1998. However, the

relationship became weak when the method of instrumental variables estimation is adopted. Similarly, Saci et al. (2008) have also reported insignificant results after the application of GMM method over 30 countries during a period from 1988-2001.

Loayza and Ranciere (2004) assert that the puzzling relationship between financial development and growth can be due to effects of financial globalisation.

Rajan (2000) suggests that the nature of the credit cycle is pro-cyclical meaning that rates of GDP growth induce high credit growth rates. In good times, if banks relax their strategies and lend loans openly to both bad and good projects so non performing loans emerge in bad times and therefore the credit sources dry up.

Since the causal impact of financial development over growth has not been established, economists have started looking for the clues of relationship between excessive financial deepening and financial crises. As discussed in chapter two, financial liberalisation has become the main concern today. Kaminsky and Reinhart have presented evidence of a link between financial liberalisation and bank crises. It is reported that eighteen out of twenty six banking crises happened in those financial systems that were financially liberalised in the preceding five years or less. During 1980s and 1990s most of the financial crises were linked to liberalisation episodes.

The next chapter is devoted to examine the impact of financial deepening over financial crises in detail. Financial globalisation has shown several benefits but at the same time some major financial crashes have been observed since 1970 when international financial integration started to take place. It is worth considering whether extensive financial deepening leads to higher growth rates or it can become a cause of collapse of huge economies.

Banking Crises and Stock Market Crashes: What is the Role of Financial Development?

5.1 Introduction

This chapter examines the relationship between financial development and financial crises. There has been a significant increase in the frequency of the financial crises in the last 30 years (Bordo et al., 2001). Is it possible that ever-increasing market capitalisation and increasingly risk-taking banks actually increased rather than decreased crises? One of the reasons can be asymmetric information in the financial system that can lead to higher chances of facing financial crisis (see Mishkin, 2000).

During the last few decades, countries have started to become more financially integrated to get the benefits of financial globalisation. The development of the financial sector is the key element of financial globalisation¹. After integrating with world

¹Blanchard (2009).

markets, financial markets have become more sophisticated and deeper. Global financial markets facilitate international risk diversification. Financial globalisation has shown several benefits but at the same time, it carries certain challenges. In the crisis of 1990s, questions about financial liberalisation and its gains were raised. It was suggested that after financial liberalisation, countries become more exposed to external shocks. They can also be affected by contagion effects and shocks from across the borders. Proper policies and financial regulations are the key requirements for the implementation of financial liberalisation in any country otherwise increased risks can be seen with financial liberalisation.

Nissanke and Stein (2003) assert that developing countries were expected to gain the maximum benefit from financial globalisation since it improves the efficiency of global resource allocation. However different results have been observed in reality. The flows of capital have been moved by market conditions of developed countries (push-factors) and also liberalisation and privatisation programmes in developing countries (pull-conditions). It has served to fulfil the needs of instant returns of international investors. The impact of globalisation on development has little evidence while significant indication of high economic and social costs are attached to it.

Schmukler (2004) suggests that policy makers need to focus on avoiding a bank and currency crisis. These objective needs more attention when there is free mobility of capital. Foreign and domestic investors both need to exercise discipline otherwise a foreign crisis can have contagious effects on domestic economies. A foreign crisis can be highly transmittable and can create major crisis in the home country. Improved institutional and enhanced business environment are pre-requisites for global financial integration. Countries with a very low rate of international financial integration slow down the process and sometimes even cause to reverse the process of financial globalisation. When countries become more financially integrated, then

governments tend to follow international policies. Therefore, governments are left with few options about their exchange rate and monetary policies. It becomes more difficult for governments to manage prices and liabilities denominated by foreign currencies. Sometimes governments lack enough resources to stop the occurrence of currency attacks.

A binary probit model has been utilised to study this relationship. Probit model is based upon two events, whether the event occurred or not. It is a binary dependent variable probability model, where the dependent variable can take values from two alternatives, zero and one. In this case, the banking crises index and stock market crisis index are dependent variables with values zero and one. Bank crisis and stock market crashes are marked with binary numbers in the following manner:

- Bank crisis are considered when there are bank runs that lead to the mergers, closures, and take overs by one or more public sector financial institutions.
- Stock market crashes are marked as a decline of 25 percent or more in the real equity prices.

5.2 An Overview of Financial Crises

This section studies different forms of financial crises. Although this study refers to banking and stock market crisis, which is important, other forms of financial crises are also discussed in section 5.3.

Leveraged based financial markets are more exposed to a financial crisis. These markets own thin capital compared to assets that are on the stake. If debts are higher than equity, the firm is considered highly leveraged. Similarly, economies can also be highly leveraged like those of the United States in 2007, and, which eventually suffered a financial crisis. People in the United States and other developed economies

borrowed large sums of capital. During the period from 2001-2007, interest rates were really low and gradually increasing. Financial institutions offered cheap loans, and mortgages rose considerably. The prices of real estate in this time period were high, reflecting a safe investment with future profits. Mortgage debt increased at 114% during this period. In 2006, the increase in prices of real estate started to stall, and investors became concerned about their investments. In 2007, the crisis hit the economy with full strength by seizing up short term lending. Investor's confidence was shattered leaving financial institutions without funds and unable to sell securities due to problematic underlying assets. All these events aggravated the situation by pulling out the market participants.

Failure to understand the fickleness and precariousness of confidence becomes the main factor of confidence collapse where lenders disappear and a crisis begins². As a common practice, banks borrow on a short-term basis and lend long-term. Borrowings, are in the form of deposits and are redeemable at comparatively short notice. However, the lending is usually in the form of long-term maturity contracts, which are not easily converted into cash at short notice. If a bank, for example, lends money for the expansion of a hardware local store, it can have full confidence of repayment after the store expands its services in the long-term but in the early stages of store expansion, the bank may not be able to call in the loan. The owner of a store simply cannot afford repayment due to insufficient revenues, even if he is forced to repay the loan along with interest. Banks with a strong base and healthy deposits with large illiquid portfolios of loan may have bright future prospects. However, if for any reason all the depositors want to withdraw all their savings from the bank at the same time, trouble can begin. The bank will not be able to serve all its customers and pay back their deposits. A recent example of panicked depositors is seen in 2007 in the United Kingdom, when the Northern Rock bank

²Reinhart and Rogoff (2009).

was eventually taken over by the British government.

Reinhart and Rogoff (2009) assert that government can also become a victim of fickle expectation that can destabilise the banking structure. If, for example, a country has a manageable public debt, tax revenue, market interest rates and growth projections and suddenly the market becomes concerned about an upcoming election that a fringe candidate may win and will greatly increase spending, debt management will become difficult. In this case, investors might start balking and stop rolling over the debts. As a result, a credit crisis could emerge.

It also appears that countries with highly managed fixed exchange rate regimes (lessons from 1980s and 1990s) become more vulnerable to a sudden confidence crisis. Speculative attacks on fixed exchange rates have blown up stable regimes overnight. Exchange rate crises are rooted from the unwillingness of a government to maintain consistent monetary and fiscal policy with fixed exchange rates.

In the next section, different forms of financial crises are reviewed. The main types of financial crises include,

- Banking Crises
- Stock Market Crash
- Inflation Crises
- Twin Crises
- Debt Crises
- Currency Crashes

5.2.1 Banking Crises

Banks lend long-term and borrow in short-term or in other words; the liability side of its balance sheet is liquid and asset side illiquid³. Therefore, banks are exposed to the risk of sudden unexpected requirements of liquidity causing “*bank runs*”. The mismatch of time structure can be observed when depositors want liquidity, but profitable investments need a long time to pay off. Banks bridge these maturity gaps in an efficient manner and to avoid risks banks need to design deposit contracts based on maturity structure, i.e. by offering higher returns on less liquid assets and lower returns on liquid assets. Therefore, insurance is provided to depositors against liquidity preference. It is suggested that crises occur for two reasons:

1. As a result of panic.
2. Fundamental reasons as an element of business cycles.

The most common feature of extreme banking crises is observed as bank runs. Depositors quickly liquidate their assets expecting bank failure. Sudden withdrawals push the banks to liquidate their assets at fire-sale prices, and they fail. Banking authorities are bound to follow the bankruptcy law that suggests, if, at any time bank is unable to fulfil claims, then it needs to wind up its services and dispense its assets after liquidation to its creditors.

Mitchell (1941) argued that financial crises take place when investors have a valid reason when economic conditions in near future seem gloomy. Investors believe that repayment of demand deposit will be impossible in the future and withdraw their funds instantly. In this scenario, depositors consider insolvency not illiquidity.

It is asserted that a banking crisis leads to a quick decline in tax revenues⁴. Government debt increases by 86% on average in three years following the banking crisis.

³Allen and Gale, p.59.

⁴Reinhart and Rogoff, p.142.

For example, if the debt of a central government is \$100 billion at the beginning of crisis so in three years time it will become \$186 billion (inflation adjusted). This is due to direct and indirect costs, including bailouts. These costs also depend upon the economic and political factors, mainly on the severity of shock and policy response that triggers the crisis. In developing countries, financial repression plays an important role in a banking crisis. In repression, banks become vehicles so that a government can squeeze maximum indirect taxes from citizens. It offers very few options to its local residents other than saving in banks. On the other hand, regulations are passed for banks to loan to the government. The government can also repress by maintaining caps on interest rates with engineered inflation, e.g. in 1970s India put a cap of 5% on interest rates and engineered inflation rate by 20%. Sometimes even these kinds of actions by a government are not sufficient to satisfy voracious requirements for savings and then a government stops their debt payments entirely. This causes a domestic default that also forces banks in turn to default on their liabilities. Consequently, depositors face a loss of their funds. Sometimes, governments do take responsibility in terms of insurance but simply renege on their promise in some cases.

5.2.2 Stock Market Crashes

A stock market crash can be defined as an extensive and instant decline in share prices comprising all sectors. Stock values plunge and bring major losses for its investors. Barro and Ursua (2009) define a stock market crash when there is an accumulative decrease of 25% or more in equity prices. Negative information about the market spreads instantly with a drastic increase in the sale of shares. If investors fear this situation, then they start selling at a rapid pace that creates panic in the market and aggravates the situation. The stock market index value nosedives and

investors start selling their stock at fire-sale prices, in panic to rescue their savings. The time span of a market crash is highly unpredictable, e.g. markets can even crash in a single day, or it may take longer. Due to financial integration and globalisation, the effects of market crashes are mostly contagious in nature.

Wilson (1990) suggests that stock market crash are interlinked with banking crises. Four major US stock market crashes were accompanied by banking sector crises, and they occurred in 1873, 1884, 1893 and 1907. The banking crises and stock market crashes are linked in a sense that banks keep all their reserves in the liquid form (in currency) to fulfil the liquidity demands of its customers. A large proportion of these funds are kept in reserves in terms of interbank deposits. Most of these banks keep their deposits with New York City banks due to their attractive interest rate offers. Further, New York City banks lent a portion of these funds in call loans markets of the New York Stock Exchange, as payable on demand. The major assets of New York banks were comprised of these loans. During the harvesting and planting seasons more cash was required in the banks of farming areas. New York banks found it difficult to manage funds at these times with certain planning. Liquidity demands increased during these times, and banks started to call-off their loans. Borrowers were forced to sell their securities and a wave of selling caused a decline in prices. Since the cash on demand side was scarce, prices crashed and so did markets.

5.3 Other Types of Financial Crises

5.3.1 Inflation Crises

Hazlitt (1978) defines "*Inflation*" as the volume of money i.e. blown up, inflated and overextended. Governments sell IOUs and bonds to banks, in return banks create

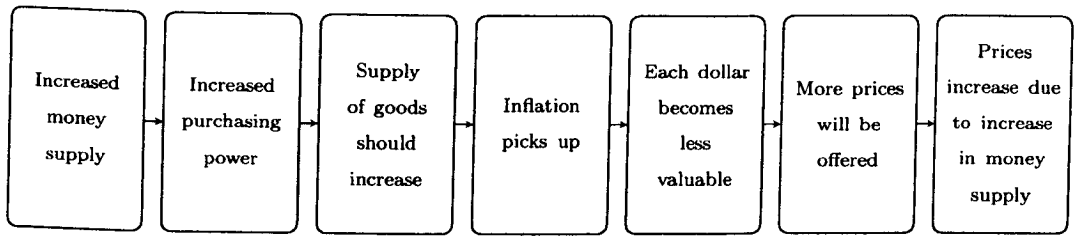


Figure 5.1: Inflation Process

payment deposits, and a government can withdraw from these accounts. Banks might sell these IOU's to central banks; in return, they can create the credit deposits for banks alternatively print more money. When a central bank buys government bonds on the open market, so direct or indirect payments are made by creating money, and inflation continues. The process of inflation is described in figure 5.1. It can be seen that an increase in the money supply leads to an increase in purchasing power. In this case, there is also a need to increase the supply of goods on the market, otherwise inflation will rise because each dollar will become less valuable, and more prices will be offered for the goods. Therefore, a rise in price will take place due to an increase in the money supply.

An inflation crisis can be controlled by having control over money and credit. Therefore, it would be correct to say "*stop inflating*". Sometimes, it becomes difficult for governments to avoid huge budget deficits, and these are managed by inflationary means or by printing money. High government expenditure becomes inflationary when printing money becomes the last resort. Reinhart and Rogoff (2009) adopt an inflation crisis threshold rate of 20% or higher per annum and consider the inflation crisis in a country when it crosses this limit.

5.3.2 Currency Crashes

A currency crash is defined as a large annual depreciation of currency against the US dollar or any other anchor currency such as the British pound, French franc, etc. or large loss of foreign reserves. There are three types of currency crises models discussed below.

- First Generation Models
- Second Generation Models
- Third Generation Models

First Generation Models

Krugman (1979) pioneered the currency crisis and introduced the first-generation currency crisis models. These models are based upon exchange rate collapses due to the budget deficit and monetarisation that exhaust foreign exchange reserves in central banks. The perfect version of the exchange rate model suggests that there should not be jumps in exchange rates so that speculators should not have any profit opportunity. If the shadow value crosses the fixed exchange rate, it can lead to sudden drop in reserves that can cause an increase in interest rates, therefore, currency begins to depreciate. Sometimes, currency crises start from investor's fear that a certain currency may devalue, and investors flee from markets instantly. Therefore, much pressure is created in the economy due to capital flight. A circular logic is also attached to currency crises phenomena i.e. expectation of devaluation makes devaluation more likely.

Second Generation Models

These models concentrate on the nonlinear behaviour of governments and include policy reactions of the government on private behaviour or when it faces the explicit

trade-off between different objectives and fixed exchange rates⁵. The changes in “attack conditional policies” can drag an economy into crisis even when policies consistent with the fixed exchange rate are implemented.

Self-fulfilling attacks depend upon people’s expectations, if a market chooses to attack, a currency crisis will emerge. On the other hand, if a market decides the opposite, a crisis will not occur. Any true or false rumour can aggravate market expectations resulting in a crisis. Obstfeld (1986) suggested that people’s expectations were important in triggering a crisis. Even when the economy is fundamentally strong if people anticipate devaluation in the future, they can start converting their domestic currency to foreign currency before devaluation and putting enormous pressure on the central bank. It is possible for a central bank to run out of foreign reserves if people continue doing this. These forms of crises are indeterminate in terms of time because they are based upon people’s expectations.

Large traders can also attack the economy by taking a massive position against fixed exchange rates. However, if the market consists of many small foreign exchange traders, then without coordination of their expectation, a sufficient size attack cannot be mounted.

Third Generation Models

Herding. The term “*herding*” reflects behaviour of international investors and currency traders who follow similar previous actions and move in a conventional manner. A little shock in society can appear as a massive shift in people’s actions⁶. For example, all traders can follow a leader without using their own judgment. Their irrational behaviour can lead them to the top of a cliff. Investors do also invest in contemporary assets without having enough knowledge of these assets.

⁵Saxena (2004).

⁶Saxena (2004).

Contagion. Contagion means when countries have real linkage with each other, and country “A” can deteriorate country “B’s” markets⁷, e.g. if both countries have similar export commodities in the global market. A devaluation of the currency of country “A” will affect the exports of country “B” and can also cause crises in country “B”. The currency crises in 1990s covered three different regional waves, including crises of ERM⁸(1992-93), the Latin American crisis (1994-95) and Asian crisis (1997-98). Contagion criteria look at how the same crises can be observed in different countries. It is also possible for a financial institution in country “A” to have equity stakes or credit exposure, or real estate in country “B”. A crisis in country “B” can spill over to home-country “A” and create weaknesses in home country’s financial institutions, e.g. crises contagion from Russia to Brazil. Investors try to liquidate their assets in one part of portfolios when there are losses in the other parts.

Kurgan (1998) asserts two explanations for contagion in apparently unlinked economies.

- In general perception countries are considered in terms of groups with common characteristics, for example; Latin American countries have the same culture, therefore, when investors see one Latin American country abandon peg due to pressure, they assume the same of other Latin American countries in terms of defence against parities (such as the Asian crisis).
- Political commitment for fixed exchange rates can also result in herding e.g. in Europe when Italy and Britain left ERM (Exchange rate mechanism), abandonment of peg to the Deutsche mark became less politically costly for Sweden.

Moral Hazard A moral hazard is the possibility that borrowers may change their

⁷Saxena (2004).

⁸Exchange rate mechanism.

behaviour in an undesirable way after getting the benefit⁹. In the case of financial markets, moral hazard takes place in the absence of asymmetric information e.g. when a government relaxes its policies in terms of extensions in government guarantees. It is also suggested that over investment, current account deficit, and excessive external borrowings result in moral hazard¹⁰.

5.3.3 Twin Crises

The crises of 1980s and 1990s comprised collapses in both the banking sector and currency devaluations and are termed as “*twin crises*”. Goldstein (2005) asserted that banking crises can occur since creditors assume that currency crises will occur. On the other hand, currency crises can occur since speculators assume that banking crises will occur. In the case of a currency crisis, the value of a bank’s investment decreases due to exchange rate depreciation. Foreign creditors assume that banks do not have enough resources to pay back their liabilities and take out their money instantly, and this causes a bank run. It also reduces a government’s foreign reserves. Therefore, it dumps fixed exchange rate regimes. Speculators see this as an opportunity for a successful currency attack. Therefore, it is suggested that the probability of one form of crisis amplifies the probability of another form of crisis. Twin crises are frequently observed in financially liberalised emerging economies compared to developed economies. It is seen that countries with currency crises also

⁹Moral hazard occurs when one party (A) is responsible for the interests of the other party (B); however, party (A) has an incentive to put its own benefits at first priority. Some of the specific examples include,

- One party sells financial instrument (e.g. mutual fund) to the other party knowing that it is not in the interest of the other party.
- One party takes risk, and the other party has to bear it.
- One may pay an excessive bonus to his/herself from the funds s/he is managing on behalf of someone else.

¹⁰Corsetti et al. (1998).

faced banking crises more or less at the same time.

Kaminsky (1999) explains twin crises in these words *“Problem in banking sector typically precede a currency crisis—the currency crisis deepens the banking crisis, activating a vicious spiral; financial liberalization often precedes banking crises. The anatomy of these episodes suggests that crises occur as the economy enters a recession following a prolonged boom in economic activity that was fuelled by credit, capital inflows, and accompanied by an overvalued currency”*.¹¹

Burnside et al. (2004) argue that in the presence of government guarantees, banks borrow in foreign currency and lend in domestic currency without hedging the consequent exchange rate risk. In the case of devaluation, banks renege on foreign debts and announce bankruptcy. It is assumed that a government is either unable or unwilling to fully cover the resulting bail out; therefore, twin crises are followed by government guarantees. Three factors of twin crises are mentioned in this regard,

- A mismatch of currency between the assets and liabilities of banks.
- The associated exchange rate risk of banks is not completely hedged.
- Implicit guarantees by a government to banks (foreign creditors).

5.3.4 Debt Crises

Debt crises can be divided into two forms, i.e. external debt crises and internal debt crises. External debts are country's liabilities to foreign creditors, including private and public officials¹². Creditors usually determine the terms of debt contracts under international law. External debt crises occur when a country's government defaults on its external debt and principal or interest payments are declined to its foreign

¹¹p.473.

¹²Rogoff and Reinhart p.12.

creditors i.e. issued under the jurisdiction of another country, and the debt is in foreign currency. The record of the largest external debt was observed by Argentina in 2001. The country defaulted in its external debt of more than \$95 billion. The reduction of interest payment and stretch in payment was undertaken to manage country's default. Rescheduled debt is extinguished to control the situation in most cases with less favourable terms compared to original commitments.

Domestic public debt is made under a country's own jurisdiction. In most cases, the debt is issued in local currency held by domestic residents. It is observed that domestic debt crises are mostly un-noticed since there is no foreign creditor involved¹³. These crises can happen due to a backdrop of poor economic conditions. Mexico was publicised during 1994-95 for its domestic debt crises. Argentina defaulted about three times on its domestic debt since 1980.

5.4 Financial Deepening and Crises: Review of the Literature

This section presents literature on financial deepening and crises in chronological order.

Mishkin (1996) focuses attention on the adverse effects of asymmetric information and moral hazard over the functioning of the financial market. Banks are important in this regard in order to tackle this issue. They can help in the collection of information and monitoring that can reduce asymmetric information.

Kaminsky (1999) reports that banking and stock market crises can become important reasons for slow growth rates, high inflation rates, a decrease in trade, and low per-capita incomes.

Esptein (2001) defines financial deepening in terms of "*financialisation*" which

¹³Rogoff and Reinhart p.13.

refers to the increased importance of financial motives and institutions both on international and domestic levels.

Loyza (2004) studied the impact of financial deepening on the growth of economy. Financial liberalisation can create short-run instabilities in financial systems, whereas financial liberalisation and growth have a positive association in the long run. It is suggested that economic growth is positively and significantly related to financial intermediation in the long run and 1% increase in domestic private credit to GDP leads to an increase of 0.7 percentage points in growth. In the short run, the impact of financial liberalisation is found extremely negative. The relationship between the two depends upon the nature of the movements, whether it is temporary or permanent.

Foster (2007) studied the impact of financial deepening in terms of the shift of economic activity from the production sector to the financial sector. It is argued that greater reliance on finance rather than the real sector is worrying and can bring major disasters in international financial systems.

Rousseau (2011) asserts that there is a great consensus regarding the positive relationship between finance and growth; however, in recent years the relationship between the two has considerably weakened. The main reason for the weakening of this relationship is financial liberalisation that started to spread around the world, and the influence of the relationship between finance and growth started to diminish. It is suggested that financial deepening can have a very positive impact on growth if it is not done excessively. Excessive and rapid financial deepening can create problems for all, even for most developed financial systems. This can lead to a weakening of the banking sector and also create inflationary trends and pressures. It can be concluded that the relationship between finance and growth is really complex and financial deepening needs to be applied along with a proper framework of policies, financial reforms and financial regulations.

Pallay (2007) asserts that functioning of countries is transformed at micro and macro levels after financial deepening. Firstly, the objective of financial deepening is to raise importance of the financial sector compared to the real sector. Secondly, it shifts income to the financial sector from the real sector. Financial deepening works through three channels. First of all, it changes operations and structures of financial markets; secondly, it changes the performance of non financial corporations, and finally; it brings change in economic policy. It is suggested that effective controls are required to get the benefits of financial deepening. Policies have made a great contribution in financial deepening, since they are determined by the politics. Therefore, political reforms are also needed to take place in order to get the benefits of financial deepening.

Reinhart and Rogoff (2009) have described the main elements of global financial crises.

1. One or more countries in global financial crises should have a significant share in world's GDP. The country can be a financial centre and may be a lender to the other countries.
2. The crises will involve two or more different regions.
3. The number of countries in crises in each of the regions will be two or more.

Lapavitsas (2010) asserts that the turmoil of 2007-09 crises originated due to the end of the bubble maintained by financial innovation and housing credit. The main feature of this bubble is considered to be the rapid increase in financial institutions and especially activities of investment banking. In United Kingdom and USA, this growth is related to the household indebtedness. This bubble showed a modest impact on consumption and production of mature countries. Crises are observed as systematic. Three different features are observed with the crises of 2007-09. First of

all, relations have been altered between the banks and non financial corporations. Secondly, banks started mediation in open market transactions, for which they started earning commissions and fees. Finally, individual households and workers were involved in financial systems to hold and borrow financial assets. All this resulted in financial profits through direct transfers of personal revenues, and this process is termed as financial expropriation.

5.5 Financial Globalisation, Crises and Policy Implications

The performance of a financial system depends upon channeling funds from savers to investors in an efficient manner. If there is asymmetry of information in the financial system, so the chances of a financial crisis increase.

Mishkin (2000) studied financial crisis in emerging markets. Policy makers in emerging economies face an agenda of having sustained procedures to avoid future problems. Asymmetric information is actually based on two elements,

1. Adverse selection occurs prior to financial transactions with risks of bad credit.
2. Moral hazard occurs after the financial transaction takes place. It occurs when the borrower tries to invest in risky projects and funds can be misallocated.

When moral hazard and adverse selection get worse, the chances of financial crises become higher. Since financial systems become unable to channel funds effectively and efficiently, economic activities are contracted as a result. There are some important elements that should be considered by policy makers to prevent future disasters.

1. Prudential regulations are very important for dealing with a financial crisis.

All financial institutions that face a lack of financial capital need to be closed down.

2. Supervision of banks can help countries to constantly monitor their performance against other countries around the world.
3. All countries are concerned with avoiding the failure of their financial systems. In the case of emerging countries, the adverse effects of these losses are much bigger. It is therefore, necessary for bigger financial institutions to be scrutinised more often and rigorously. Prudential supervisors in emerging economies receive very low salaries and resources. To avoid future crises prudential supervisors should be given sufficient resources so that their performance can be improved.
4. Political involvement in prudential regulation is also found in emerging economies. Central banks should work independently without any political pressure. Connected lending has also created problems in the past¹⁴. A lack of diversification may occur if large loans are issued to one party.
5. Efficient functioning of financial systems mainly depends on the efficient working of the judicial and legal system of any country. A lack of the rule of law is the main issue and is one of the major reasons for weakening the efficiency of the financial system. In some developing countries, domestic banking structures are not very strong and some restrictions are imposed over entries of foreign banks considering them as a threat to their domestic banking system. Entries of foreign banks should be encouraged so that competition can be created between domestic and international banks. This can lead to an effective banking structure within a country.

¹⁴Connected loans are basically the lending to managers, owners or business associates. Issuing loans to them means that there will be less or no monitoring by financial institutions.

6. In the case of developing countries, a foreign dominated debt structure can be a bigger threat to the economy. It creates instability and currency devaluation in the financial system leading to financial crises.
7. Major financial crises and disasters can take place if financial liberalisation is not managed and controlled accurately.

Taylor (2009) studied the main causes of financial crises and their prolonged intervals. It is suggested that the reason for a crisis is monetary excess. It leads to a period of boom and then bust. The crises of 2007 were created by the housing markets that caused turmoil in the United States and also in other countries. Government intervention caused a deeper and prolonged financial crisis misdiagnosing the problem in bank credits and therefore, focused in the wrong direction. Liquidity is focused rather than considering risks. The main requirement is to create a set of rules for future preventive actions. It is suggested that financial globalisation is beneficial for countries, and financial liberalisations can help in developing financial systems. It helps to enhance financial opportunities, reduce the costs of capital and boost liquidity and investments.

Reinciére et al. (2006) asserts that financial liberalisation has proven to have more solid results in middle income countries compared to low income countries, however, the process of liberalisation is not very transparent in middle income countries. Financial systems in low income countries are not too strong to smoothly absorb the increments in financial flows and leverages.

5.6 Measurement of Financial Crises

It is important to know the state of the financial sector so that the critical conditions for financial crises can be identified. Aykut (2002) has developed a model based upon

the working of banking sector. Three main indicators of banking sector include:

1. Bank liabilities / bank deposits
2. The foreign liabilities of banks
3. Bank credits issued to domestic private sector

The fragility of the banking sector can be noticed from the fluctuations and variations in these indicators. Bank deposits are considered liabilities for the banks (these are actually funds that banks acquire from savers). A banking sector fragility (BSF) index has been constructed, which can detect difficulties in the banking sector and help policy makers create efficient policies and prudential regulations. Variation in the BSF index needs to be monitored to identify patterns of systematic and non systematic crisis. The index has proven to be helpful in identifying and monitoring the different episodes and difficulties in a financial crisis.

Edison (2003) studied early-warning signals of financial crises. It is suggested that a signalling approach is helpful in monitoring the variation in indicators during the period preceding the crises which can be signalled when the values exceed the threshold or fall below it. Countries should be chosen on the basis of crises in this approach. Every chosen country must have experienced at least one episode of financial crisis. Secondly, indicators of financial crises should also be observed very carefully by using the signalling approach. It is suggested that values should be considered in terms of percentages so that units can be compared across countries.

The variables included in study are,

1. M2 multiplier
2. Domestic credit to GDP
3. Domestic real interest rates

4. Commercial bank deposits
5. Lending /deposits interest rates

Monthly data from 1970-1998 are examined. The model has performed well in identifying the vulnerabilities. However, in some cases mixed results are found.

5.7 Data and Methodology

This section explains the data, sample countries and methodology that are employed throughout this chapter.

5.7.1 Data Variables and Abbreviations

A panel of seventy countries covering a period from 1960 to 2009 is employed¹⁵. The data is based upon the annual observations, and countries are selected from the database of Reinhart and Rogoff (2010)¹⁶. An attempt is made to choose reliable and authentic measures of financial deepening so that the effects of financial deepening over the probability of financial crises could be accurately examined using the most-recent data from 1960-2009. The binary dependent variable model is applied in which dependent variable can take only two values either 0 or 1 and is called probit analysis.

The indicators of financial development are similar to those given in chapter 4, and the details are already given in previous chapter. In this chapter, two models are estimated using probit estimations.

1. Financial deepening in the banking sector over the probability of financial crises.

¹⁵The detailed list of countries is available in appendix A.6.

¹⁶The database is chosen because of its authenticity and coverage of the maximum number of countries.

2. Financial deepening in stock markets over the probability of financial crises.

The first model predicts the impact of banking development over the probability of banking crises, and second model captures the impact of stock market development over the probability of stock market crises.

Indicators of Banks in Probit Analysis

The banking crises index is a dependent variable in this model and proxies of banking sector development are mentioned below.

- Deposit money bank assets to (deposit money + central) bank assets
- Private credit by deposit money banks and other financial institutions to GDP
- Liquid liabilities to GDP

The effect of banking sector development over the probability of a financial crisis is expected to be positive in this model. The effects of imports, reserves, short-term debt to reserves, real interest rate differentials, output and real exchange rate (deviation from trends) are controlled¹⁷.

Indicators of Stock Market in Probit Analysis

The Stock market crises index is a dependent variable in this model and proxies of stock market development are mentioned below.

- Stock market capitalisation to GDP
- Stock market turnover ratio to Capitalisation
- Stock market total value traded to GDP

¹⁷Reinhart & Rogoff (2010).

The effect of stock market development over the probability of a financial crisis is expected to be positive in this model. The effects of imports, reserves, short-term debt to reserves, real interest rate differentials, output and real exchange rate (deviation from trends) are controlled¹⁸.

The variables used throughout this chapter along with their acronyms are presented in table 5.1.

¹⁸Reinhart & Rogoff (2010).

Table 5.1: Variables and Abbreviations

Abbreviation	Variables
BA	Deposit Money Bank Assets to (Deposit Money + Central) Bank Assets
CR2	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP
LL	Liquid Liabilities to GDP
SC	Stock Market Capitalisation to GDP
ST	Stock Market Turnover Ratio to Capitalisation
SV	Stock Market Total Value Traded to GDP
IMP	Imports (\$Million)
XR	Real Exchange Rate Deviation from Trend
RIRD	Real Interest Rate Differential
IP	Output
RES	Reserves
PC1	Financial Development Index (Constructed in Chapter 3)

Liquid liabilities measure the size and deepening of the financial sector in an economy. It is also known as *depth* since it captures the overall size of the financial sector (Beck et al. 1999).

Claims on the private sector measure the level of financial services. It distinguishes credit issued to the private or public sector. It is an efficiency measure of the financial system because strong financial systems promote issuance of credit to private sectors. It indicates credit issued on merit and also the promotion of innovation, research and development in an economy. Higher values of this ratio are recommended and reflect low transaction and information costs along with higher level of financial intermediation and development. Kaminsky (1999) asserts that "*claims on private sector*" is one of the main signs which capture boom and bust cycles of the credit market. Banking crises have been associated with increased levels of credit issued by financial sectors and a crisis can happen in the presence of asymmetric information.

Imports are included in the model as a conditioning variable, which has a positive impact on financial crises because in the event of financial crises, adjustments are made on the import side and exports fail to grow. Countries in financial crises are found unable to attract trade credits to finance their exports.

Reserves are important in order to avoid financial crises. Unsustainable money with the fiscal deficit can lead to the loss of reserves and can become the reason for a financial and currency crash. The impact of reserves over the probability of financial crises is negative.

Real interest rate differential has a positive impact upon the probability of financial crises because high world interest rates can be alarming for currency crises and can lead to capital outflows. Kaminsky and Reinhart (1999) assert that currency crises can turn into banking crises. Real interest rate differential is calculated as the difference between domestic interest rate (adjusted for CPI) and US interest rate

(adjusted for US CPI).

The impact of output (IP) on financial crises is negative. Output has a direct link with growth. Therefore, an increase in output and the probability of financial crises move in opposite directions.

Real exchange rate (deviation from trend) can have a negative impact on the probability of financial crises. A positive value of real exchange rate (Hodrick Prescott) means currency depreciation is high. If currency depreciates from trend that makes the exports cheaper.

History of Banking Crises in Countries of Probit Analysis

This section discusses some of the included countries in the analysis along with their banking crises periods¹⁹. As mentioned earlier the complete list of countries is given in appendix A.6.

Bolivia has the least-developed economy of Latin America. In the 1980s, Bolivia suffered from catastrophic economic crises. In 1990s, its government reformed the policies for private investments that resulted in a boost of economic growth. It helped to decrease the poverty rates in Bolivia during 1990s. Bolivia was hit by racial anxiety, political instability, and major protests against the policies during the period 2003 to 2005. These circumstances brought a decline in Bolivian growth rates. Inflation has increased rapidly in last few years from 2% to 11%. Bolivia's public debt is almost 44% of its GDP. In 1987, five banks including two of the state owned commercial banks of Bolivia were liquidated and seven reported major losses. Nonperforming loans in the banking sector reached to 30% to 92% by 1988²⁰. Four of the domestic banks holding 30% of banking sector assets faced severe liquidity problems and non performing loans²¹.

¹⁹World Fact Book (2009).

²⁰Kaminsky and Reinhart (1999).

²¹Caprio and Klingebiel (2003).

Colombia has faced challenges such as unemployment and narcotic trafficking. Its infrastructure needs improvement due to the financial crises of 1990s that reduced its export demands. The government is reforming the policies to enable free trade with Asian and European economies. The business sector of Colombia is affected badly due to global recessions. In 1998, many financial institutions and banks failed and total assets in the financial sector contracted by 20%²².

Denmark is a developed economy and is renowned for the government welfare projects and the provision of high living standards. It enjoys a modern agricultural sector, developed industrial sector, and highly-developed world class pharmaceutical industry. Its exports are generated by energy and food. Denmark was hit by the banking crises during 1980s, and the economy had to face slow growth rates. During 1987-1992, two small Danish banks collapsed causing panic in the banking sector and forty more banks were merged²³.

Ecuador is oil producing country, and half of its exports earnings are generated from the petroleum sector. Ecuador suffered badly from the economic crises in 1999, and its economy shrank by 6%. The banking structure collapsed and later in the same year; it defaulted on external debts. In 2000, some reforms were adopted to restructure its economy, and it adopted dollars as legal tender. These reforms of dollarisation helped Ecuador's economy in the stabilisation process. From 1998-99, banks with 60% of banking assets were either closed or taken over. A further sixteen financial institutions that accounted for 65% of assets, were taken over or closed by 2000²⁴.

Finland is a developed industrial country with high per capita income and exports. It suffered from banking crises in 1991 but recovered due to efficient government policies. During the period from 1991-94, the government took over three

²²Reinhart (2002).

²³Bordo et al. (2001).

²⁴Caprio and Klingbiel (2002).

banks that accounted for 31% of banking sector assets, and a large bank collapsed during the same period²⁵. The economic crises of 2008 have once again hit the economy of Finland and this time the effects were deeper than in 1991. The upcoming years are very important for Finnish policy makers who need to introduce effective reforms so that the economy can get back to its former structure.

Indonesia has a stable economy due to the fact that it relies on domestic consumption. The government of Indonesia has utilised the fiscal incentive and efficient monetary policy to reduce the effects of financial crises. Strong financial reforms are applied to the tax system, treasury bills utilisation, and for development of capital markets. The Indonesian government is working on the improvement of the unemployment ratio, eradication of corruption and efficient resource allocation. In 1992, a large Indonesian bank collapsed that triggered three small banks run. In 1994, nonperforming assets rose to 14% of the banking sector. In 2002, 70 banks were closed and 17 more were nationalised. Nonperforming loans rose to 75% of the total loans²⁶.

Israel is one of the technologically advanced countries with a developed industrial and agricultural system as well. The main exports of Israel depend upon high technological products. It has conflicts with Palestine due to which its GDP contracted in 2001 and caused problems in its technical sectors. Israel has adopted the reforms on financial liberalisation and fiscal policy to combat financial crises. Between 1977-83, almost the whole banking sector and stock exchange were affected, and the country's stock markets remained closed for 18 days. Stocks of the four major banks also collapsed and were finally nationalised by the government²⁷.

Malaysia is a middle-income country and has transformed into a multi sector economy since 1970. The government of Malaysia has played an important role in

²⁵Kaminsky and Reinhart (1999).

²⁶Bordo et al. (2001).

²⁷Reinhart (2002).

promoting the country in highly technological industries, technical development, in the medical and pharmaceutical field. Major exports of Malaysia include electronics, gas, and oil. Bank runs of major domestic banks were noticed during the years 1985-88. In 1997, the number of financial institutions was reduced from 39 to 10. The central bank took over two large finance companies and non performing loans reached 35%.²⁸

Mexico has a dominated private sector with a blend of agriculture and industry. It is a free economy with class of trillion dollars, and has expanded competition in its industrial sector. Mexico has more than fifty contracts of free trade with fifty countries that have helped the economy to get 90% of its trade. During 1981-82, the government nationalised private banks due to capital flights. In the years 1994-97, around 19 banks were reported insolvent²⁹.

Norway is a developed mixed economy with influence of government intervention and market activity. Major sectors are controlled by the government. The Norwegian economy was shrunk by 1.5% due to the financial crises of 1990s. Two main regional banks collapsed during the period from 1987-1993, and the government took over control over three major banks containing 85% of banking assets³⁰.

Paraguay is an agricultural country. It has greatly improved exports during the period from 2003 to 2008 due to the favourable climatic conditions. The main obstacles to growth throughout the economy include corruption, the instability of the government, and a lack of infrastructure. In 1997, two banks were closed and one of Paraguay's largest banks closed was closed in 2002³¹.

Peru is renowned for its tropical climate. Its economy is highly dependent on metals and minerals, and it fluctuates with variations in world prices. Peru has

²⁸Bordo et al. (2001).

²⁹Jacome (2008).

³⁰Jonung and Hagberg (2005).

³¹Caprio and Klingbiel (2002).

adopted free trade agreements to overcome financial crises. During 1983-1990, two of the largest banks failed and non performing loans were raised to higher levels³².

The Philippines do not rely on exports. Almost four to five million Filipinos are working abroad, which helps maintain good foreign exchange reserves. The government of the Philippines has taken strong measures to tackle the financial crises and these include decreasing government expenditure, reducing the debt and debt servicing ratios. The main long-term challenges to the country include tax reforms, trade boost, reduction in poverty and unemployment. Between 1981-1987, the commercial paper market of the Philippines collapsed causing a failure of the financial institutions and bank runs. Problems appeared in six private and two public banks with more than 60% assets of the banking sector. In the years 1997-1998 nonperforming loans reached 12% increasing to 20% in 1999³³.

Spain is the twelfth largest capitalist economy into the world. It suffered banking crises in 1978. Once again, the economy of Spain has suffered from financial crises in 2007 as the economy was in recession. Unemployment rose to 19%, fiscal deficit increased to 7.9% of GDP, and economy contracted by 5%. The government of Spain has taken stimulus actions to fight financial crises. In 1983 four banks were liquidated; four were merged, and twenty were nationalised³⁴.

Sweden has attained high living standards. It has strong external and internal communication systems. The Swedish economy suffered from financial crises twice during the past three decades, first in 1991 and second in 2008. During 1991-1994 Nordbanken and Gota bank became insolvent with 22% of banking sector assets. At the same time, six major banks with 70% of assets in the banking system faced difficulties.³⁵

³²Kaminsky and Reinhart (1999).

³³Reinhart (2002).

³⁴Caprio and Klingbiel (2002).

³⁵Jonung and Hagberg (2005).

Turkey is a mix of dynamic commerce and an industrial sector. Turkey suffered from financial crises in 1990s and 2000. Due to these recession periods, GDP declined. The government took strict actions against the crises such as, a tight fiscal policy but the economy still remained under the pressure of high current account deficits as well as external debts and caused a lack of investor's confidence in the Turkish economy. In the years 1982-1985, three banks merged with government owned agricultural banks and were liquidated after some time. In 1991, the government guaranteed the deposits due to bank runs. In 1994 three banks collapsed³⁶.

Venezuela depends highly on oil revenues with almost 90% from oil exports. In the years 1993-1995 bank runs, including failure of Banco Latino was observed and insolvent banks appeared with 35% of banking assets, but due to high shares of oil exports, Venezuela managed to recover but once again, the country was struck by the global financial crises of 2008³⁷.

5.7.2 Methodology

The effects of financial deepening over the probability of financial crisis are examined by the "*probit binary model*". The model is based upon two events, whether the event occurred or not. It is a binary dependent variable probability model where the dependent variable can take values from two alternatives zero and one. In this case, the banking crises index and stock market crisis index are dependent variables.

The probit model is stated as,

$$Prob(crises = 1) = F(X\beta_{i,t}) + \epsilon_{i,t}$$

X is matrix of indicators of financial development estimated twice, once with the

³⁶Kaminsky and Reinhart (1999).

³⁷Caprio and Klingbiel (2002).

banking sector development indicators and then with the stock market development indicators. The model is based upon a limited dependent variable, including 0 and 1, where 0 represent no crisis and 1 reflects the occurrence of crisis.

The banking crises index is based upon two forms of events. First, if there are bank runs that involve bank closures, takeovers by public sector, and mergers. Second, if there are no bank runs but involve takeovers by public sector, and merger. The Stock market index is based upon stock market crashes.

5.8 Results

An attempt has been made to capture the impact of financial development with maximum coverage of financial indicators over the probability of financial crises. First, an empirical examination is conducted with the proxies of bank indicators and whole set of conditioning variables. The results are reported in table 5.2. Furthermore, to capture the probability of financial crisis accurately, the analysis is expanded over income groups³⁸. It is seen that although some of the banking indicators have shown a significant impact on the probability of banking crisis (see table 5.2) but the number of crisis had dropped drastically leaving with only 20 events of crises. Secondly, due to data limitations, the analysis is conducted on lower and upper middle income countries ³⁹.

Imports and reserves are the two control variables that leave nearly half of the crises events in the model, while the remaining conditioning variables decrease the number of crises in the specifications. Therefore, in the next step, the relationship between development of banking sector and probability of financial crisis is studied by controlling imports and reserves only, and the results are reported in table 5.3.

³⁸Income groups used in this chapter are similar with the previous chapter and detailed list of countries in different income groups is in appendix.

³⁹Obs with Dep=1.

It is found that liquid liabilities are associated with an increase in the probability of banking crises by 1.19 percentage points, and reserves can decrease the probability of banking crises by 0.16 percentage points. The last column shows results for the high-income countries, again the impact of liquid liabilities is found positive over the probability of banking crises by 2.14 percentage points.

Finally, the impact of banking sector development over the probability of banking crises is examined without the set of conditioning variables, and the results are reported in table 5.4. This has increased the number of crises captured by the model. In most of the cases, an increase in liquid liabilities has shown an increase in the probability of banking crises.

Table 5.2: Probit Analysis Banks (1960 – 2009)

	All Countries	Low Middle Income	Upper Middle income
C	-0.976* (0.207)	-1.628* (0.418)	0.189 (0.428)
CR2	-4.105* (1.027)	-5.336* (1.419)	-9.442* (2.404)
BA	1.084 (1.087)	1.043 (1.329)	2.083 (3.202)
LL	4.886* (1.450)	7.623* (2.246)	13.759* (3.579)
IMP	-1.653* (0.571)	-1.879** (0.875)	-3.347* (1.240)
RES	-0.655 (0.452)	0.446 (0.588)	-4.541* (1.379)
ST_RES	0.112 (0.382)	0.409 (0.537)	0.571 (0.467)
RIRD	-0.062 (0.200)	-0.427 (0.279)	0.763 (0.468)
IP	-0.745 (2.335)	-3.420 (3.984)	-3.648 (3.879)
XR	-0.310** (0.152)	-0.222 (-1.131)	-0.298 (0.367)
Obs with Dep=0	97	50	37
Obs with Dep=1	20	8	11

Notes: All variables are in terms of first difference logarithms.

*1% level of significance, ** 5% level of significance.

*** 10% level of significance

Standard errors are reported in brackets.

See table 5.1 for names of the variables.

Table 5.3: Probit Analysis Bank with Few Control Variables (1960 – 2009)

	All Countries	Low Income	Lower Middle Income	Upper Middle Income	High Income
C	-0.977* (0.035)	-0.666* (0.112)	-0.987* (0.069)	-0.990* (0.070)	-1.051* (0.064)
CR2	-1.241* (0.384)	0.447 (0.868)	-2.554* (0.690)	-0.663 (0.576)	-1.636*** (0.929)
BA	0.145 (0.308)	0.090 (0.260)	0.851 (0.793)	-0.728 (1.186)	-3.788*** (2.142)
LL	1.199** (0.556)	-1.142 (1.321)	2.399** (1.099)	0.779 (0.864)	2.140*** (1.182)
IMP	-1.212* (0.215)	-0.403 (0.452)	-0.945* (0.334)	-1.529* (0.338)	-1.644* (0.456)
RES	-0.169** (0.088)	-0.193 (0.276)	-0.278** (0.135)	-0.400*** (0.213)	0.319** (0.164)
Obs with Dep=0	2083	123	564	526	870
Obs with Dep=1	340	39	95	81	125

Notes: All variables are in terms of first difference logarithms.

*1% level of significance, ** 5% level of significance.

*** 10% level of significance

Standard errors are reported in brackets.

See table 5.1 for names of the variables.

Table 5.4: Probit Analysis Bank without Control Variables (1960 – 2009)

	All Countries	Low Income	Lower Middle Income	Upper Middle Income	High Income
C	-1.085* (0.032)	-0.714* (0.108)	-1.103* (0.064)	-1.120* (0.067)	-1.132* (0.052)
CR2	-1.087* (0.353)	0.509 (0.845)	-1.757* (0.639)	-0.373 (0.529)	-2.338* (0.901)
BA	-0.269 (0.274)	0.045 (0.252)	-0.087 (0.502)	-2.407** (1.187)	-3.344*** (1.960)
LL	1.412* (0.528)	-1.229 (1.284)	2.371** (1.023)	0.758 (0.795)	3.454* (1.133)
Obs with Dep=0	2191	125	605	531	930
Obs with Dep=1	354	39	98	81	136

Notes: All variables are in terms of first difference logarithms.

*1% level of significance, ** 5% level of significance.

*** 10% level of significance

Standard errors are reported in brackets.

See table 5.1 for names of the variables.

The relationship between the stock market development and stock market crashes is studied by following the same procedure as in the banking crises. Inclusion of all stock market indicators and conditioning variables decreased the number of crises in specifications (see table 5.5). Due to data limitation; lower and middle income countries are included at this stage. ST (Stock market turnover ratio) has shown a positive impact over the probability of stock market crises in the world economies (column 1) by 0.79 percentage points. In the case of upper middle income countries, SC (stock market capitalisation) along with ST (stock market turnover ratio) have shown a positive impact over the probability of stock market crises by 1.53 and 2.06 percentage points respectively. Therefore, in the case of upper middle income countries, it is observed that stock market development can increase the probability of stock market crises.

Imports and reserves are the two conditioning variables that capture reasonable amount of stock market crises. Therefore, the model is estimated again with stock market indicators by controlling only imports and reserves, and the results are presented in table 5.6. Upper middle income countries in this table (column 4) show that an increase in SC (stock market capitalisation to GDP ratio) and ST (stock market turnover to GDP ratio) can increase the probability of stock market crashes by 1.35 and 1.50 percentage points respectively. In the case of high income countries, (column 5) an increase in ST (stock market turnover ratio) can increase the probability of market crash by 2.14 percentage points.

Finally, the impacts of stock market development over the probability of stock market crashes are examined without including a conditioning set of variables, and the results are reported in table 5.7. It has increased the number of stock market crashes in the specification and again, the impact of stock market turnover is found a predictor of stock market crashes in all groups of countries.

Table 5.5: Probit Analysis Stock Markets (1960 – 2009)

	All Countries	Lower Middle Income	Upper Middle Income
C	-0.299 (0.191)	-0.600*** (0.312)	-0.370 (0.436)
SC	0.505 (0.618)	-2.994*** (1.737)	1.536*** (0.837)
ST	0.794** (0.362)	-0.910 (0.938)	2.060* (0.672)
SV	-1.364* (0.521)	-0.414 (0.950)	-2.665* (1.008)
IMP	-0.011 (0.640)	-1.002 (0.796)	0.978 (0.980)
RES	0.057 (0.524)	1.610*** (0.968)	-1.582*** (0.872)
ST_RES	-0.133 (0.320)	0.344 (0.384)	-1.419* (0.624)
RIRD	0.085 (0.289)	-0.971 (0.722)	0.301 (0.379)
IP	-1.022 (2.421)	-9.484** (4.381)	7.563 (5.472)
XR	-0.084 (0.147)	-0.039 (0.261)	0.397 (0.268)
Obs with Dep=0	54	21	33
Obs with Dep=1	27	10	7

Notes: All variables are in terms of first difference logarithms.

*1% level of significance, ** 5% level of significance.

*** 10% level of significance

Standard errors are reported in brackets.

See table 5.1 for names of the variables.

Table 5.6: Probit Analysis Stock Market with Few Control Variables (1960 – 2009)

	All Countries	Low Income	Lower Middle Income	Upper Middle Income	High Income
C	-0.295* (0.050)	0.665* (0.255)	-0.0851 (0.118)	-0.403* (0.090)	-0.369* (0.079)
SC	0.415 (0.502)	-1.402 (1.051)	-0.565 (0.620)	1.356* (0.492)	-1.315** (0.560)
ST	1.209* (0.209)	0.455 (0.750)	0.624 (0.390)	1.505* (0.327)	2.150* (0.579)
SV	-1.778* (0.222)	-0.867 (0.637)	-1.111* (0.390)	-2.222* (0.382)	-2.350* (0.519)
IMP	-0.411 (0.270)	-1.340 (1.449)	-0.415 (0.605)	0.125 (0.395)	-0.899*** (0.525)
RES	-0.194 (0.144)	-1.234* (0.437)	-0.365 (0.295)	-0.201 (0.293)	-0.059 (0.227)
Obs with Dep=0	691	22	121	216	332
Obs with Dep=1	346	27	70	108	141

Notes: All variables are in terms of first difference logarithms.

*1% level of significance, ** 5% level of significance.

*** 10% level of significance

Standard errors are reported in brackets.

See table 5.1 for names of the variables.

Table 5.7: Probit Analysis Stock Market without Control Variables (1960 – 2009)

	All Countries	Low Income	Lower Middle Income	Upper Middle Income	High Income
C	-0.335* (0.045)	0.370*** (0.199)	-0.139 (0.107)	-0.414* (0.083)	-0.433* (0.068)
SC	0.433 (0.483)	-0.410 (0.623)	-0.708 (0.602)	1.367* (0.490)	-1.088* (0.537)
ST	1.286* (0.212)	1.178** (0.580)	0.640*** (0.372)	1.550* (0.322)	2.319* (0.564)
SV	-1.884* (0.220)	-1.318** (0.557)	-1.136* (0.372)	-2.276* (0.374)	-2.558* (0.505)
Obs with Dep=0	717	23	121	216	357
Obs with Dep=1	360	29	70	108	153

Notes: All variables are in terms of first difference logarithms.

*1% level of significance, ** 5% level of significance.

*** 10% level of significance

Standard errors are reported in brackets.

See table 5.1 for names of the variables.

The impact of financial index over the probability of banking and stock market crises is also examined separately by controlling the effects of imports and reserves⁴⁰. Results are reported in table 5.8 and 5.9. Since the index “FIND” is constructed with principal component analysis that squeezes the number of observations with maximum variation in data, therefore, the inclusion of “FIND” has reduced the number of crises in specifications.

To study the effect of financial deepening over financial crises an attempt is made to analyse the relationship in all possible aspects. In this regard, the tests are also performed decade wise. Data has been split into five sets of decades, including 1960-70, 1970-80, 1980-90, 1990-2000 and 2000-2009 and tables 5.10 and 5.11 report the results.

⁴⁰ “FIND” index constructed in chapter 3.

Table 5.8: Probit Analysis Banks with "FIND" Index (1960 – 2009)

	All Countries	Lower Middle Income	Upper Middle Income	High Income
C	-0.822* (0.100)	1.088*** (0.638)	-0.825* (0.307)	-0.906* (0.116)
PC1	-0.725** (0.331)	-1.666** (0.669)	-2.840** (1.329)	-0.505 (0.383)
IMP	-2.815* (0.671)	-2.166 (1.845)	-2.365 (1.484)	-2.960* (0.850)
RES	0.548 (0.375)	-13.112* (4.950)	-0.357 (0.675)	1.145** (0.564)
Obs with Dep=0	250	14	26	210
Obs with Dep=1	50	6	5	39

Notes: All variables are in terms of first difference logarithms.

*1% level of significance, ** 5% level of significance.

*** 10% level of significance

Standard errors are reported in brackets.

See table 5.1 for names of the variables.

Table 5.9: Probit Analysis Stock Market with "FIND" Index (1960 – 2009)

	All Countries	Lower Middle Income	Upper Middle Income	High Income
C	-0.518* (0.092)	0.210 (0.476)	-0.555** (0.275)	-0.496* (0.105)
PC1	-0.024 (0.241)	0.003 (0.297)	-0.842 (0.905)	-0.125 (0.302)
IMP	0.995 (0.611)	0.341 (1.862)	-0.333 (1.470)	-1.516** (0.763)
RES	-0.144 (0.341)	-6.128** (2.661)	-0.105 (0.805)	0.005 (0.379)
Obs with Dep=0	215	13	23	179
Obs with Dep=1	83	7	8	68

Notes: All variables are in terms of first difference logarithms.

*1% level of significance, ** 5% level of significance.

*** 10% level of significance

Standard errors are reported in brackets.

See table 5.1 for names of the variables.

Table 5.10: Probit Analysis Banks with All Income Groups in Different Decades

	1970-80	1980-90	1990-2000	2000-2009
C	-1.649* (0.163)	-0.814* (0.064)	-0.533* (0.060)	-1.148* (0.082)
CR2	0.329 (1.055)	0.339 (0.687)	-1.581** (0.642)	-2.516* (0.918)
BA	1.743*** (1.041)	0.352 (0.521)	-0.401 (0.557)	-1.172 (0.968)
LL	-1.376 (1.277)	0.777 (0.930)	0.240 (0.770)	2.913*** (1.509)
IMP	-0.720 (0.586)	-0.497 (0.365)	-0.964** (0.376)	-2.009* (0.394)
RES	-0.178 (0.297)	-0.256***	-0.050 (0.140)	-0.213 (0.264)
Obs with Dep=0	452	454	468	520
Obs with Dep=1	18	116	169	62

Notes: All variables are in terms of first difference logarithms.

*1% level of significance, ** 5% level of significance.

*** 10% level of significance

Standard errors are reported in brackets.

See table 5.1 for names of the variables.

Table 5.11: Probit Analysis Stock Market with All Income Groups in Different Decades

	1970-80	1980-90	1990-2000	2000-2009
C	1.608* (0.530)	-0.188*** (0.106)	-0.216* (0.076)	-0.372* (0.077)
SC	0.411 (2.546)	0.056 (0.539)	0.722 (0.550)	-0.466 (0.519)
ST	2.573 (1.687)	1.038* (0.388)	1.234* (0.266)	1.479* (0.425)
SV	-3.455*** (1.563)	-1.458* (0.376)	-1.728* (0.305)	-2.009* (0.470)
IMP	-2.237 (2.055)	0.420 (0.507)	-0.920** (0.509)	-0.342 (0.393)
RES	-2.429 (1.604)	-0.252 (0.247)	-0.001 (0.182)	-0.600** (0.263)
Obs with Dep=0	11	105	308	309
Obs with Dep=1	16	78	174	129

Notes: All variables are in terms of first difference logarithms.

*1% level of significance, ** 5% level of significance.

*** 10% level of significance

Standard errors are reported in brackets.

See table 5.1 for names of the variables.

5.9 Concluding Remarks

The issue of financial deepening has divided economists into two groups. One group is followers of Schumpeter (1911) who emphasised the importance financial development for growth. The other group follows Robinson (1952) who asserted that growth is the prime mover behind financial development.

In the last few decades countries have started to become more financially integrated to get the benefits of financial globalisation. Development of the financial sector is the key element of financial globalisation. After integrating with the world markets, financial markets have started to become deeper and sophisticated and facilitate international risk diversification. Financial globalisation has shown several benefits, but at the same time it can have certain challenges attached to it. Questions were raised about the financial liberalisation and its gains in the crisis of 1990s. It is suggested that after financial liberalisation countries become more exposed towards external shocks⁴¹.

Reinhart and Rogoff(2009) write *“Modern economies depend on sophisticated financial systems, and when the banking system freeze up, economic growth can quickly become impaired or even paralyzed. That is why mass bank failures can be so problematic for an economy and why countries in crisis that fail to fix their financial systems—such as Japan in the 1990s—can find themselves going in and out of recession and performing below potential capacity for years. The kind of real estate and stock price collapse that surrounds banking crisis, would have very substantial adverse effects even in the absence of banking collapse. International capital mobility has repeatedly produced international banking crises, not only famously, as they did in 1990s, but historically”*⁴².

Performance of a financial system depends upon channeling of funds from savers

⁴¹Blanchard (2009).

⁴²p.173.

to investors in an efficient manner. If there is asymmetric information in the financial system, the chances of facing financial crises increase⁴³. In this chapter, a panel of 70 countries is studied to examine the impact of financial deepening on the probability of a financial crisis. Proxies for financial deepening include the indicators from banking development indicators and stock market development indicators. However, the effects of imports, output, real interest rate differentials reserves and real exchange rate trends are controlled. In most of the cases, liquid liabilities to GDP ratio are significantly associated with an increase in banking crisis. It suggests that an increase in “liquid liabilities to GDP” can increase the probability of banking crises. On the other hand, in the case of stock market crises the “stock market turnover ratio” and “stock market capitalisation” are found significant and positive in predicting the probability of stock market crashes.

To achieve benefits of financial liberalisation and financial regulations, policies should be designed in such a way that the problem of moral hazard and asymmetric information can be avoided and detected properly.

⁴³Mishkin (1996).

CHAPTER 6

Concluding Remarks

The importance of a developed financial system in economic growth is introduced by Schumpeter (1911). The concept has divided economic agents into two different groups. One group follows Schumpeter and strongly believes that the financial sector is the main driving force of an economy. A well developed financial system promotes investment opportunities to potential businesses, mobilises savings, enables trading, monitors the performance of managers, offers hedging, and diversifies risk. Countries with developed financial systems enjoy high economic growth rates; however, countries with a low level of financial development have deprived economies (Goldsmith 1969, Levine 1993, Rajan and Zingales 1998, Arestis and Luintel 2001).

On the other hand, followers of Robinson (1952) believe that "*Where enterprise leads finance follows*"¹. This concept suggests that an increase in income create higher demands for financial services. Lucas (1988) asserts that economists badly over-stress the role of a financial system in economic growth. Financial development

¹p.80.

may not have a strong positive impact on growth in each country, but it will depend on the level of financial development within each country². The impact of financial development on growth has declined significantly in countries with a high rate of inflation³.

Financial integration across borders was initiated in 1980s among developing and industrialised economies with the hope of better global capital allocation and risk sharing. The role of developed financial markets cannot be over emphasised. The collapse of Lehman Brothers in 2008 is an obvious example of contagion effects that were not restricted to the United States but also transmitted to all developed economies. Kaminsky and Reinhart (1999) present evidence on the link between financial liberalisation and crises. During 1980s and 1990s most of the financial crises were linked to liberalisation episodes.

The theoretical analysis on the relationship between financial development and growth is studied in chapter 2. The main theories of finance and growth, existing evidence, role of fiscal policy for the development of an economy and the main issues attached to the role of financial development on growth are discussed. Almost all countries have liberalised their financial systems; some have liberalised extensively while others narrowly in the last three decades. The top ten countries are thirty times richer than those at the bottom⁴.

Fiscal policy works best if the tax collection is done in an effective and efficient manner and if government spending is utilised in productive areas. Heavy borrowing by governments tends to increase the tax rate that makes corporations and general individuals incapable of affording loans. Therefore, the situation of crowding out occurs. Countries with weak governance spend more on unproductive areas; higher taxes are required which they cannot generate efficiently. Therefore, productive

²Rioja and Valve (2004).

³Rosseau and Wachtel (2002).

⁴Ray (1998).

areas suffer a lack of funds, and eventually growth is impaired in this way⁵.

There are certain issues related to the relationship between finance and growth. The first one is the different level of property rights exercised in different countries. Property rights identify how people may benefit or be harmed, who should pay whom for actions taken by people⁶. In developed countries, the legal framework is designed in a way that protects investors' property rights. The main difference between developing and developed countries is not just the markets but the legal system which exists there⁷. Financial development is high in countries with a strong legal framework and better creditor's rights. Lenders are encouraged to collateralise loans and thereby finance the firms. Cross country variation in financial development is mainly due to the difference in protection against private property rights and its primary endowments⁸. Developed countries are more market oriented due to the practice of strong legal and property rights protection.

Secondly, a very important issue is the extent of financial liberalisation and its impact on growth. The world is moving steadily towards greater financial openness⁹. Industrialised countries have maintained a high level of financial openness over the period and steadily improved levels since the 1970s. The liberalisation process should be kept gradual and sequenced to achieve higher efficiency as part of financial reforms¹⁰. In the case of developing countries, capital account liberalisation should not be implemented until the domestic financial system is fully reformed.

This work has revisited the link between financial development and growth by employing a newly created index of financial development with most-recent data. It has also examined the effect of the extent of financial development on the probability

⁵Gray et al. (2007).

⁶Demsetz (1967).

⁷De Soto (1993).

⁸Beck et al., (2003).

⁹Chin and Ito (2008).

¹⁰Bird and Rajan (2001).

of a banking crisis or stock market crash. Given the renewed interest on the effects of financial development, this study has identified three main areas of work, including,

- Measurement of financial development.
- Empirical link between financial development and growth.
- Possible link between financial development and the scope for financial crises.

A financial development index “FIND” is constructed to measure financial development (see chapter 3). The method of principal component analysis is employed for this purpose with up to date data set. “FIND” is based on the proxies of banking sector, stock markets and insurance companies. The index has also helped to determine the structure of a financial system. Financial index “FIND” constructed in this chapter is in line with Saci and Holden (2008) but more indicators of financial development are included compared to previous studies. In total, thirteen components of financial sector development are included from banks stock markets and insurance companies. As already mentioned “FIND” is constructed on the basis of most-recent data sets extracted from reliable sources with a time period of 1988 to 2009 and 22 annual observations with 41 countries. “FIND” is a composite index that captures size, structure, activities and efficiency measures of the banking sector, stock market and insurance companies.

Overall, the countries in the sample have experienced an increase in their levels of financial development. Some countries appeared bank based whereas others are concentrating more on their capital markets. To study the structure of the financial sector in sample countries, individual indices are also constructed on the basis of banks i.e. “BAEAN ”, stock market index named as “STEAN” and insurance company’s index is named “INEAN”. These indices are utilised to make a comparative analysis of financial structure in different countries.

The second objective was to find an empirical link between finance and growth relationship. A variety of sources are utilised to carefully collect most recent and pertinent data sets. The whole data is divided into four income groups. The relationship between financial development and economic growth is examined by a panel of 95 countries during the period 1960-2009. Average annual growth rates of all variables are also studied (see table 4.2 and 4.3). It is observed that the global economy has grown 3.71%, low income economies 3.5%, lower middle income countries 3.8%, upper middle income countries 3.5% and high income countries 3.9% during the years 1960-2009.

It is found that development of financial intermediaries excluding financial depth are associated with macro-economic development and economic technical efficiency. If development of credit to private sector and relative importance of commercial banks providing the financial services to the economy are found significant so the financial depth (LL to GDP) does not affect it. In the case of stock market development indicators, SC (stock market capitalisation to GDP) is considered as one of the important measures of stock market development, and it measures the size of financial development. The growth of SC has led to a positive change in growth during the period 1960-2009. The coefficients of ST (stock market turnover ratio to GDP) are also found to be significant and positive in high income and whole sample of countries in both results suggesting low transaction costs with high efficiency.

The index of financial development "FIND" (constructed in chapter 3) is also included into the analysis to capture its impact over growth. The main intension to include "FIND" in this analysis is that the results achieved from this index can portray the overall impact of financial development (based upon numerous financial indicators from banks, stock markets and insurance companies) over growth during the sample period. It is observed that the effect of financial index over growth is found to be significant with expected positive signs in the case of the whole sample

of 21 countries.

The causal impact of financial development over growth is still not resolved. An attempt is made to re-examine the endogeneity of finance and growth relationship by employing the two stage least square method. A causal impact of financial development on growth could not be established since the estimated coefficient is insignificant. Our results are in line with those of Zang and Kim (2007).

Finally, the dynamic panel estimations were utilised and Arellano and Bond's (1991) technique of generalised method of moment is used. The first difference of dependent variable is included to eliminate the problem of omitted variable bias. Our results are in line with Favara's (2003), who reported a strong association between domestic credit by banks and other financial institutions as a percentage of GDP and economic growth, the effects of inflation, black market premium, trade openness to GDP and secondary school enrolment are controlled.

The third and final objective to explore was the impact of financial deepening over the probability of financial crises. Based on the very recent financial crises, it is difficult to know whether shifting savings from real sector to the financial sector benefits economies or leads to failure? Can too much financial globalisation, financial deepening and integration lead to development or become a reason behind the collapse of developed economies? Should more importance be given to the financial sector over the real sector?

After integrating with world markets, financial markets become more sophisticated and deeper. Global financial markets facilitate international risk diversification. Financial globalisation has shown several benefits, but at the same time it is seen that there are certain challenges attached to it. In the crisis of 1990s, questions about financial liberalisation and its gains were raised. It was suggested that after financial liberalisation countries became more exposed towards external shocks. They can be affected by the contagion effects and shocks from across the borders as well. Proper

policies and financial regulations are key requirements for the implementation of financial liberalisation in any country otherwise increased risks can be seen with financial liberalisation.

A panel of 70 countries is studied by using the probit model. Proxies of financial deepening are taken from banks, stock markets and insurance companies. Results report that an increase in liquid liabilities can increase the probability of a banking crisis and increase in stock market turnover ratio can increase the probability of stock market crashes in most cases. To study the effect of financial deepening over financial crises an attempt is made to analyse the relationship in all possible aspects. In this regard, the analysis is done with and without conditioning variables, and tests are also performed decade wise. Data has been split into five sets of decades, including 1960-70, 1970-80, 1980-90, 1990-2000 and 2000-2009 and tables 5.10 and 5.11 report the results.

When moral hazard and adverse selection get worse, the chances of financial crises become higher¹¹. Since financial systems become unable to channel funds effectively and efficiently, economic activities are contracted as a result. To achieve the benefits of financial liberalisation, it is necessary that financial regulations and policies should be designed in such a way that the problem of moral hazard and asymmetric information can be avoided and detected properly. Entries of foreign banks should be encouraged so that a competition can be created between the domestic and international banks. This can lead to effective banking structure within a country. Major financial crises and disasters can take place if financial liberalisation is not managed and controlled accurately.

Prudential regulations are very important to deal with a financial crisis. Political involvement in prudential regulation should be avoided. Central banks should work independently without any political pressure. Supervision of banks can help

¹¹Mishkin (2000).

countries to constantly monitor their performance against other countries around the world.

Efficient functioning of financial systems mainly depends on efficient working of the judicial and legal system of any country. Proper legal and policy structures, including the protection of property rights are required to have a strong financial system. Well established property rights are important for secure returns of intangible assets. In developed countries, the legal framework is designed in a way that investors' property rights are protected. The main difference between developing economies and industrialised countries is not just the markets but the legal system¹². Lack of rule of law is one of the major causes, which weakens the efficiency of the financial system. Developed countries have strict rules of property rights for all types of assets, including tangible and intangibles. Investors in developed economy feel safe to invest in intangibles due to the protection to their rights. However, the case is different in developing economies. Asset structure in developing countries is very different from developed countries. In developing countries firms hold more of fixed and tangible assets as a percentage of total assets in contrast to developed countries¹³.

The global financial crisis of 2007-09 has undermined the reliability of deregulation, financial liberalisation and financial integration. The crises have also created doubts in leverage, debt and credit entitlements. "In the aftermath of global financial crisis, the world is in the midst of major cyclical dislocations and large secular realignments. The bumpy road to the new normal means virtually every segment of the global economy must retool"¹⁴. I would like to extend my future research to explore the unique characteristics and determinants of the recent financial crisis and how the effects spread to the real economy.

¹²De Soto (1993).

¹³Maksimovic and Kunt (1999).

¹⁴El-Erian (2010), p.47.

APPENDIX A

Appendix

Table A.1: Descriptive Statistics for “BAEAN”

Categorized by values of COUNTRY
Sample: 1988 2009
Included observations: 798

COUNTRY	Mean	Max	Min.	Std. Dev.	Obs.
Argentina	-3.027	-2.133	-4.890	0.648	19
Australia	0.785	2.521	-0.335	0.811	18
Austria	1.347	1.752	1.152	0.150	20
Belgium	0.878	1.720	-0.575	0.698	20
Brazil	-3.208	-2.562	-4.738	0.617	18
Canada	1.481	2.957	0.612	0.802	22
Chile	-1.002	0.491	-2.205	0.737	22
Colombia	-2.145	-1.083	-2.729	0.490	19
Czech Republic	0.007	0.388	-0.552	0.284	16
Denmark	0.562	3.929	-1.024	1.656	22
Egypt, Arab Rep.	-0.601	-0.181	-1.392	0.354	21
Finland	0.689	1.309	0.295	0.302	21
France	0.774	1.616	0.447	0.306	20
Germany	1.258	1.626	0.654	0.319	20
Greece	-0.370	1.736	-1.500	1.174	18
Hungary	-1.963	-0.935	-3.157	0.662	20
India	-0.911	0.472	-1.695	0.682	18
Indonesia	-1.359	-0.398	-2.019	0.575	20
Israel	0.540	1.321	-0.322	0.597	17
Italy	-0.063	1.592	-0.624	0.641	22
Japan	3.835	5.234	2.641	0.953	22
Kenya	-2.014	-1.613	-2.455	0.223	15
Korea, Rep.	0.748	1.422	-0.149	0.571	19
Malaysia	2.095	2.801	1.704	0.320	17
Morocco	-0.197	1.517	-1.374	0.819	17
Netherlands	2.404	3.976	1.590	0.677	20
Norway	0.402	0.821	-0.012	0.236	15
Pakistan	-1.395	-0.770	-1.791	0.320	18
Peru	-2.233	-1.507	-3.749	0.691	18
Philippines	-1.323	-0.808	-2.197	0.414	21
Poland	-1.452	0.034	-2.585	0.759	18
Portugal	1.454	3.622	-0.399	1.258	22
South Africa	0.059	0.653	-0.897	0.408	17
Spain	1.298	5.123	0.009	1.437	22
Switzerland	3.065	3.734	2.756	0.265	22
Thailand	1.443	3.014	0.363	0.682	22
Tunisia	0.041	0.229	-0.256	0.149	18
Turkey	-2.697	-0.884	-4.797	0.943	22
United Kingdom	2.184	5.039	1.230	1.049	20
United States	0.577	1.509	-0.113	0.471	18
Venezuela, RB	-3.551	-1.504	-5.784	1.306	22
All	4E-15	5.234	-5.784	1.901	798

Table A.2: Descriptive Statistics for "STEAN"

Categorized by values of COUNTRY					
Sample: 1988 2009					
Included observations: 843					
COUNTRY	Mean	Max	Min.	Std. Dev.	Obs.
Argentina	-0.983	-0.022	-1.240	0.264	22
Australia	0.613	4.908	-0.710	1.405	21
Austria	-0.733	0.433	-1.201	0.442	21
Belgium	-0.412	1.677	-1.056	0.705	21
Brazil	-0.720	0.021	-1.135	0.277	20
Canada	0.411	2.804	-0.717	0.950	21
Chile	-0.429	0.707	-1.136	0.441	22
Colombia	-1.191	-0.746	-1.395	0.190	22
Czech Republic	-0.687	-0.105	-1.044	0.271	15
Denmark	-0.132	1.495	-0.951	0.662	21
Egypt, Arab Rep.	-0.861	0.135	-1.380	0.538	21
Finland	0.919	5.213	-1.230	1.898	21
France	0.268	2.795	-0.882	1.052	21
Germany	0.303	1.942	-0.647	0.690	21
Greece	-0.542	1.207	-1.356	0.717	22
Hungary	-0.603	0.788	-1.399	0.611	18
India	0.150	3.003	-0.975	1.123	22
Indonesia	-0.880	0.079	-1.451	0.317	20
Israel	-0.124	1.577	-0.889	0.683	21
Italy	0.196	5.710	-1.204	1.642	21
Japan	0.490	2.231	-0.423	0.908	21
Kenya	-1.209	-0.908	-1.393	0.164	20
Korea, Rep.	1.501	5.563	-0.231	1.670	22
Malaysia	0.968	3.387	-0.738	1.270	20
Morocco	-1.062	-0.055	-1.422	0.330	19
Netherlands	1.482	7.132	-0.727	1.980	21
Norway	-0.029	2.320	-0.975	0.941	21
Pakistan	0.122	2.737	-1.351	1.360	22
Peru	-0.968	0.260	-1.348	0.380	20
Philippines	-0.743	-0.095	-1.200	0.343	20
Poland	-0.810	-0.146	-1.152	0.297	18
Portugal	-0.654	0.457	-1.183	0.491	20
South Africa	1.034	4.663	-0.369	1.366	21
Spain	1.014	4.918	-0.972	1.688	21
Switzerland	3.311	9.757	-0.235	2.616	19
Thailand	-0.079	0.557	-0.800	0.360	22
Tunisia	-1.261	-1.131	-1.390	0.083	21
Turkey	-0.186	1.377	-1.381	0.695	22
United Kingdom	1.274	5.283	-0.143	1.325	19
United States	2.193	6.953	-0.209	2.074	21
Venezuela, RB	-1.257	-1.010	-1.390	0.132	19
All	-2E-16	9.757	-1.451	1.440	843

Table A.3: Descriptive Statistics for “INEAN”

Categorized by values of COUNTRY					
Sample: 1988 2009					
Included observations: 881					
COUNTRY	Mean	Max	Min.	Std. Dev.	Obs.
Argentina	-0.922	-0.649	-1.202	0.154	22
Australia	1.139	1.604	0.656	0.308	19
Austria	0.486	0.666	0.295	0.108	22
Belgium	1.041	2.570	-0.031	0.841	22
Brazil	-0.893	-0.670	-1.485	0.225	22
Canada	0.863	1.846	0.179	0.416	22
Chile	-0.695	0.012	-1.158	0.278	22
Colombia	-0.930	-0.680	-1.226	0.155	22
Czech Republic	-0.508	-0.099	-1.076	0.311	19
Denmark	0.562	1.746	-0.052	0.535	22
Egypt, Arab Rep.	-1.620	-1.504	-1.708	0.055	22
Finland	0.554	0.912	0.058	0.270	22
France	1.110	1.858	0.286	0.456	22
Germany	0.825	1.092	0.444	0.179	22
Greece	-1.272	-1.031	-1.487	0.140	22
Hungary	-0.805	-0.468	-1.144	0.187	22
India	-1.194	-0.616	-1.543	0.303	22
Indonesia	-1.466	-1.199	-1.620	0.099	22
Israel	0.500	0.829	0.083	0.219	22
Italy	0.044	0.933	-0.781	0.577	22
Japan	1.363	1.882	0.673	0.349	22
Kenya	-0.621	-0.184	-0.962	0.195	22
Korea, Rep.	1.736	2.964	0.599	0.504	22
Malaysia	-0.292	0.042	-0.859	0.262	22
Morocco	-0.691	-0.242	-1.049	0.197	22
Netherlands	1.736	4.401	1.040	0.725	20
Norway	0.050	0.214	-0.161	0.112	22
Pakistan	-1.659	-1.582	-1.726	0.041	19
Peru	-1.491	-1.350	-1.588	0.056	18
Philippines	-1.378	-1.181	-1.468	0.084	22
Poland	-0.827	-0.294	-1.721	0.363	22
Portugal	0.245	1.063	-0.690	0.567	19
South Africa	2.256	3.264	1.011	0.741	22
Spain	0.183	0.779	-0.439	0.329	19
Switzerland	2.023	2.921	1.089	0.623	22
Thailand	-0.944	-0.550	-1.462	0.278	22
Tunisia	-1.010	-0.828	-1.178	0.104	22
Turkey	-1.427	-1.151	-1.744	0.186	22
United Kingdom	2.688	3.855	1.147	0.758	22
United States	1.791	2.202	1.598	0.163	22
Venezuela, RB	-0.745	-0.459	-1.148	0.203	22
All	5E-16	4.401	-1.744	1.250	881

A.1 Low Income Countries

Afghanistan, Guinea, Nepal, Bangladesh, Guinea-Bissau, Niger, Benin, Haiti, Rwanda, Burkina Faso, Kenya, Sierra Leone, Burundi, Korea Dem Rep, Solomon Islands, Cambodia, Kyrgyz Republic, Somalia, Central African Republic, Lao PDR, Tajikistan, Chad, Liberia, Tanzania, Comoros, Madagascar, Togo, Congo Dem. Rep Malawi, Uganda, Eritrea, Mali, Zambia, Ethiopia, Mauritania, Zimbabwe, Gambia, The Mozambique, Ghana, Myanmar.

A.2 Lower Middle Income Countries

Angola, India, So Tom and Principe, Armenia, Iraq, Senegal, Belize, Jordan, Sri Lanka, Bhutan, Kiribati, Sudan, Bolivia, Kosovo, Swaziland, Cameroon, Lesotho, Syrian Arab Republic, Cape Verde, Maldives, Thailand, China, Marshall Islands, Timor Leste, Congo, Micronesia, Tonga, Cte d'Ivoire, Moldova, Tunisia, Djibouti, Mongolia, Turkmenistan, Ecuador, Morocco, Egypt, Arab Rep, Nicaragua, Ukraine ,El Salvador, Nigeria, Uzbekistan, Georgia, Pakistan, Vanuatu, Guatemala, Papua, New Guinea, Vietnam, Guyana, Paraguay, West Bank and Gaza, Honduras, ,Philippines, Yemen, Indonesia, Samoa

A.3 Upper Middle Income Countries

Albania , Dominican Republic, Namibia, Algeria , Fiji , Palau, American Samoa, Gabon, Panama, Antigua and Barbuda, Grenada, Peru, Argentina, Iran , Romania, Azerbaijan, Jamaica, Russian Federation, Belarus, Kazakhstan, Serbia, Bosnia and Herzegovina, Lebanon, Seychelles, Botswana, Libya, South Africa ,Brazil , Lithuania, St. Kitts and Nevis , Bulgaria, Macedonia, St.Lucia, Chile, Malaysia, St. Vincent and the Grenadine, Colombia, Mauritius, Suriname , Costa Rica, Mayotte,

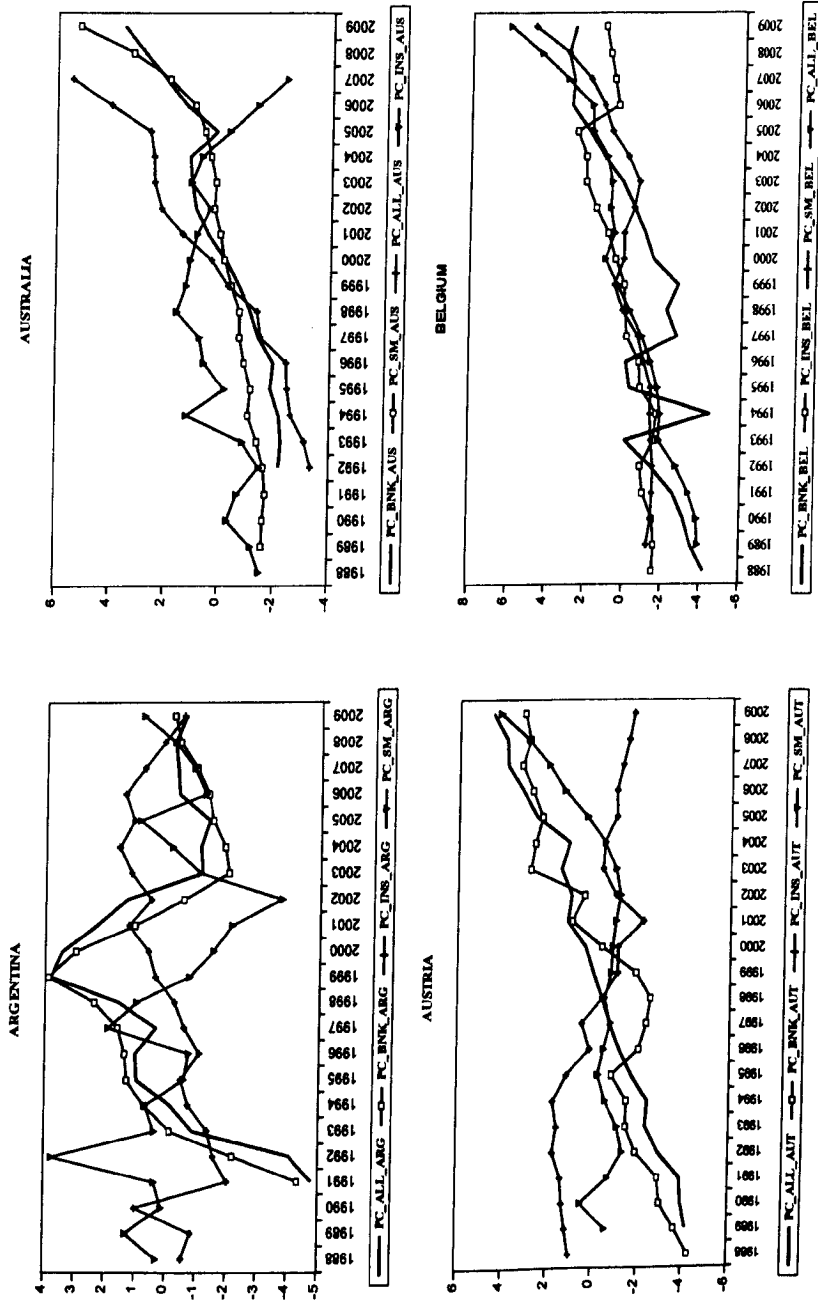


Figure A.1: Principal Component Analysis (a) Argentina (b) Australia (c) Austria (d) Belgium

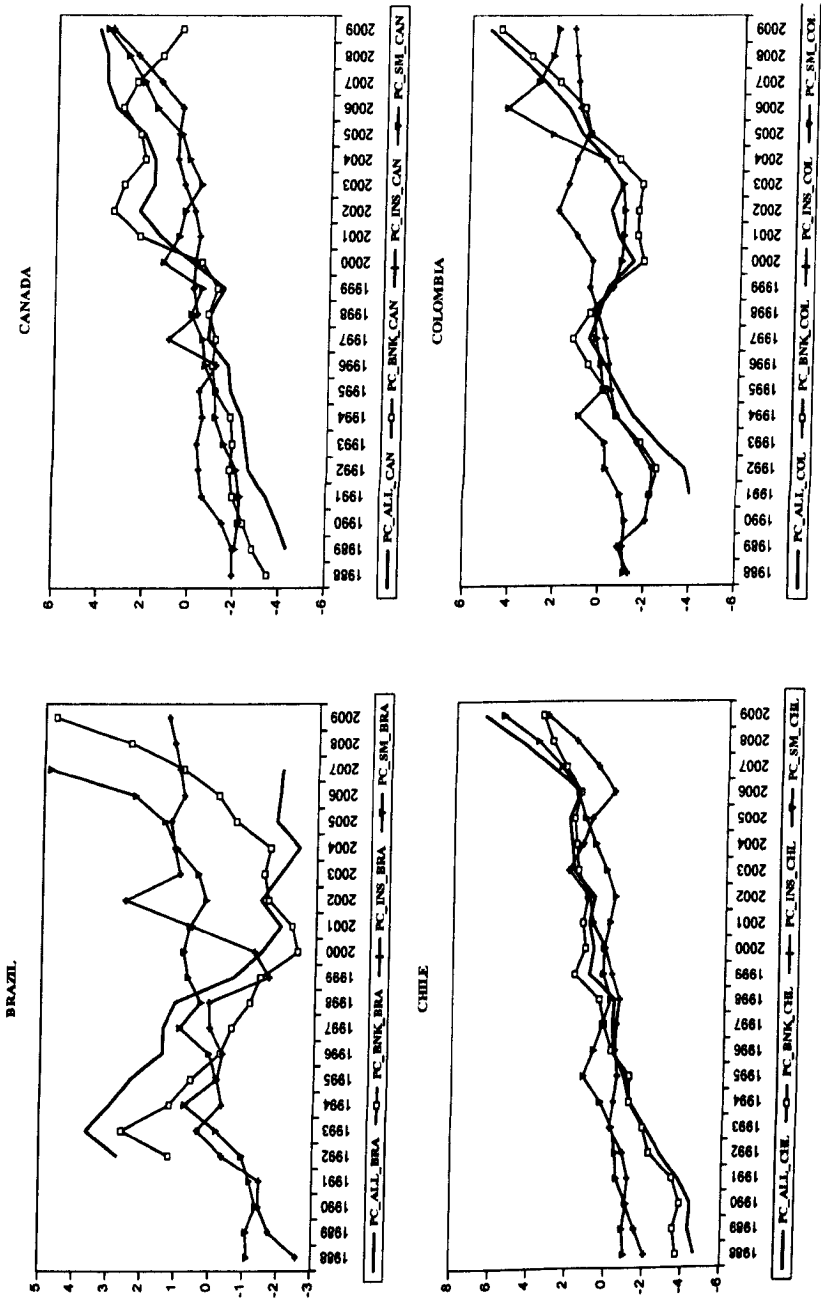


Figure A.2: Principal Component Analysis (a) Brazil (b) Canada (c) Chile (d) Colombia

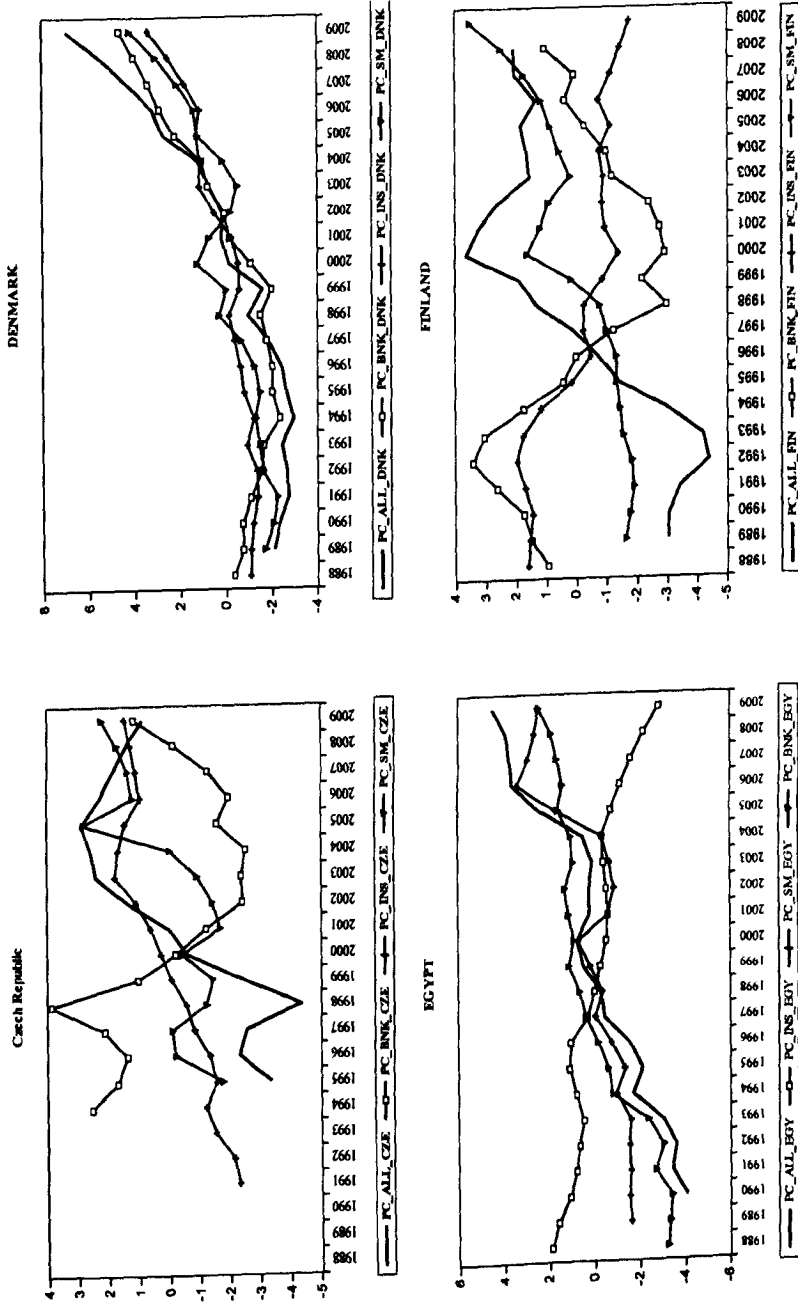


Figure A.3: Principal Component Analysis (a) Czech Republic (b) Denmark (c) Egypt (d) Finland

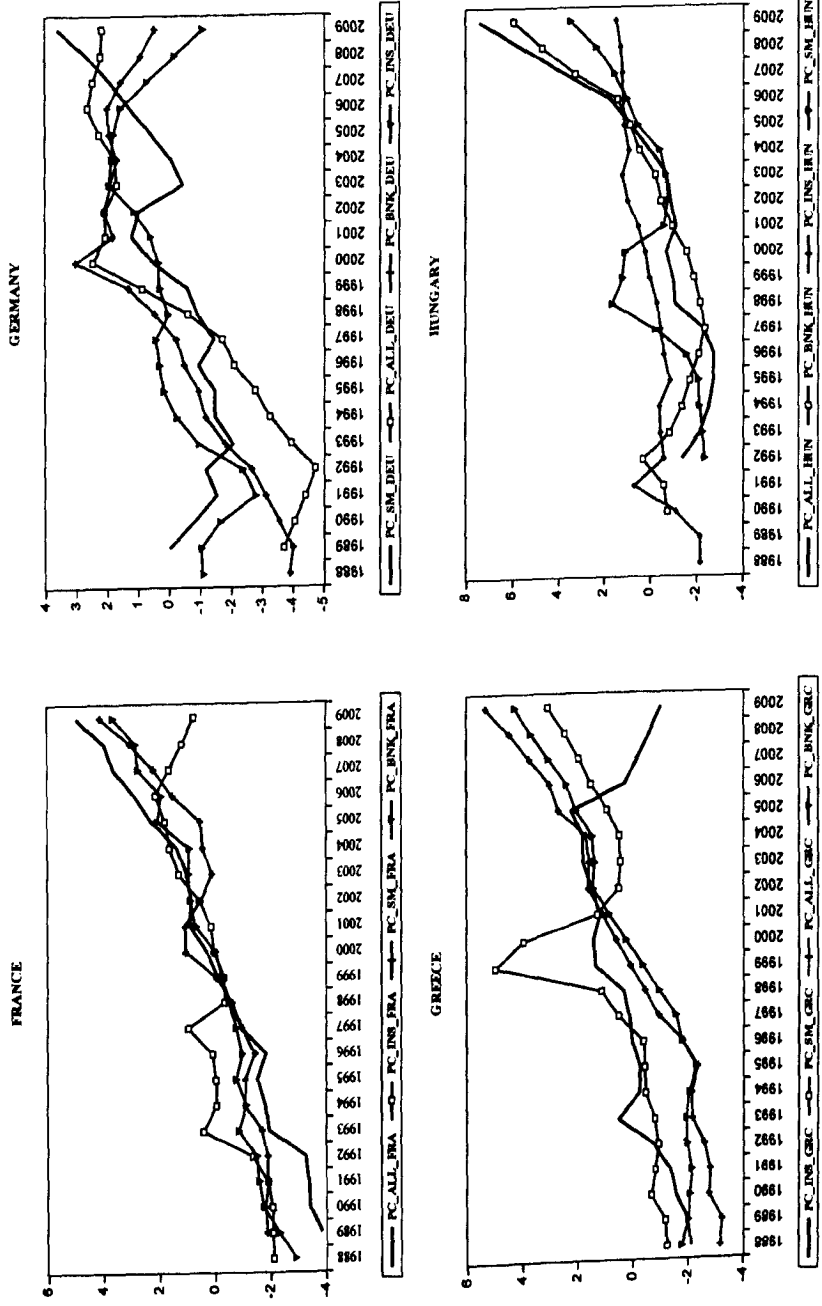


Figure A.4: Principal Component Analysis (a) France (b) Germany (c) Greece (d) Hungary

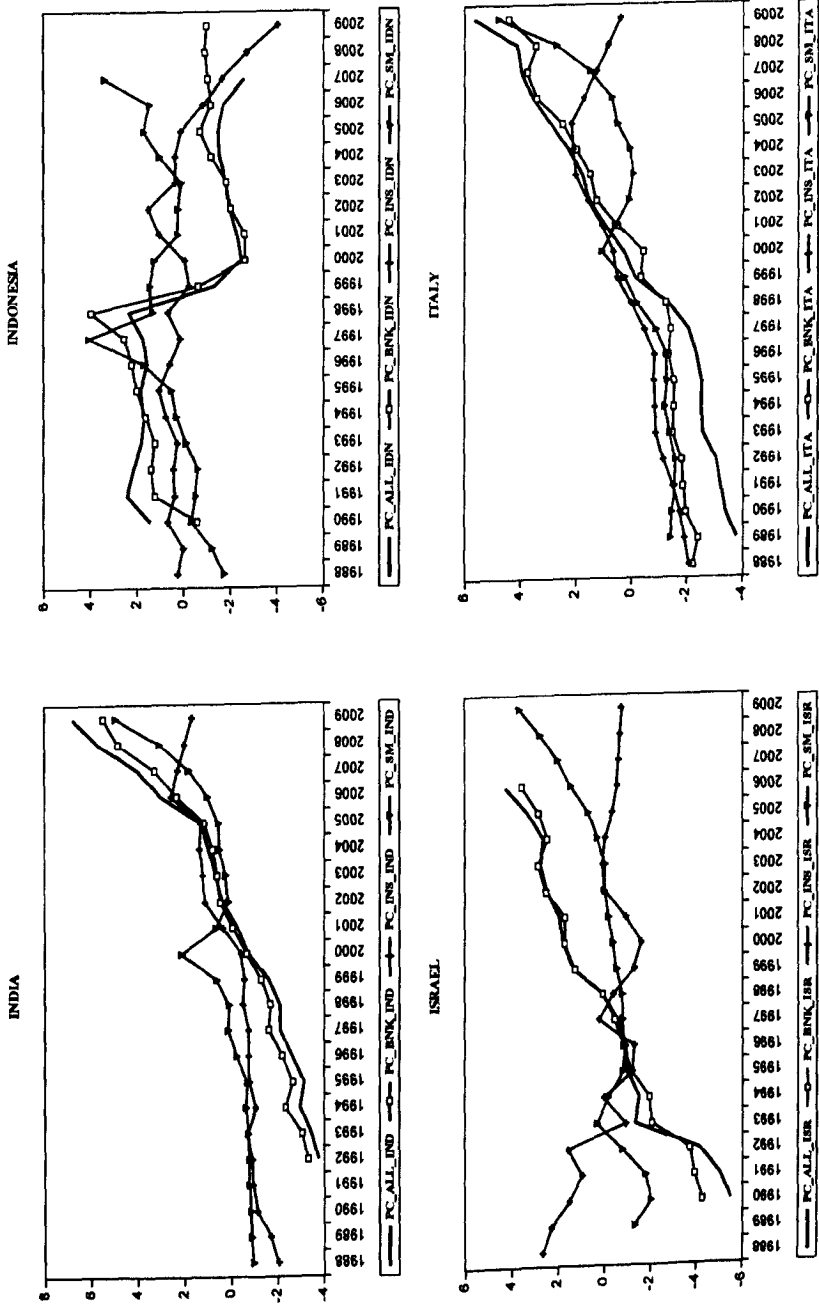


Figure A.5: Principal Component Analysis (a) India (b) Indonesia (c) Israel (d) Italy

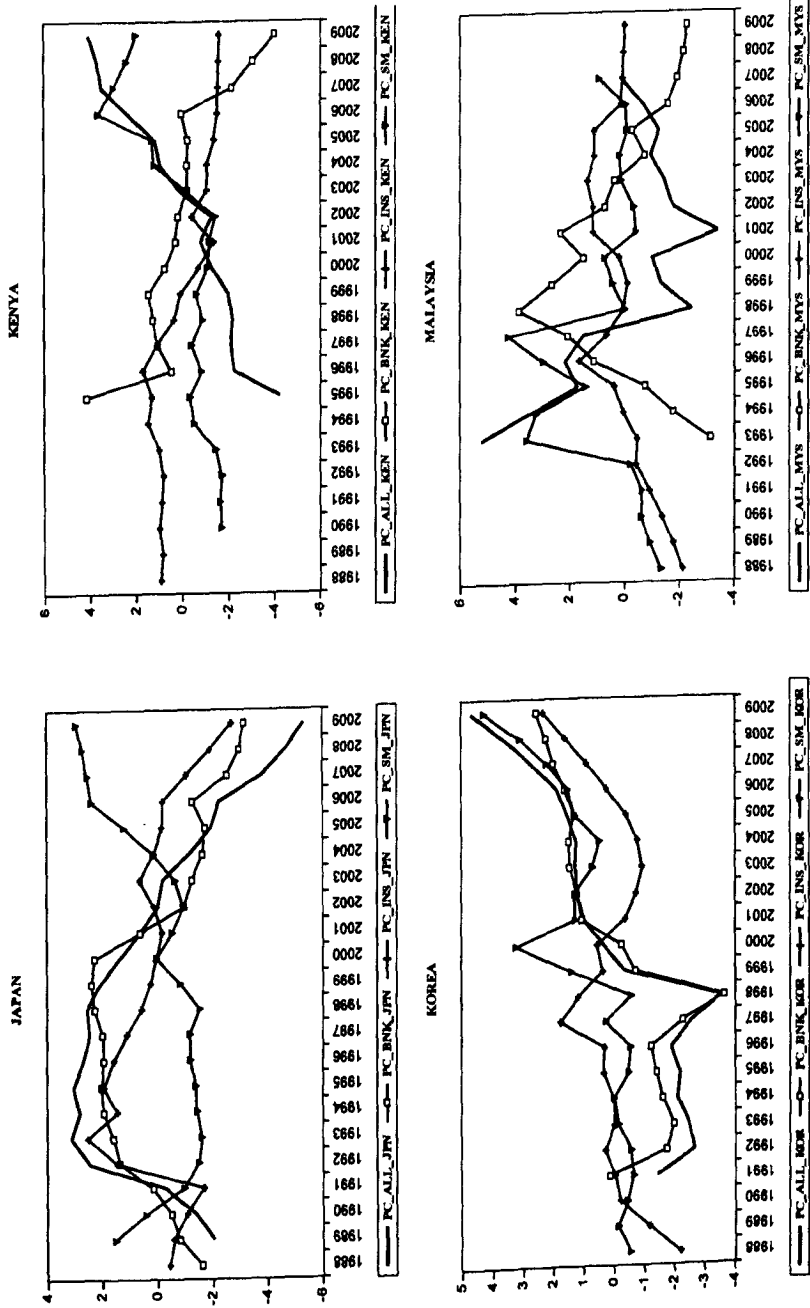


Figure A.6: Principal Component Analysis (a) Japan (b) Kenya (c) Korea (d) Malaysia

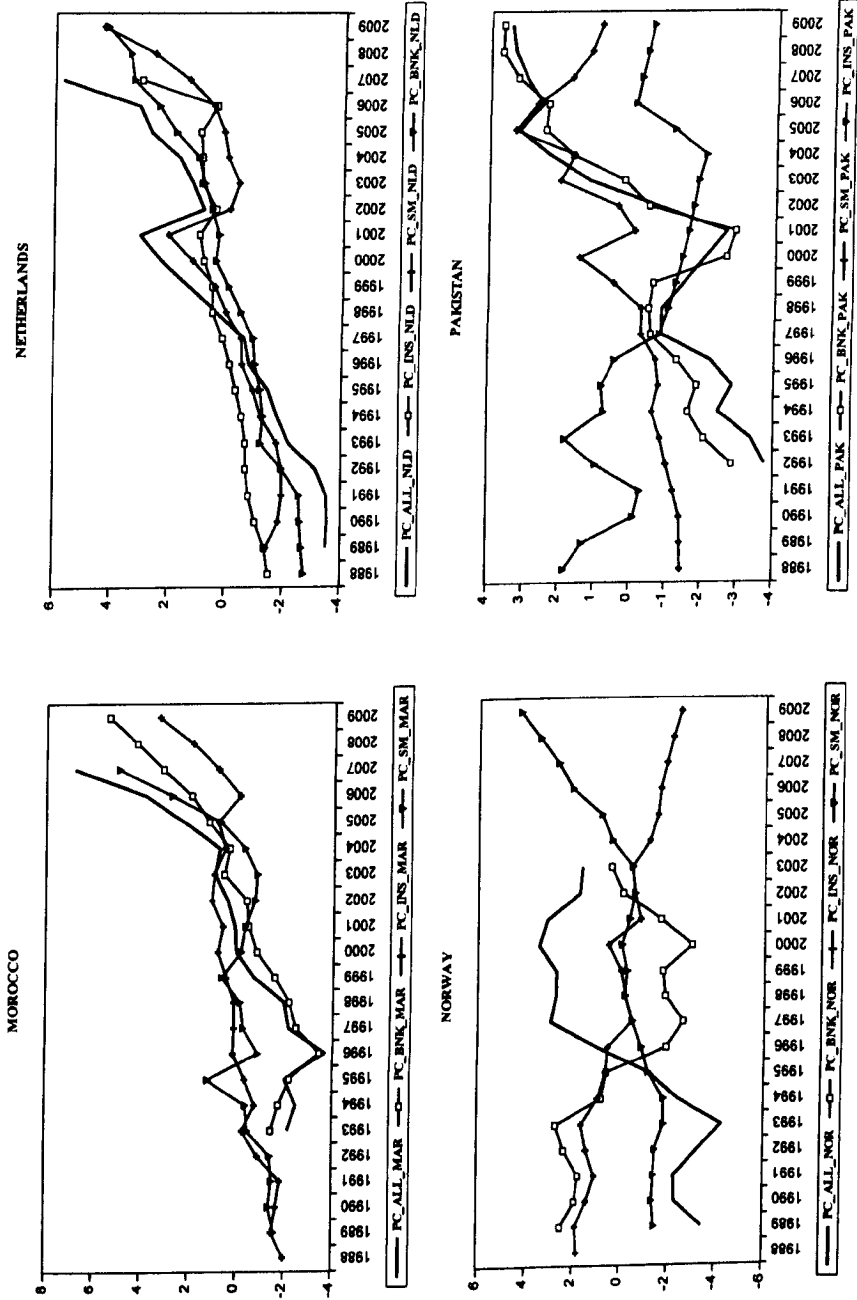


Figure A.7: Principal Component Analysis (a) Morocco (b) Netherlands (c) Norway (d) Pakistan

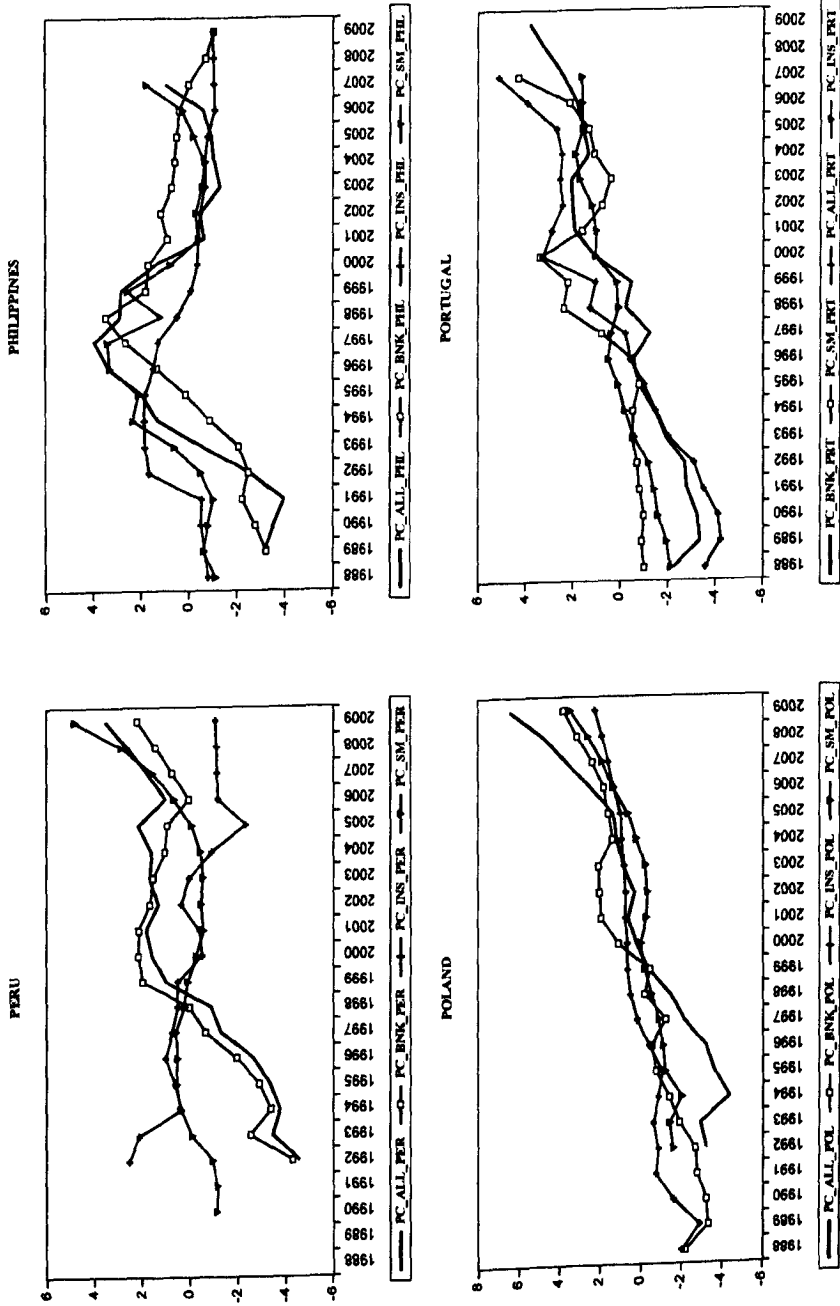


Figure A.8: Principal Component Analysis (a) Peru (b) Philippines (c) Poland (d) Portugal

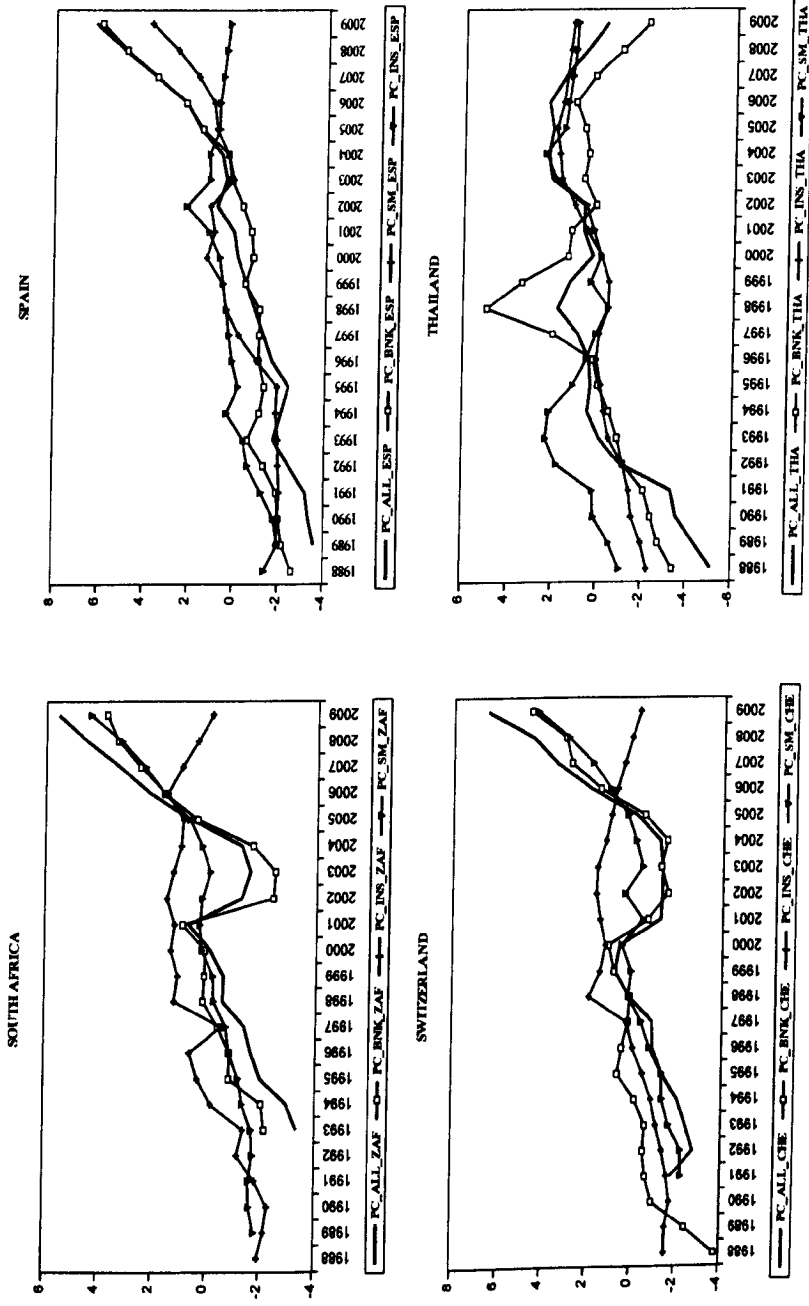


Figure A.9: Principal Component Analysis (a) South Africa (b) Spain (c) Switzerland (d) Thailand

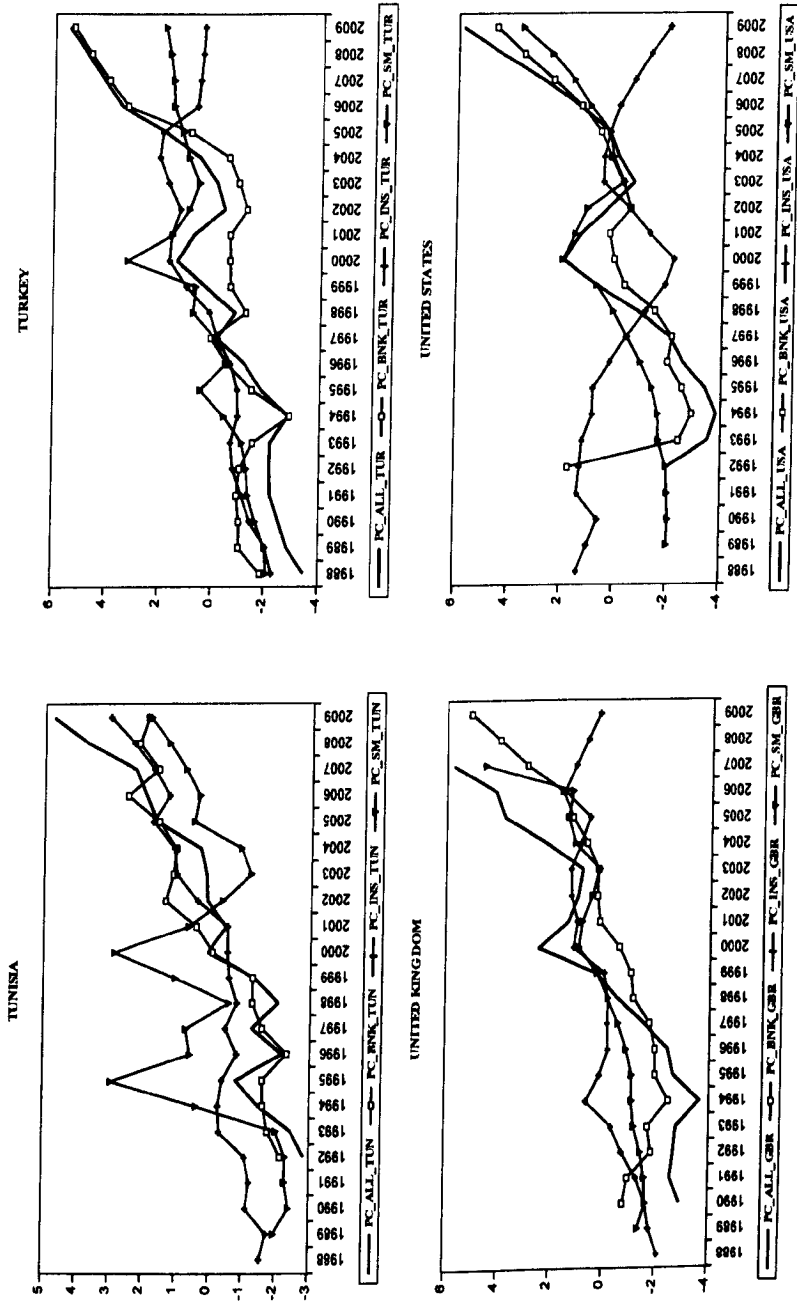


Figure A.10: Principal Component Analysis (a) Tunisia (b) Turkey (c) United Kingdom (d) United States

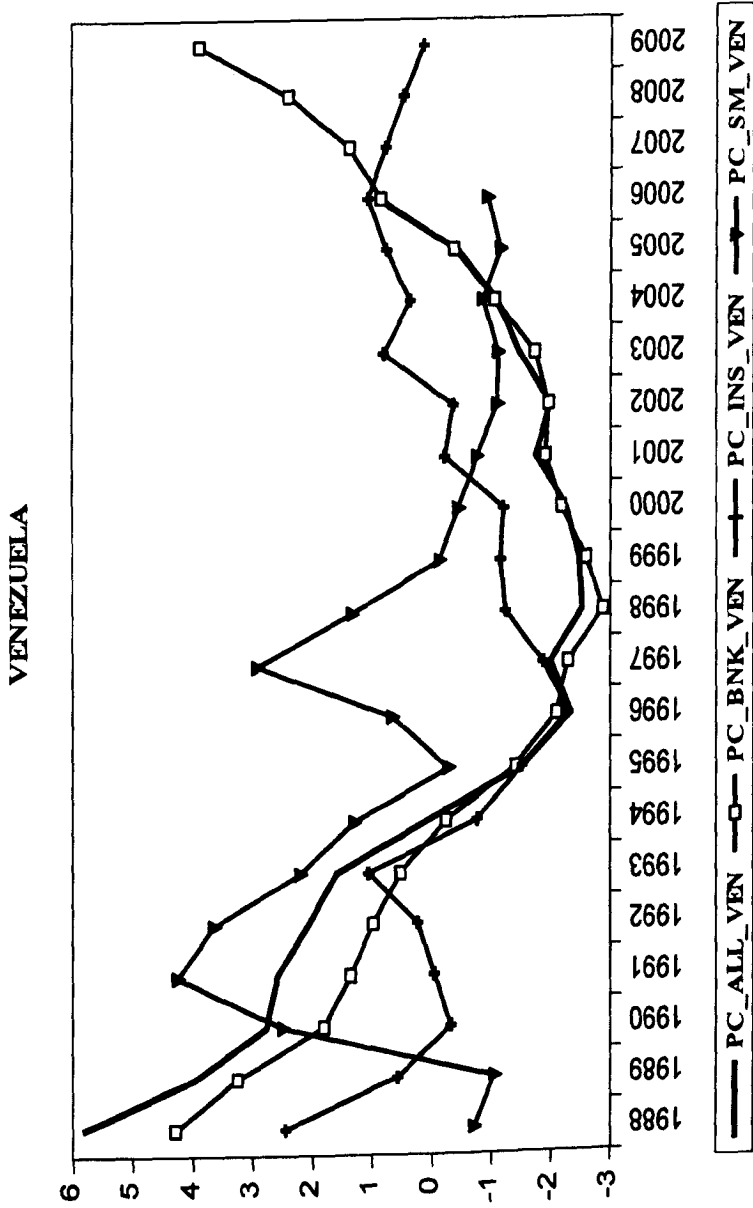


Figure A.11: Principal Component Analysis (a) Venezuela

Turkey, Cuba, Mexico, Uruguay, Dominica, Montenegro, Venezuela.

A.4 High Income Countries

Andorra, Germany, New Caledonia, Aruba, Gibraltar, New Zealand, Australia, Greece, Northern Mariana Islands, Austria, Greenland, Norway, Bahamas, Oman, Bahrain, Hong Kong SAR, China, Poland, Barbados, Hungary, Portugal, Belgium, Iceland, Puerto Rico, Bermuda, Ireland, Qatar, Brunei Darussalam, Isle of Man, San Marino, Canada, Israel, Saudi Arabia, Cayman Islands, Italy, Singapore, Channel Islands, Japan, Slovak Republic, Croatia, Korea, Rep. Slovenia, Cyprus, Kuwait, Spain, Czech, Latvia, Sweden, Denmark, Liechtenstein, Switzerland, Estonia, Luxembourg, Trinidad , Tobago, Equatorial Guinea, Macao SAR, China, Turks and Caicos Islands, Faeroe Islands, Malta, United Arab Emirates, Finland, Monaco, United Kingdom, France, Netherlands, United States, French Polynesia, Netherlands Antilles, Virgin Islands (U.S.)

A.5 Data, Sources, Time Period

Table A.4: Variable, Source and Range

Variable	Source	Range
Deposit Money Bank Assets / (Deposit Money + Central) Bank Assets	A New Database on Financial Development and Structure, Beck, T. and Kunt, A. and Levine, R.(2000)	1960-2009
Liquid Liabilities / GDP	A New Database on Financial Development and Structure, Beck, T. and Kunt, A. and Levine, R.(2000)	1960-2009
Private Credit By Deposit Money Banks And Other Financial Institutions / GDP	A New Database on Financial Development and Structure, Beck, T. and Kunt, A. and Levine, R.(2000))	1960-2009

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Table A.4: Variable, Source and Range

Variable	Source	Range
Life Insurance Premium Volume / GDP	A New Database on Financial Development and Structure, Beck, T. and Kunt, A. and Levine, R.(2000)	1960-2009
Non-Life Insurance Premium Volume / GDP	A New Database on Financial Development and Structure, Beck, T. and Kunt, A. and Levine, R.(2000)	1987-2009
Stock Market Capitalization / GDP	A New Database on Financial Development and Structure, Beck, T. and Kunt, A. and Levine, R.(2000)	1976-2009

Continued on next page

Table A.4: Variable, Source and Range

Variable	Source	Range
Stock Market Total Value Traded / GDP	A New Database on Financial Development and Structure, Beck, T. and Kunt, A. and Levine, R.(2000).	1975-2009
Stock Market Turnover Ratio	A New Database on Financial Development and Structure, Beck, T. and Kunt, A. and Levine, R.(2000)	1976-2009
Trade to GDP	World Bank Development Indicators	1960-2009
Inflation	International Monetary Fund, International Financial Statistics and Data Files	1960-2009
Fiscal	World Bank Development Indicators.	1960-2009
Real GDP	World Bank Development Indicators	1960-2009

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Table A.4: Variable, Source and Range

Variable	Source	Range
Real GDP Per Capita	World Bank Development Indicators	1960-2009
Foreign Direct Investments Net Inflow (% OF GDP)	International Monetary Fund	1960-2009

Table A.5: Variable, Source and Range

Exchange rate regime	Carmen M. Reinhart And Kenneth S. Rogoff (2002)	1960-2007
<p>The fine classification codes are: 1: No separate legal tender 2: Pre announced peg or currency board arrangement 3: Pre announced horizontal band that is narrower than or equal to +/-2% 4: De facto peg 5:Pre announced crawling peg 6:Pre announced crawling band that is narrower than or equal to +/-2% 7: De factor crawling peg 8: De facto crawling band that is narrower than or equal to +/-2% 9: Pre announced crawling band that is wider than or equal to +/-2% 10: De facto crawling band that is narrower than or equal to +/-5% 11: Moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation over time) 12:Managed floating 13:Freely floating 14:Freely falling 15:Dual market in which parallel market data is missing.</p>		

A.6 Countries in Probit Analysis

Algeria, Angola, Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Canada, Central African Republic, Chile, China, Colombia, Costa Rica, Cte d'Ivoire, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Finland, France, Germany, Ghana, Greece, Guatemala, Honduras, Hungary, Iceland, India, Indonesia, Ireland, Italy, Japan, Kenya, Korea, Malaysia, Mexico, Morocco, Myanmar, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Singapore, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, Tunisia, Tunisia, Turkey, United Kingdom, United States, Uruguay, Venezuela, Zambia, Zimbabwe.

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