CAUSALITY BETWEEN FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: A CASE STUDY OF SELECTED SAARC COUNTRIES

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CERTIFICATE

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ACRONYMS

ADB	Agriculture Development Bank
ADF	Augmented Dickey Fuller
ARDL	Autoregressive Distributed Lag
AIC	Akaike Information Criterion
BDL	Bank Deposit Liabilities
BVAR	Bivariate Vector Auto Regression
CBSL	Central Bank of Srilanka
CC	Currency in Circulation
CCIL	Clearing Corporation of India
CDC	Central Depository Company
CDR	Credit Deposit Ratio
CDS	Central Depository System
CIB	Credit Information Bureau
CIRC	Corporate and Industrial Restructuring Corporation
CLA	Corporate Law Authority
CMDP	Capital Market Development Programme
CPI	Consumer Price Index
CSE	Colombo Stock Exchange
DEA	Data Envelopment Analysis
DFIs	Development Financial Institution
ECM	Error Correction Mechanism
FCAs	Foreign Currency Accounts
FD	Financial Development
FDI	Foreign Direct Investment
FSRP	Financial Sector Reform Programme
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GFC	Gross Fixed Capital Formation
GMM	Generalized Method of Moments
IFC	International Finance Corporation
IMF	International Monetary Fund
KSE	Karachi Stock Exchange
LDCs	Least Developed Countries
MENA	Middle Eastern and North African Countries
MM	Money Multiplier
NCBs	National Commercial Banks
NDS	Negotiated Dealing System
NPL	Non Performing Loans
OLS	Ordinary Least Squares
OMO	Open Market Operation
PACRA	Pakistan Credit Rating Agency

PBC	Pakistan Banking Council
PPAF	Pakistan Poverty Alleviation Fund
PRs	Prudential Regulations
PSC	Private Sector Credit
RBI	Reserve Bank of India
RDR	Real Deposit Rate
SAARC	South Asian Association of Regional Cooperation
SBP	State Bank of Pakistan
SBC	Schwarz Bayesian Criterion
SEBI	Securities and Exchange Board of India
SECP	Securities and Exchange Commission of Pakistan
SMEs	Small and Medium Enterprises
SMC	Stock Market Capitalization
TFP	Total Factor Productivity
UECM	Unrestricted Error Correction Mode
VAR	Vector Auto regression
WB	World Bank
WTO	World Trade Organization

DEDICATION

I DEDICATE MY WORK TO MY LOVING PARENTS
AND MY BROTHER
RAMEEZ HASSAN QURAISHI
WHO HAVE BEEN STANDFAST SUPPORTERS
THROUGHOUT MY CAREER WITH THEIR
INVALUABLE LOVE AND UNDERSTANDING

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TABLE OF CONTENT

Acronyms.....(i)

Dedication.....(iii)

Acknowledgements.....(iv)

List of Tables and Figures.....3

CHAPTER 1 INTRODUCTION.....4

1.1 Objectives and Rationale of the Study.....6

1.2 Organization of Study.....7

CHAPTER 2 REVIEW OF LITERATURE.....8

2.1 Review of Empirical Literature.....8

2.2 Review of Empirical Literature on SAARC Countries.....18

CHAPTER 3 OVERVIEW OF FINANCIAL SECTOR REFORMS IN SAARC REGION.....21

3.1 Financial Sector Reforms: Case of Bangladesh.....22

3.2 Financial Sector Reforms: Case of India.....26

3.3 Financial Sector Reforms: Case of Pakistan.....28

3.4 Financial Sector Reforms: Case of Sri Lanka.....32

3.5 Comparison of Financial Sector Performance in SAARC Countries.....35

Chapter 4 THEORETICAL MODEL, DATA AND VARIABLES.....38

4.1 Models of Financial Development and Economic Growth.....38

__4.1.1 Keynesian Model.....38

__4.1.2 Neo classical Model.....39

__4.1.3 The McKinnon-Shaw Model.....40

__4.1.4 McKinnon's (1973) Model.....40

__4.1.4 McKinnon's (1973) Model 40

__4.1.5 Shaw's Model 41

4.2 Theoretical Model 41

4.3 The Variables and Data Description 46

Chapter 5 METHODOLOGY AND MODEL 49

5.1 Stationarity 49

5.2 Auto Regressive Distributed Lag (ARDL) Approach 50

5.3 ARDL Representation of the Model 51

__5.3.1 Cointegration Tests to Determine Long run Relationship 52

__5.3.2 Testing Stability of Parameters 52

Chapter 6 ANALYSIS OF RESULTS 54

6.1 Unit Root Test 54

6.2 Cointegration Analysis: ARDL Approach 55

__6.2.1 Bangladesh 56

__6.2.2 India 58

__6.2.3 Pakistan 60

__6.2.4 Sri Lanka 62

6.3 Short run Causality 64

Chapter 7 SUMMARY AND CONCLUSION 68

Refrences 72

LIST OF TABLES AND FIGURES

Table 3.1 Financial Reform Measures in Bangladesh.....24

Table 3.2 Financial Reforms Measures in India.....27

Table 3.3 Financial Sector Reforms in Pakistan.....30

Table 3.4 Financial Sector Reforms in Sri Lanka.....33

Table 3.5 Measures of Financial Deepening in SAARC Countries.....36

Table 3.6 Capital Formation and Saving.....37

Table 6.1 Unit Root Test Results.....54

Table 6.2 Cointegration Test Results.....56

Table 6.3 Results of ARDL Test of Cointegration.....63

Table 6.4 Causality Test Results.....66

Figure 1 Trends of Monetary Aggregates in Bangladesh.....25

Figure 2 Trends of Monetary Aggregates in India.....28

Figure 3 Trends of Monetary Aggregates in Pakistan.....31

Figure 4 Trends of Monetary Aggregates in Sri Lanka.....35

Figure 5 Results of CUSUM and CUSUMSQ Test.....67

CHAPTER 1

INTRODUCTION

Financial development is the establishment and expansion of financial institutions and financial market. The direct relationship between growth and finance has been a focal point of debate in developing countries since 1990, but still the channels of growth at theoretical and empirical levels are not determined. Mckibbin (2005) argued that a well-functioning financial system of a country helps mobilize household savings, works for efficient allocation of resources, diversifies risks, and leads to reduction in information as well as transaction costs. In other words, a well-functioning financial system promotes higher savings and retained earnings, which ultimately raise funds for investment projects.

Majority of Empirical studies support the idea presented by Schumpeter (1911), and McKinnon and Shaw (1973) that a positive relationship exists between financial sector development and economic growth which works through its impacts on productivity, capital growth rate and allocation of resources. They argued that financial deepening helps increase the use of financial intermediaries for efficient flow of resources in the economy and in turn this increases efficiency of investment. On the other hand a controlled financial system with government intervention adversely affects domestic investment and thereby obstructs economic growth process.

A market based financial sector enables the economy to allocate funds efficiently and establishes a positive relationship between economic growth and finance. A few important studies like: Goldsmith (1969), Fry (1978), Shaw (1973), Smith (1991), and King (1993)

support the McKinnon and Shaw hypothesis regarding a positive relationship between economic growth and financial development. However Lucas and Robinson (1952), Stern (1990) concluded with no evidence of robust and positive link between development of financial sector and real sector growth of the economy. On the other hand a few more studies[1] argued that there are several conditions of macroeconomic stability and structural change that must be met by developing countries to ensure the success of financial liberalization. Solow (1956) presented the view that a number of countries[2] share some common characteristics; however each country possesses some unique distinctive features as well. Thus, there is an evolution in the economic behavior of countries over time, and a dynamic model is therefore required to explain the relationship between finance and growth.

Barro (2003) found that low investment in the SAARC region was due to increased intervention of the government, lack of human capital and political instability. However, with the emergence of globalization, countries in this region have introduced various reforms in financial sector to bring it at par with developed countries. The process of financial reforms was initiated in SAARC region during the late 1980s and early 1990s and the process is still underway. Various programs have been launched since then to strengthen the financial sector and to promote liberalization process. Various regulatory and prudential measures for commercial banks and finance companies have been under-taken like privatization, deregulation of interest rate, and removal of entry barriers.

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[1] Wijenbergan (1983) and Buffie (1984)
[2] Especially developing nations

1.1 Objectives and Rationale of the Study

Given the paramount importance of financial sector in the economic growth process, we attempt to use various development indicators with emphasis on the banking sector to examine the success of financial reforms in the SAARC region. The study tries to explore as to how the ever changing financial environment affects economic growth. In addition, we also attempt to investigate the nature of relationship between financial development and economic growth in four major SAARC countries (Bangladesh, India, Pakistan, and Srilanka). The specific objectives include:

- To investigate the role of financial development in determination of economic growth. Special attention has been focused on four SAARC countries,
- To explore the difference in the degree of financial liberalization within the SAARC region.
- To investigate the causality between financial development and economic growth.

Most of the empirical studies exploring the relationship between financial development and economic growth have concentrated on the developed countries. Of course a few case studies are available for developing countries but they deal with individual countries. To the best of my knowledge there is no study available presents that uses the latest technique of ARDL and compares the extent of financial development among the SAARC countries. Thus this study contributes to the existing literature by comparing the financial sector development in selected SAARC countries at one hand since 1980's and on other hand explores the causality between financial development and economic growth by employing the latest analytical tools.

1.2 Organization of Study

This study is organized as follows. Empirical literature is reviewed in chapter 2. An overview of financial sector reforms in selected four SAARC countries along with outcome of reforms is given in Chapter 3. Different theories of financial development and its relation with economic growth along with theoretical model are given in chapter 4. Estimation methodology followed by description of variables and discussion of data issues is discussed in chapter 5. Interpretation of empirical results is given in chapter 6 and Chapter 7 concludes the study with some policy recommendations.

CHAPTER 2

REVIEW OF LITERATURE

Many countries have introduced financial sector reforms since 1980's to improve their performance and efficacy. The purpose of these reforms was to stimulate efficient resource allocation, ensure perfect competition, enhance mobilization of savings for effective investment projects and facilitate financial transactions (King and Levine, 2001). A number of studies[3] at micro and macro levels are available to illustrate the channels of economic growth and role of financial liberalization in this regards. Recent literature on the relationship between financial sector and the process of economic growth reveals that different econometric methodologies can be employed to explore the impact of financial reforms and financial sector development on economic growth. This chapter reviews existing literature relating to the issues of finance and growth.

2.1 Review of Empirical Literature

Ebadi *et al.* (2008) conducted a study to investigate the nature of relation between economic growth and financial sector liberalization for the economy of Iran. The study used time series data ranging from 1961-2004 and applied Cointegration and Granger Causality techniques. This study used ratio of private sector credit to GNP as an indicator of financial sector development and real GDP per capita as a proxy of economic growth and concluded no

[3] Goldsmith (1969), Fry (1978), Smith (1991), Schumpeter (1911) and Robinson (1952)

evidence of long run relationship between financial sector development and growth. However, an evidence of one way causality running from economic growth to financial development was found.

Farda (2007) investigated the finance growth relationship and direction of causality for Turkey and used annual data ranging from 1968-2005. For the assessment of direction of causality between financial sector development and economic growth this study used Bound Testing approach to Cointegration. The study applied Granger causality test to assess the short run and long run causality. Moreover it used broad money to GDP and ratio of Bank Deposit Liabilities to GDP as an indicator of financial development and real GDP per capita as a proxy for economic growth. The major findings of this study suggested that there is existence of a long run relationship between economic growth and financial development. In addition, an evidence of unidirectional causation running from financial development to economic growth was also found.

Guryay *et al.* (2007) studied the finance growth nexus for the economy of Northern Cyprus using annual data set for the period 1986-2004. This study used growth rate of real GDP as an indicator of economic growth, market capitalization to GDP ratio as financial development indicators and applied ordinary least square (OLS) estimation method. This study found a negligible positive impact of finance on economic growth. Moreover, Granger Causality technique found an evidence of unidirectional causality running from economic growth to financial development.

In a comparative study for developed and developing economies, Aydogan and Akdeniz (2007) analyzed the issue of economic growth and finance. This study used a sample of panel and time series data for a set of developed and under developed countries ranging over the period of 1994-2003. For time series analysis, study used quarterly data over the period 1982:Q1-2005:Q3. This study employed the Generalized Method of Moments (GMM) technique for dynamic or panel data set, while exploring the time series properties study used vector error correction method (VECM). This study had two types of conclusions: a robust and direct relation was observed between the variables of interest, while time series analysis provided mixed results. Time series estimation in this study general indicated more robust relationship for the countries that have medium sized futures market value relative to GDPs.

McGrath (2006) analyzed the relationship among deregulation, development of financial sector and economic growth. This study calculated the magnitude of effective components on economic growth for Poland, Hungary and Czech Republics. A quarterly data over the period 1993 to 2003 were used and estimation was carried on by using the Granger Causality technique. The Results supported the view that financial liberalization increased the monetary sector performance (Shaw's view), government intervention results in efficient services (Stiglitz' view), and government intervention results in poor functioning of banking sector (Berth's view). Moreover King and Levine results were also supported by this empirical study that higher level of economic growth is correlated with development of banking sector.

Similarly Jordan and Jonahing (2006) conducted a case study to analyze the finance growth nexus for the economy of China. This Study used annual data set over the period 1978-2001 and applied Vector Autoregression (VAR) approaches to examine the inter- relationship between financial development indicators and growth of real GDP per capita in VAR system. Using ratio of private sector credit, gross fixed capital formation, stock market capitalization and quasi money as an indicators of financial development and found two way causality between financial sector development and economic growth. Moreover it did not support the arguments in favor of demand following hypothesis[4].

Three measures for financial development including high value of nominal interest rate, the low transaction costs of credit markets by government, and allocation of resources to non-state sector were used by Zho (2005) in an empirical analysis. Using standard regression techniques the study concluded that; higher deposits rate leads to faster economic growth through higher savings, and lower transaction costs help to attract more savings for private sector. Furthermore, with the high level of investment and high scale of production, economic growth is higher and non-state sector gets more shares of loanable funds, which results in higher output rate.

Bonfiglioli (2005) examined the impact of financial development and banking sector crisis on investments activities and on economic growth. The study performed empirical analysis

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[4] higher growth creates more needs for financial services and modern financial institutions, hence growth leads finance (Patrick, 1966)

on two data sets: a set of 85 countries with data set ranging from 1975-1999, and another data set of 93 countries ranging from 1975 to 1999. The Major findings of the study highlighted that financial liberalization spurs productivity growth. However financial liberalization exerts very little effects on accumulation of capital. The results also suggest that investment activities and total factor productivity was depressed because of banking sector crisis. Financial liberalization responded quickly from productivity growth rate, while it had minor impact over the speed of convergence.

Ang (2005) investigated the existence of supply leading and demand following hypothesis for Malaysia using a time series data over 1960-2001. The study used nominal interest rate, real interest rate, real GDP and investment as indicators and applied cointegration and causality tests to assess the relationship between financial development and economic growth. The study found a direct and positive relationship between economic growth and financial sector development in long run. The Study also argued and presented a policy implication in favor of better provision of macro-economic conditions before liberalizing the financial sector.

Badr (2005) studied the causality relation between financial sector liberalization and economic growth. Using time series data over the period 1960-2001 for Egypt the study applied Granger Causality technique to identify the directions through which finance affects economic growth. Major findings of the study include that financial sector development causes economic growth because it causes investment to be high. Hence it concluded that

raising the financial sector deepening can be a major channel to enhance savings and economic growth in long run.

Testa (2005) investigated the long run relationship between economic growth and financial development for Japan and United States using Engel Granger and Johansson cointegration method. The study used quarterly data ranging from 1957 to 2003 for Japan and US economy and concluded that in case of Japan, economic growth is determined by the investment share in long run, and for US case there is no suitable economic interpretation, and results seemed to be inconclusive.

Shrestha and Chowdhry (2005) tested the existence of supply leading hypotheses using the interest rate, investment and savings for Nepal. The study used annual data set over 1970 to 2003 and applied ARDL modeling approach. Major conclusion included that there is strong and robust effect of real interest rate on savings, and the study also strongly supported the MacKinnon and Shaw financial liberalization hypothesis. A very important policy implication can be inferred from this study is that saving and investment rate can be maintained by taking real interest rate as a policy instrument.

Son and Meverotes (2004) tried to investigate the empirical relationship between financial liberalization and growth of real GDP per capita. This contribution had three main elements: firstly, the study used a panel data set of 65 different economies over 1961 to 1999. Secondly, the study constructed a financial development index by using principal component analysis, and thirdly, this study employed most recent econometric analysis related to two

step GMM system estimators and also applied sensitivity analysis for checking robustness. The study found a positive relation between financial development and economic growth in developing as well as in industrial countries. If some gap occurred in developing economies, it is very easily filled up in industrial countries, and equilibrium is restored in shorter time period.

In an empirical study, Fevera (2003) examined the nature of the relation between financial sector development and economic growth for a panel of 87 countries over the period 1960 to 1998. One part of the study relied upon the cross sectional data and found a positive correlation between finance and growth. However, this relationship was disturbed when instrumental variables regression technique was carried out. The second part of study used time series data and used panel data technique and found statistically insignificant relationship between financial development and economic growth. Overall, the results suggested that financial development did not exert any impact on economic growth. However, the results were varied across the economies.

Abdurrahman (2003) conducted an empirical study to test the relationship between financial sectors reforms and its impact on the productivity growth for Indonesia. This study used ratio of broad money to GDP as financial development indicator and real interest rate as an indicator of deregulation to test the existence of supply leading or demand following hypothesis. For the evaluation of relationship, this study used annual time series data ranging over the period 1970 to 1997 and Simple OLS regression as econometric technique. The study found that financial reforms taken to accelerate economic growth process have been

fruitful to mobilize savings to productive sector of the economy. Hence a positive and robust link was identified between growth rate of real GDP and financial sector.

In a panel analysis, Calderon (2002) examined the causal relationship between economic growth and financial sector development. The study used pooled data for a panel of 109 developing and developed countries over the period 1960 to 1994 to test the supply leading and demand following hypotheses. Finally concluded that, there is positive and direct relationship between financial development and growth indicators. Furthermore, the study also found an evidence of two way causality between financial development and economic growth indicators. Moreover, the impact of financial deepening is more strong and significant for underdeveloped countries than that of developed nations.

Boulila and Trablesi (2002) empirically investigated the issue of causality for financial and economic growth relationship for the economy of Tunisia. This study used bivariate vector auto regressive (BVAR) framework of co-integration. It also used the annual data over the period of 1962-1997 and found inconclusive evidence during different sample periods. An evidence of bi-directional causal relation was found between financial development and economic growth. The study used credit to private sector and investment rate as indicators. The major findings implied that bank credits have been an important determinant of growth, and overall conclusion remained weak and inconsistent to address the issue of causality.

Levine (2001) investigated the relationship between financial integration and economic growth and also tried to analyze the importance of finance as determinant of economic

growth. The Study used a data set ranging from 1960 to 1990 for 69 developing countries, and applied panel data and cross sectional regressions techniques. Empirical findings suggested that liberalizing capital flows raised liquidity of stock market which further helped to accelerate economic growth. Secondly, when entry berries were eased for foreign banks, it enhanced the banking sector efficiency. These findings can be further summarized that there is positive relationship between financial sector development and economic growth.

Bakaert *et al.* (2001) studied the effects of financial liberalization on economic growth. The study included different data samples, Sample I including 95 countries, sample II including 75 countries, while samples III and IV consisting of 50 and 28 countries. Initially this study constructed a proxy index for financial development and applied pooled regression techniques. The conclusion of this study suggested that when the determinants were controlled, the process of liberalization would improve the growth rate of per capita GDP and the adoption of financial sector reforms raised conditional convergence.

In an analytical discussion, Oks (2001) studied the empirical relationship between economic growth and liberalization of financial sector for Central and Eastern European countries. The study used monthly data set over the period of 1992-1999 for empirical investigation and used credit to private sector as an indicator of financial sector development. The study employed Granger Causality test and pooled regression techniques for empirical analysis. The conclusions of the study suggested that financial sector development exerts same effects on the economic growth for all the countries.

Yildirim *et al.* (2001) analyzed the relationship between financial development and economic growth along with finding the magnitude of this effect across the major provinces of Turkey. This study investigated the issue on spatial grounds using data sample ranging over the period 1991 to 2001. In order to explore the impact of financial crisis of 1994, the entire sample period was divided into two sub periods i.e. 1991-1995 and 1996-2001. The Study found that geographic components and spatial dimensions played a major role for the process of convergence via factor mobility channel and trade spillover effects. In addition, financial sector liberalization played a significant role for economic growth. The study suggested that private sector credit accelerated the process of economic growth; while on the other hand, deposits discouraged the process of growth.

Using OLS technique, Odedokun (1996) has tested the hypothesis that finance leads to economic growth and also examined the effects of efficiency of financial intermediation on real GDP per capita. Annual data over the period of 1960-1980 for 71 countries was used along with modified Orthodox model and found that there is positive effect of financial sector development on productivities of input factors. Moreover, it was found that 85 percent of the country's financial intermediation promotes growth of real output. The positive effects of financial sector development are prevalent in LDCs and high income group countries get varying benefits across the different regions of the world.

King and Levine (1993) in an empirical study examined whether high financial development is correlated with economic growth? The study used a data set ranging from 1969 to 1989 for a panel of 80 developed and developing countries and applied 2SLS and 3SLS techniques of

estimation. The main conclusions can be interpreted as firstly; the average level of financial development was strongly associated with growth for that period. Secondly, financial development follows growth and a strong positive relation exists between financial liberalization and investment activities. Overall results suggested that various measures of financial development are having strong link with current and future level of economic growth.

2.2 Review of Empirical Literature on SAARC Countries

Ma and Jalil (2008) checked the effects of financial liberalization and financial deregulation on the growth rate of real GDP per capita for the case of Pakistan and China. The study used framework of Auto Regressive Distributed Lag Modeling (ARDL) and two sample data sets, sample I ranging from 1960 to 2006 and sample II from 1979 to 2006. By using liquid liabilities and credit to private sector as financial development indicator this study concluded an evidence a of significant and robust link between real growth rate and liquid liabilities' for China, while a negative relation was found between credit to private sector and growth of real GDP per capita for the case of Pakistan.

Subhash and Manasvi (2007) analyzed the finance growth relation for India using annual time series data ranging from 1971-2004. This study was aimed at finding firstly, the extent and magnitude of financial infrastructure development indicators on economic performance. Secondly, the study analyzed the dynamic behavior of mentioned time series in short run as well as in long run. Finally the study made an attempt to statistically find the direction of causality using Granger Causality estimation techniques. The study found an evidence of

"finance-led economic growth" in short run. Moreover, this study provided supportive evidence in favor of supply leading hypothesis[5].

Kumar *et al.* (2004) constructed financial liberalization index and examined the direction of causality along with nature and strength of relation between financial development indicator and economic growth. The study used a monthly data for India over the period of 1993 to 2004 and obtained the measure of financial liberalization by Bivariate Cointegration and Error Correction Model. Empirical findings suggested that there exists a long run relation between growth and financial sector. Granger Causality showed that causality runs from financial liberalization to output growth and not vice versa. The impulse response coefficients showed positive impact of openness on output growth.

Khan and Qayyum (2005) examined the nature of relationship among three indicators of financial liberalization, trade liberalization and economic growth using an annual time series data set ranging from 1961-2005. The study used Bound testing approach to co-integration and found that process of economic growth is enhanced by the liberalizations of financial and trade sector for economy of Pakistan in long run, while there were very low short run responses. Finally they concluded that the liberalization policies must be introduced to enhance more growth.

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[5] This hypothesis states that causality runs from financial development to economic development in less developed countries (Patrick, 1966)

Mamoon (2004) tried to check existence of Mckinnon and Shaw hypothesis of financial liberalization for Pakistan. This study analyzed two fundamental issues; (a) did financial liberalization lead to financial development in Pakistan? And (b) if it did, whether this financial development came to increase the real economic activity? This study used annual dataset from 1980 to 2000 and employed Vector Auto Regression (VAR) models to avoid the econometric problems of autocorrelation and multicolinearity. Major findings concluded that financial deepening experienced in banking sector, capitalization of stock market had a positive and robust impact on private savings and results did not support McKinnon-Shaw hypothesis for Pakistan.

The analysis of literature suggests that over the time, a large body of empirical literatures studied the link between financial development indicators and growth rate of real sector of economy. We classify these Empirical findings into three categories; Firstly, most of studies Schumpeter (1911), Goldsmith (1969); McKinnon, Fry (1978); Shaw (1973); Smith (1991); King (1993) supported that financial liberalization accelerates economic growth and finance is an essential component to enhance economic growth. Secondly, Lucas Robinson (1952) (1988), Stern (1990) concluded no evidence of robust and significant positive link between development of financial sector growth of real sector of economy. Thirdly, the studies conducted by Wijnbergan (1983) and Buffie (1984); argued that there are several conditions, which must be met by most of the developing countries to develop these conditions which are necessary to ensure the success of financial liberalization.

CHAPTER 3

OVERVIEW OF FINANCIAL SECTOR REFORMS IN SAARC REGION

An efficient and well-functioning financial system helps to advance funds for profitable investment projects, makes easy availability of funds, better prices for financial products and better quality services for consumers. If the financial system is put under regulations, financial markets would not function efficiently and the use of financial resources would not provide desired outcomes and hence reforms would have less impact on the overall economic development. Financial development reforms process in developing countries and specifically in SAARC region have been extensively studied for the last two decades. These economies were characterized by government ownership of financial institutions, credit ceiling and regulations. All these factors were intended to provide cheap financial resources to priority sectors of the economy. As a consequence, investment level remained lower than expected level and due to this economic growth process was slow.

During the last two decades, almost all the developing economies have implemented financial reforms package under the guidance and financial assistance of World Bank and International Monetary Fund (IMF). The purpose of financial reforms taken by developing countries was to improve the overall macro-economic performance of their economies, particularly to achieve faster and sustainable rate of economic growth and maintain lower inflation rate. Many countries in the SAARC region have been struggling since last two decades to achieve self-reliance and to establish efficiency in the financial sector. The 1980s

and 1990s have witnessed the adoption of adjustment programs directed by multilateral funding agencies. The adjustment programme emphasizes on the opening of the trade and financial system in LDCs and integrates the economies of LDCs with the world economy as major part of "Washington Consensus" and has been the conditionality of above mentioned funding agencies.

It is important to mention here that financial sector reforms cause improvements in quality and quantity of competition along with efficiency and these are responsible to bring changes at institutional level. Against this backdrop, this chapter gives brief account of reforms in financial sector carried out in Bangladesh, India, Pakistan and Sri Lanka.

3.1 Financial Sector Reforms: Case of Bangladesh

Until 1980, the financial system of Bangladesh was marked with financial repression. Government owned the major share of banking and financial institutions with an inactive capital market. After experiencing a deteriorating economic performance of the country, it entered into the IMF structural adjustment programme. Formal application of financial reforms was carried out during 1990. In the initial phase an agenda was launched with the appointment of a commission[6]. This commission submitted a report and a financial sector reforms programme was launched under International Development Agency. Some other agencies[7] also provided support to overcome the problems caused during the implementation of reforms. However, since last two decades Bangladesh have taken a number of reforms to

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[6] National Commission on Money, Banking and Credit (NCMBC)
[7] USAID

promote economic growth. Liberalization process started with the privatization of the existing nationalized banks along with granting permission to private banks for free operations. A brief summary of reforms adopted by Bangladesh is given in Table 3.1.

Table 3.1
Financial Reform Measures in Bangladesh

Reforms Area	Date	Description
Privatization	Mar-1980 Jan-1984 Jun-2005	Privatization started in early 1980s with selling of two nationalized banks (Rupali bank and Uttar banks) to private sectors. Elimination of ceiling on private investment. Reduction in reserve list of industries under public sector. Relaxation of investment procedure for private sector. Establishment of disinvestment board. 160 new bank branches were opened.
Price Liberalization	Jan-1990 Jan-1992 2000-2001	Abolition of administered interest rate. Abolition of lending quotas. Interest rates rose to positive real levels. Except priority sector lending rates were freed. Bands of interest rate were dropped in 1992 except for small industries, agricultural fields and exports. Lending rates of nationalized commercial banks rose to market rates. Banks also granted permission for charging differential interest rates on risks and maturity period basis. Provision of technical assistance for recommendations on interest rates. Reimbursements of interest subsidies to banks by government.
Institutional reforms	1993-1994 1991	Central Bank was given perfect autonomy. A new department named Monetary Management and Technical Unit was developed for formulation of monetary and reserve money programme along with establishment of Credit Information Bureau (CIB) to report about defaults. Improvement in the inspection capability of Bangladesh's Bank. Introduction of external auditing of Bangladesh Bank. Establishment of Credit Information Bureau. Formation of new rules for interest payment provisions. Rationalization of bank reporting requirements.
Legal Reforms	1990 Jan-1993 Apr-1999	Implementation of new Financial Loan Court Act. Establishment of Money Loan Court Act. Loans were classified into four categories[8]. Introduction of Financial Institution Act. Introduction of Bank Deposit Insurance.
Strengthening of Nabs	2000-2001	Provision of legal advice and training for strengthening the management and accounting system. Recapitalization of Nabs through government bonds. Introduction of a new lending risk analysis (LRA) system to accelerate credit risk analysis. Setting up of new management information system (MIS) for management information. An extensive report system (LLRS) was established to monitor loans,

[8] Unclassified loans, substandard loans, doubtful loans and bad loans.

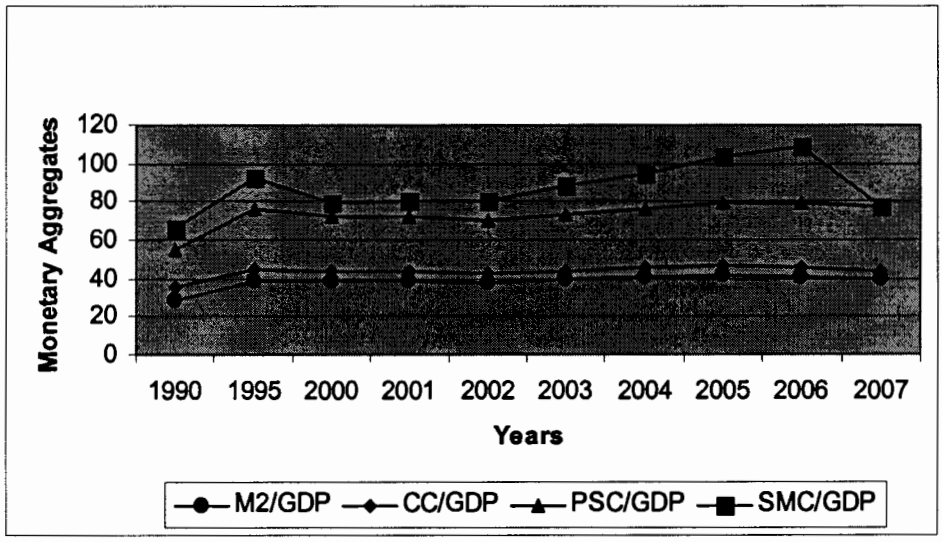
		and debt recovery system. Introduction of CAMEL rating systems.
Credit Controls	1990	After 1989 directed and controlled credit was phased out. Cash reserve requirements lowered to 5 percent.

Source: Central Bank of Bangladesh and (Chowdary), 2002)

Figure 3.1 shows the trends of monetary aggregates relative to GDP, i.e. broad money to GDP (M2/GDP), private sector credit to GDP (PSC/GDP), stock market capitalization to GDP (SMC/GDP) and currency in circulation to GDP (CC/GDP). These ratios reflect increasing trends over time which is an indication of efficient and developed financial sector.

Figure 3.1

Trends of Monetary Aggregates in Bangladesh



3.2 Financial Sector Reforms: Case of India

Before the emergence of market based system in financial sector Indian financial sector was lacking free and flexible financial system. Prior to 1990s, the Indian economy was representing a highly repressed financial sector characterized by nationalization, administered interest rates, directed credit programmes, inefficient banking structure, lack of proper accounting and risk management systems and lack of transparency in operations of major financial market participants. Prior to 1985, India launched a number of measures to alter the structure of its financial system. The first phase of financial liberalization was launched during 1991-92.

These reforms reduced the role of government sector over the operations of banking industry and allowed a fair competition among banks. Second phase of financial sector reforms process was intended to narrow down the interest rate spread and reduction of inflation in the country. The basic objective was to accelerate the economic growth and sustain the high growth rate of the economy. Initially reforms process was introduced to achieve allocative efficiency in financial market and at the same time to ensure macroeconomic stability in the economy. The country achieved price stability along with reduction in inflation expectations, this sector realized efficient price discovery of interest rate and exchange rate. Table 3.3 highlights the major financial reforms introduced in India:

Table 3.2
Financial Reform Measures in India

Reforms Area	Date	Measures
Price Liberalization	1991-1992	Wholesale interest rates were liberalized first, followed by lending and deposit rates.
Measures to Enhance Competition	1997-1998	Reduction of public sector ownership in banking industry. Autonomy was granted to government banks. Norms were introduced for easy entry and exit of new insurance companies' along with banks. Giving permission for FDI from abroad. Providing full directions for corporate governance and ownership of banking sector.
Institutional Measures	1993.1994	Establishment of debt recovery units, asset reconstruction companies, settlement advisory committees for quick recovery and restructuring. Introduction of Securities Interest Act, afterwards its amendment for ensuring rights of creditors. Establishment of an Information Bureau of for Indian Limited (CIBIL) to collect information about defaulters. Introduction of Clearing Operation of India (CCIL) to gather information regarding money market.
Supervisory Measures	Feb-1994	Establishment of the Board for Financial Supervision. Establishment of an authority for supervision and performance of commercial banks and other private institutions. Introduction of CAMELS rating system, move towards risk based supervision. Better introduction of measures for auditing system. Strengthening corporate governance and diligence on shareholders.
Measures to Enhance Technology	1992-1993	Introduction of Negotiated Dealing System (NDS). Setting up of INFINET.
Prudential Measures	1999-2000	Introduction of measures on risk weighted capital adequacy, provisioning of income recognition and accounting practices. Measures were taken to strengthen risk management Introduction and application of market principle for investment portfolio and limits on deployment of funds in sensitive activities. Application of guidelines for ownership and governance, securitization and debt restructuring mechanism norms.

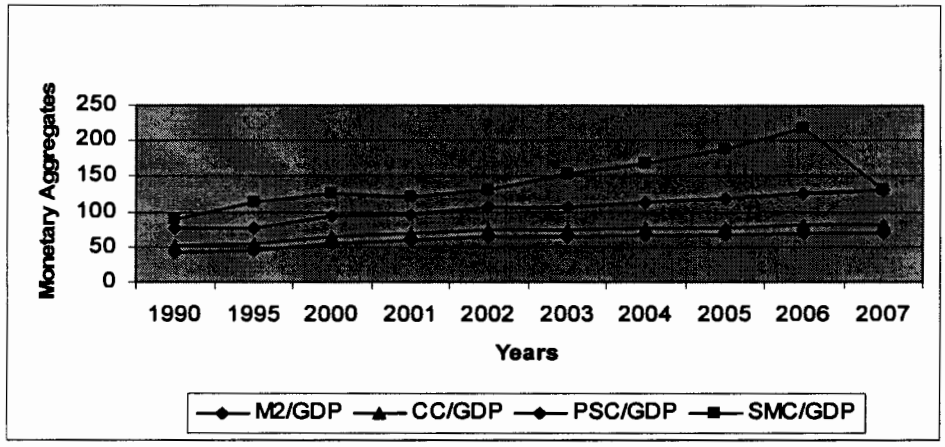
Measures to Enhance Role of Market Forces	Jun-1994	Introduction of market determined prices for government securities. Disbanding of interest rate to accelerate transparency. Establishment of system for call money market rate.
Reforms in Foreign Exchange Market	Jun-1999	Conversion of fixed exchange rate system to market determined floating exchange rate regime. Earlier foreign exchange regulation act (FERA) was replaced with a new market friendly foreign exchange management Act (1999) Permission was granted for availing forward cover.

Source: Reserve Bank of India, Annual Report 2005

Figure 3.2 shows the ratio of financial indicators relative to GDP, ratio of broad money to GDP (M2/GDP), Private sector credit to GDP (PSC/GDP), Stock market capitalization to GDP (SMC/GDP) and Currency in circulation to GDP (CC/GDP). These ratios reflect increasing trends over the time which is an indication of efficient and developed financial sector.

Figure 3.2

Trends of Monetary aggregates in India



3.3 Financial Sector Reforms: Case of Pakistan

Till the early 1980s the financial sector of Pakistan could be described as a classic example of "financial repression", marked with directed credit, subsidized credit, and interest rates

were set by government and were negative in real terms and banking sector was nationalized. In this era, the objective of government was to support macro-economic policies. By the end of 1980s it became clear that the goals to be achieved by nationalization were not being met because financial sector became inefficient, private sector crowded out, quality of assets was deteriorated. Pakistan Banking Council (PBC) was set up to control the activities of nationalized banks[9]. Banking sector was not performing at its best due to lack of healthy competition. Supervisory system was weak due to presence of multiple supervisory authorities like State Bank of Pakistan (SBP) and the PBC, the process of nationalization which started in 1974 greatly affected the performance of banking sector and reduced private sector participation.

When government analyzed the performance of nationalized institutions and realized that goals have not been met so they revised the nationalization policy in order to encourage competition and private sector participation on the advice and financial assistance of international financial agencies[10] like International Monetary Fund (IMF) and World Bank (WB) in late 1980s. Pakistan initiated the financial sector reforms under broader macro-economic structural adjustment programme in the early 1990s. The objectives of this comprehensive reforms process was to enhance competition and making financial industry

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[9] See *State Bank's Financial Sector Assessment Report* 1990-2000

[10] The World Bank provided loan of $150 million in 1989 and $200 million in 1997 under Financial Sector Adjustment Loan. A Financial Sector Deepening and Intermediation Project of $216 million was started in 1995, and another loan of $300 million under Financial Sector Restructuring and Privatization Project was awarded in 2001. Asian Development Bank also lent her helping hand for the restructuring. In 1997 it assisted in Capital Market Development Programme (Hanif, Muhammad N, 2003).

more transparent and competitive by privatizing nationalized commercial banks along with liberalization of interest rate and credit ceilings. Table 3.3 below highlights the major reforms introduced by Pakistan financial sector:

Table 3.3
Financial Reform Measures in Pakistan

Reform Area	Date	Description
Privatization	Apr-1990 Mar-1991 Apr-1991 Aug-1991 Sep-1994	Amendment of Bank Nationalization Act to smooth the way for privatization A full-fledged auction system was introduced. Disinvestment of Major banks to private sector[11]. Permission was granted for opening of 18 new private banks. Three foreign banks were allowed to open their branches (1991), later three more were allowed to operate. Provincial banks[12] were scheduled. Number of non-bank financial entities was also allowed to operate to meet credit requirements. Subsidies on special financing schemes including LLM were reduced.
Price Liberalization	1990	Deregulation, Liberalization and Privatization with an emphasis on market and instrument development
Removal of Entry Barriers	Jan-1991 Feb-1991	New bank branches were opened, overstaffing was controlled, and foreign investment was encouraged as a part of financial sector reforms process. New financial and NBFIs were granted permission to start their operations. Foreign investors were allowed to make new investments in all industries except specific one.
Institutional Reforms	1990 Jan-1992 1992 Feb-1994 1997-1998 Sep-2000	Establishment of Credit Information Bureau and National Commission for Credit to meet the requirements of data compilation. Establishment of National Credit Commission to review credit allocation. Expansion of supervisory capacity of the central bank of Pakistan over leasing companies, investment banks and housing financing institutions (1991). A department for regulations and supervision of NBFIs was established. SBP gave instructions over business rules, and it was granted strengthening autonomy. Issuance of prudential restructuring Downsizing their organizations in order to reduce the financial intermediation cost. A corporation for restructuring of industrial sector (CIRC) was set up to monitor the non-performing loans of nationalized commercial banks.

[11] 26 percent of MCB and 26 percent share of ABL were sold to private sector.
[12] Including Bank of Khyber and Bank of Punjab.

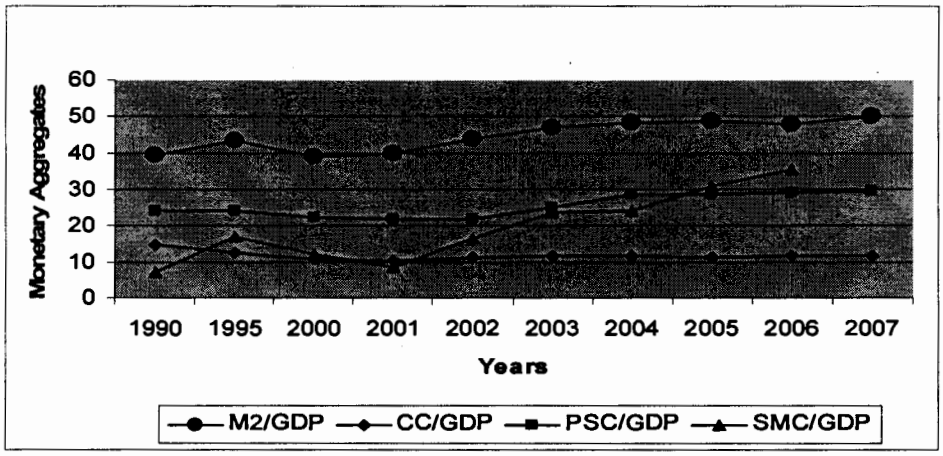
Legal Reforms	Aug -1992 Nov-1993 Feb-1997 Jun-1997 Dec-1997	Directions were given to banks for classification of NPLs. Instructions were given to banks to report quarterly performance and activities. They were given directions to submit debt recovery targets. Two already existing loan recovery laws were replaced by new broad ACT in 1997. New banking courts were established for admission of loan default cases. Two loan incentives schemes were introduced for defaulters.
Debt Management Reforms	Dec-1990 Mar-1991	Setting up of securities department of SBP for launching auction system of public debts. The government introduced treasury bills for six months for auction. Setting up of national saving scheme.

Source: Pakistan Financial Sector Assessment Report 1990-2000 (issued by SBP)

Figure 3.3 shows the ratio of financial indicators relative to GDP, Ratio of broad money to GDP (M2/GDP), Private sector credit to GDP (PSC/GDP), Stock market capitalization to GDP (SMC/GDP) and Currency in circulation to GDP (CC/GDP). These ratios reflect increasing trends over the time which is an indication of efficient and developed financial sector.

Figure 3.3

Trends of Financial Indicators in Pakistan



3.4 Financial Sector Reforms: Case of Sri Lanka

Sri Lanka was the pioneering country among SAARC region which introduced financial reforms. The financial liberalization programme was implemented to enhance economic growth and market efficiency in order to extend benefits to general public. But the goals of this liberalization were not being met due to dominance of inefficient state-owned banks. The overall performance was weak but these banks supported access of the state to deposit sources. The quality of intermediation was poor due to lack of competition and directed credit to political beneficiaries. There was clear inefficiency due to overstaffing and it further caused high cost of business, the spread between lending and deposit rate was observed to be high. Major focus of Sri Lanka's financial reforms programme was banking sector.

In this scenario, to provide a better and competitive financial sector which is efficient and market-based, was necessary so to ensure financial development, so a broad and comprehensive financial reforms programme was launched. Since 1977 government started financial liberalization program in which a number of policy changes were introduced and this process is still ongoing. Along with reforms in banking sector, a few reforms in equity sector, micro finance sector and capital market were also introduced. These reforms brought substantial changes in money market, capital market, electronic market, widespread ATM machines and also internet banking.

Competition among banks was enhanced by privatizing the banking sector along with this some foreign banks was allowed to open their operations in the country. Reforms process was intended to relax the financial sector from government's grip and introducing the

regulatory measures. Major financial reforms taken by Sri Lanka have been mentioned in Table 3.4 below:

Table 3.4
Financial Reforms Measures in Sri Lanka

Reforms Area	Date	Description
Price liberalization	1990	Deregulation of interest rates on deposits and advances. An interest rate policy was designed in which Bank rate was raised. The bank rate was raised from 8.5 percent to 10 percent, was followed by a sharp increase in interest rates on deposits at the government-owned National Saving Bank (NSB). Interest rates on deposits have been freely determined.
Measures to Enhance Competition	1992 Apr-1995	Financial reforms encouraged private sector to participate in the financial services industry where the state sector had been dominating for many years. Adopted a single banking license rather than the current distinction between commercial and specialized banks and financial institutions
Institutional Measures	1980 1985	The prohibition on new foreign bank branch offices, which had been in place since 1961, was relaxed in 1979. By mid-1980, 14 foreign banks had opened branches in Colombo, bringing the total number of foreign banks operating in the country to 21. Another institutional measure authorized all commercial banks to operate Foreign Currency Banking Units (FCBUs). An FCBU is permitted to undertake offshore banking services (accepting deposits and , renting loans in designated foreign currencies) to non-residents, commercial banks, free trade zone enterprises, and other residents approved by the Central Bank
Supervisory Measures	1992	More clearly establish the objectives, independence and accountability of the CBSL through introduction of the new Central Bank Act. Introduce the legal foundation for netting and retail acceptance of electronic payments through the new payments transaction law. Establish minimum licensing requirements for fund managers and pension scheme managers, insurance brokers, Underwriters and agents, as well as practitioners in the fields of factoring and leasing, establish prompt corrective action and the introduction of a new banking law to cover Apex provisions and broaden the definition of related parties. Vest regulation-making authority in the CBSL, among other things, through organizations providing micro credit and other finance facilities to SMEs. Provide modern insolvency provisions through revisions of the Companies Act. Introduce anti-money laundering statute to include insurance sector.

		Introduce laws to ensure that life fund insurance assets are segregated and safeguarded.
Credit Allocation	1985	The most important policy initiative in the sphere of credit allocation was the termination of the Comprehensive Rural Credit Scheme[13]. The Central Bank launched a scheme to establish Regional Rural Development Banks (RDBMS)[14].
Removal of Entry Barriers	1980	Foreign banks were also allowed to compete with state owned and private sector financial institutions in varying degrees.
Measures to Enhance Market Forces	1991-1992	Establish a central registry for moveable property Computerized records and filing procedures in registry offices. Complete the planned cadastral survey and land registry reform project, on an accelerated timetable if possible. Accelerate the privatization of the Credit Information Bureau.

Source: Edirisuriya, 2007, Annual Report Central Bank of Sri Lanka

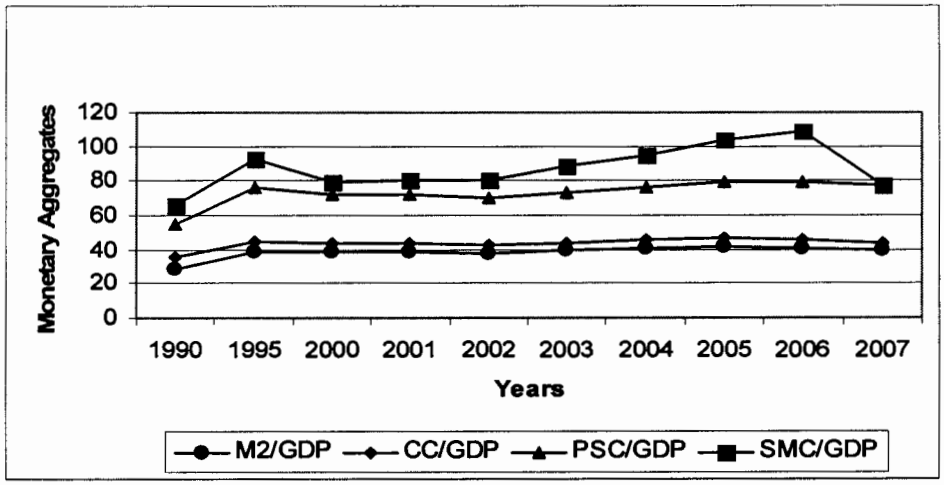
Figure 3.4 shows the ratio of financial indicators relative to GDP. Ratio of broad money to GDP (M2/GDP), Private sector credit to GDP (PSC/GDP), Stock market capitalization to GDP (SMC/GDP) and Currency in circulation to GDP (CC/GDP) is given in figure. These ratios reflect increasing trends over the time which is an indication of efficient and developed financial sector. Hence in Sri Lanka financial reforms accelerated investment activities and financial sector provision at a faster pace.

[13] Under this Central Bank offered 75 % defaultage guarantee to NCBs and cheap loans provided to the agricultural sector

[14] Which essentially took the form of regional outlets providing cheap credit, the goal was "to build a sound rural credit structure because the existing commercial banks in the country were not granting an appropriate amount of credit to the rural sector" (Central Bank, 1985).

Figure 3.4

Trends of Financial Indicators in Sri Lanka



3.5 Comparison of Financial Sector Performance in SAARC Countries

For the purpose of comparison we use private sector credit to GDP and M2 to GDP as indicators of financial sector development. The M2 to GDP ratio is known as a measure of financial depth or the degree of intermediation in the financial system, it has been used widely in most of the studies including King and Levine, 1993, World Bank 1989; Gelb, 1989 and Calderon and Liu 2003 while the ratio of private sector credit to GDP helps to assess the quantity and efficiency of investments, it has been used in a number of studies including Levine and Zervos (1993), King (1993); Demetrius's (1996); Beck *et al.* (2001); Gregorio and Guiddoti.

Table 3.5 below gives a comparison of these two ratios for SAARC countries under study, this tables shows that in case of Pakistan M2/GDP is 50.05 percent which shows a less degree of financial depth than that of 64 percent of the Indian economy and 59 percent of Bangladesh but clearly higher than Sri Lanka. Further, the private sector credit to GDP ratio in Pakistan is 29.42 percent for the year 2007 higher than the Sri Lanka economy and lower

than rest of countries in the region. Private sector credit is the credit extended by the 'deposit money banks' to the private sector only. Comparing these ratios we come to know that Indian economy has high degree of financial liberalization, and reforms have been more fruitful in raising the credit available to investment activities. There is also improvement in the credit provision of Banglsdesh banks and Sri Lanka banking industry.

Table 3.5

Measures of Financial Deepening in SAARC Countries

Financial variables	Bangladesh		India		Pakistan		Sri Lanka	
	PSC/GDP	M2/GDP	PSC/GDP	M2/GDP	PSC/GDP	M2/GDP	PSC/GDP	M2/GDP
1980-85	9.1	20.3	24.6	39.6	23.5	15.3	26.7	31.1
1990	16.7	23.3	25.2	42.7	24.2	39	19.6	28.3
1995	21.6	29.3	23.7	45.2	24.7	46	29.9	37.6
2000	24.7	34.7	28.9	55.6	22.3	39	28.8	38.4
2001	27.8	45	29.1	58.7	21.8	39	28.1	39
2002	30.2	47.8	32.8	63.6	21.7	43	28.6	39.4
2003	30.2	48.3	32.1	64.0	24.6	46	29.9	40.8
2004	32.1	51.3	36.6	65.4	28.7	48	31.5	42.4
2005	34.0	44.7	40.6	66.5	28.6	49	32.8	43.3
2006	35.8	56	44.8	69.9	29	48	35.6	43
2007	36.9	59	48.3	64.7	29.4	50	33.5	39.9

Source: calculated from IFS 2008
PSC=Private Sector Credit, M2= Broad Money,

A major contribution by the financial sector reforms which were carried out during the 1990s has helped mentioned SAARC countries to grow faster and realize higher economic growth. Financial reforms policies have also helped towards establishing a more advanced financial system in the region. Apart from this, an increase in private capital inflows and foreign direct investments in these countries are the direct outcome of deregulatory measures. It can be noticed from Table 3.9, that not only in Sri Lanka but also in other countries, domestic savings have increased with the financial liberalization. Furthermore, capital formation has also increased in all countries. This proves that financial sector

reforms have contributed positively towards economic growth in these countries including Sri Lanka.

Table 3.6

Capital formation and Savings (percentage of GDP)

	Bangladesh		India		Pakistan		Sri Lanka	
	Sav	Cap	Sav	Cap	Sav	Cap	Sav	Cap
1990	13	17	23	26	14	19	13	21
2000	18	23	23	24	16	17	17	28
2007	22	26	26	27	18	19	19	31

Source: Taken from Asian Development Bank (Various Issues)
Sav = Domestic Savings as a percentage of GDP
Cap = Capital Formation as a percentage of GDP

Chapter 4

THEORETICAL MODEL, DATA AND VARIABLES

The literature suggests that there are two major channels, through which the financial sector affects economic growth. These channels include firstly capital accumulation which focuses on the financial sector's ability to enhance savings mobilization, which in turn attracts investment projects and thereby leads to economic growth. Secondly total factor productivity channel, which affects economic growth through innovative financial technologies, reduction of information asymmetries and monitoring of investment projects (Townsend, 1979; Greenwood and Jovanovic, 1990; King and Levine, 1993). Levine (1997) argued that a financial system can perform following functions:

- Resource Allocation
- Saving Mobilization
- Facilitation of Transactions
- Corporate Control

4.1 Models of Financial Development and Economic Growth

4.1.1 Keynesian Model

According to model developed by Keynes, money held by individuals is either for transaction purposes or speculative purposes. Demand for speculation motive is an outcome of decision about choosing between holding money or holding bonds. A negative relation exists between interest rate and incentive to hold speculative money balances. Keynesians model considers liquidity trap, which refer to a situation where the demand for money becomes infinitely elastic, i.e. where the demand curve is horizontal, so that further injections of money into the

economy will not serve to further lower interest rates. So the real money demand function can be written as:

$$(M/P)^d = a + \frac{b}{(i - \hat{i})} \qquad \text{where a>0, b>0}$$

Where a and b are parameters, i is market interest rate and $\hat{i}$ is liquidity trap. Market interest rate has inverse relationship to demand for real money balances. Keynesian model implies that in the presence of liquidity trap, planned investment is determined by real interest rate and the whole framework implies that high interest rate is not conducive for growth.

4.1.2 Neo classical Model

The main assumption of the neoclassical model is that capital market operates perfectly without any cost. Money is only for transaction purposes and has no direct influence on capital accumulation. While distinguishing between currency and deposit money can be considered as outside fiat money. In Neo classical model expression for real money balances can be expressed as.

$$(M/P)^d = f(Y, R_k, R_m)$$
$$f_Y > 0, F_{RK} < 0, F_{RM} > 0$$

Where Y *is* real capital, R_k is real rate of return on capital, R_M is real return rate on money. A positive relation exists between Y and $(M/P)^d$ due to transaction demand for money, hence holding large real cash balances will prevent the accumulation of capital. R_K is negatively correlated while R_M is positively correlated with real money balances.

4.1.3 The McKinnon-Shaw Model

McKinnon and Shaw developed two financial liberalization models which emphasize on different aspects of the effects of the raising interest rate. McKinnon model emphasizes the relationship between deposit rate and investment while Shaw's model stresses on the importance of lending and borrowing activities. With more supply of credit, financial intermediaries may promote investment and raise output growth through borrowing and lending. The McKinnon Shaw model has strong implications for financial development, which can begin by allowing the real interest rate to free flow according to market mechanism. The main difference between these models lies in the assumption about the way finance is raised[15].

4.1.4 McKinnon's (1973) Model

McKinnon's model assumes that capital market functions competitively with a single market rate of interest. These views cannot explain the role of capital markets in poor countries, as there are often characterized by fragmented rate of interest rate. McKinnon (1973) states that money and capital are compliments in developing countries where there is no efficient financial system. Complementarity hypothesis is a joint hypothesis where the demand for real money balances (M/P) depends positively on the real average return on the capital and the investment ratio. Investment ratio is assumed to be positively related to the real deposit

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[15] McKinnon's outside money (gold or cash) model considers that all finance is raised internally, while Shaw's inside money (debt that is used as money) model considers externally raised funds.

rate. The joint hypothesis implies that M/P and I/Y react positively to a rise in real capital and real money. McKinnon model can be expressed as:

$$(M/P)^D = f(y, R_K, R_M)$$
$$f_y > 0, f_{R_K} > 0, f_{R_M} > 0$$
$$I/Y = g(R_K, R_M); g_{R_K} > 0, g_{R_M} > 0$$

4.1.5 Shaw's Model

Shaw (1973) argued that high interest rates are essential in attracting more savings with more supply of credit. Financial intermediation may promote investment and increase output growth through borrowings and landings. Shaw (1973) stresses the importance of raising funds externally where money plays the role of credit and tangible medium of exchange. So complementarity has no role as investors are not constrained to self-finance. This model can be summarized as:

$$(M/P)^D = f(y, R_{opp}, R_M, T)$$
$$f_y > 0, f_{Ropp} > 0, f_{R_M} > 0, f_T > 0$$

y is real income, $(M/P)^D$ is real money balances, R_{opp} a vector of opportunity costs of money holdings, R_M is the real deposit rate of interest, and T is technological development in financial industry.

4.2 Theoretical Model

Following Berthelemy and Varoudakis (1996), and Jappelli and Pagano (1994) we adopted a theoretical model based on the endogenous growth, consisting of households, firms and financial sector. For simplification and to explain the household's behavior we have certain assumptions: First, the initial level of population is constant, second, households have made

claims to the financial sector, which gains a real interest rate *r*. Finally, real interest rate is equal to marginal rate of return on capital. Assume that households maximize the present value of their intertemporal utility function subject to budget constraint:

$$Maximize \int_0^{\infty} \frac{C_t^{1-\sigma} - 1}{1-\sigma} e^{-\rho t} dt \quad \text{.....(1)}$$

$$subject - to$$

$$\dot{V}_t = rV_t + w_t - C_t \quad \text{.....(2)}$$

Where U(C (t)) is Utility function, C (t) is consumption at time t, here the consumption function is concave, σ is risk preference, and ρ is discount rate. Equation (2) represents budget constraints, where V is amount of assets, $\dot{V}_t$ is change in amount of assets in time t, w is real wage rate and, C is consumption.

The preferences can be assumed as standard Ramsey-Type to ensure constant interest rate and consumption growth in the steady state situation (Barro, Sala i Martin, 1999). Equation (2) represents budget constraint which implies that changes in assets equals' interest rate income from assets plus wage income minus consumption. Firms use bank loans for external financing. Based on these arguments we can express the total factors productivity in the following ways

$$A_t = \phi K_t^{\eta} \quad \text{.....(3)}$$

ϕ is level of technological development; K_t is the amount of capital in the economy; this equation implies that technological development is a function of the amount of capital in the

economy (Japalli, 1993). The aggregate production function can be written in the following form.

$$Y_t = \phi K_t^{1+\eta} \quad \ldots\ldots(4)$$

Economies of scale are dependent upon the values of η. If $\eta = 0$ economy is constant returns to scale. To incorporate the role of financial sector in the production process, we further assume that domestic productivity depends upon the efficiency of financial sector. Therefore, we add coefficient F which increases with the development and efficiency of domestic financial sector (Sanchez-Robbles, 1997). Now our modified model takes the following form:

$$Y_t = F \phi K_t^{1+\eta} \quad \ldots\ldots(5)$$

Taking derivative of equation (5) with respect to K, we get the marginal productivity of capital.

$$\frac{\partial Y_t}{\partial K} = MPK = (1+\eta) F \phi K_t^{\eta} \quad \ldots\ldots(6)$$

If R= interest rate for bank loans, i is the mark up of banks. Following Berthelemy (1996) the arbitrage condition between deposits and productive capital will be:

$$R = (1+i) r \quad \ldots\ldots(7)$$

Equating above two equations i.e. MPK with real interest rate we get profit maximization condition for firms:

$$R = (1+\eta) F \phi K_t^{\eta} \quad \ldots\ldots(8)$$

Equations (7) and (8) can be rewritten in the following form:

$$(1+i) r = (1+\eta) F \phi K_t^{\eta} \quad \ldots\ldots(9)$$

$$r = \frac{(1+\eta)F\phi K_t^{\eta}}{(1+i)} \quad \text{.....(10)}$$

Since bank efficiency is determined by the distinction between the borrowing and lending rates, while markup i is the resource consumed by financial intermediation. Banks with higher intermediation cost show inefficiency and are costly for the economy.

Now we consider there is intensive competition and on average banks earn zero profit, under this assumption we implement optimal control technique for the construction of Hamiltonian:

$$H = U(C(t))e^{-\rho t} + \lambda(t)[rV_t + w_t - C(t)] \quad \text{.....(11)}$$

$$H = \frac{C_t^{1-\sigma} - 1}{1-\sigma} e^{-\rho t} + \lambda(rV_t + w_t - C) \quad \text{.....(11.a)}$$

Taking derivative of equation (11.a) with respect to C and setting $\frac{\partial H}{\partial C} = 0$

$$\frac{\partial H}{\partial C} = \frac{1}{1-\sigma}(1-\sigma)C_t^{1-\sigma-1}e^{-\rho t} - \lambda \quad \text{.....(12)}$$

$$C_t^{-\sigma}e^{-\rho t} - \lambda = 0 \quad \text{.....(12.1.a)}$$

$$C_t^{-\sigma}e^{-\rho t} = \lambda \quad \text{.....(12.1.b)}$$

$$\frac{\partial \lambda}{\partial t} = -\frac{\partial H}{\partial V} \quad \text{.....(12.2)}$$

$$\frac{\partial \lambda}{\partial t} = -r\lambda \quad \text{.....(12.3)}$$

Substituting value of λ from (12.1.b) into (12.3) we get:

$$\frac{\partial \lambda}{\partial t} = -rC_t^{-\sigma} e^{-\rho t} \quad \text{.....(12.4)}$$

(12.1.a) states that MU should be equated to the present shadow price of an additional unit of asset.

Now differentiating (12.1.a) with respect to 't'

$$-\sigma C_t^{-\sigma-1}.\frac{\partial C}{\partial t}.e^{-\sigma t} + C_t^{-\sigma}.e^{-\rho t}(-\rho) = \frac{\partial \lambda}{\partial t} \quad \text{.....(12.5)}$$

Comparing (12.4) and (12.5)

$$-rC_t^{-\sigma} e^{-\rho t} = -\sigma C_t^{-\sigma-1}.\frac{\partial C}{\partial t}.e^{-\sigma t} + C_t^{-\sigma}.e^{-\rho t}(-\rho) \quad \text{.....(13)}$$

Cancelling common factor and rearranging

$$-\sigma \frac{\dot{C}}{C} = \rho - r \quad \text{.....(14)}$$

$$\frac{\dot{C}}{C} = \frac{1}{\sigma}(r - \rho) \quad \text{.....(15)}$$

This equation states that consumption growth depends positively on the difference between interest rate and discount factor. Putting deposit interest rate to the Keynes-Ramsey condition and assuming that labor force stays constant (Romer, 1986), then

$$\frac{\dot{K}}{K} = \frac{\dot{Y}}{Y} = \frac{\dot{C}}{C} = g \quad \text{.....(16)}$$

Substituting value of r from (10) into (15) Therefore, the socially optimal growth rate can be written in this form:

$$g = \frac{1}{\sigma}\left[\frac{(1+\lambda)F\phi K_t^{\lambda}}{1+i} - \rho\right] \quad \text{.....(17)}$$

Equation (17) implies that the larger the intertemporal elasticity of substitution, higher is the growth rate of the economy. Furthermore, an economy grows on the condition that MPK is

higher than discount factor and MPK depends positively on the financial sector efficiency, if F grows, growth rate will be high. The relationship between economic growth and liquidity constraint is negative, as the markup of banks (1+i) which is also representing liquidity constraints is negatively related with g. Equilibrium conditions state that the growth will be larger though efficient banking system with lower markup and vice versa. The approximation of equation (17) can be written as:

$$g = g(fd, K_t, \rho_t) \quad \text{.....(18)}$$

Based on equation (18) and following Khan *et al.* (2005), the link between financial development and economic growth can be expressed as:

$$y_t = \beta_0 + \beta_1(FD)_t + \beta_2(SI)_t + \beta_3(R)_t + \varepsilon_t \quad \text{.....(19)}$$

Where y_t is log of Real GDP, *FD* is log of financial sector development, *SI* is log of Share of Investment in GDP, *R* is real interest rate and ε_t is error term.

4.3 The Variables and Data Description

Empirical analysis is carried out using annual time series data-set over the period 1975-2007. The purpose to choose this time period is that financial development and economic growth studies started to some extent in 1970. The variables used in the study are Gross Domestic Product (GDP) divided by CPI of four countries as an indicator for economic growth, the real interest rate as an indicator of deregulation, ratio of private sector credit to GDP as an indicator of financial sector development, Gross fixed capital formation relative to GDP as an indicator for share of investment in GDP. All variables except real deposit rate are expressed in logarithm.

(a) Real GDP

Real GDP is gross domestic product divided by CPI. GDP is the sum of gross value added by all residents producer in the economy plus any product taxes and minus any subsidies not included in the value of product. It is calculated without making deduction for depreciation of fabricated assets or for depletion and deregulation of natural resources. Data are expressed in millions of rupees. Data on real GDP have been taken from Yearbooks of International Financial Statistic (IFS) 2008, 2006, 2004 and 1990 published by International Monetary Fund (IMF).

(b) Gross fixed capital formation/ GDP

It is used as a proxy for investment Gross fixed capital formation include land improvements, plants, machinery, equipment, purchases, construction of roads, railways, and alike. Moreover it includes schools, offices, hospitals, and private residential dwellings, commercial and industrial buildings. Data on gross fixed capital formation have been taken from Yearbooks of International Financial Statistic (IFS) 2008, 2006, 2004 and 1990 published by International Monetary Fund (IMF).

(c) Real interest rate (RIR)

It is a proxy for deregulation and calculated by subtracting inflation from the deposit rate. Inflation is measured by the consumer price index which reflects the annual percentage change in the cost to the average consumer. Data on deposit rates have been taken from reserve bank of reserve bank of Bangladesh, Reserve bank of India, State Bank of Pakistan and Reserve Bank of Sri Lanka, while data on CPI for all countries

have been taken from Yearbooks of International Financial Statistic (IFS) 2008, 2006, 2004 and 1990 published by International Monetary Fund (IMF).

(d) Domestic credit to private sector/ Nominal GDP

It is an alternative measure of financial development and refers to financial resources provided to the private sector, such as through loans, purchases of non-equity securities, trade credits and other accounts receivable that establish a claim of repayment. It's an indicator of financial sector development. Data on credit to private sector have been taken from Reserve bank of Bangladesh, Handbook of statistic on Indian Economy, Hand book of Statistic on Pakistan Economy and Reserve Bank of Sri Lanka for Bangladesh, India, Pakistan and Sri Lanka respectively.

Chapter 5

METHODOLOGY AND MODEL

The econometric model outlined in Chapter 4 (equation 19) will be estimated in stages. In the first stage, an attempt will be made to analyze the time series properties of data by means of ADF unit root test. In the second stage, we check the Cointegration between the variables using Auto Regressive Distributed Lag model (ARDL) techniques developed by Pesaran *et al.* (2001). Finally short run causality have been estimated.

5.1 Stationarity

A variable is said to be stationary if its mean and variance are constant over time and the covariance between two time periods depends only on the distance or lag between the periods and not on the actual time at which covariance is computed (Gujrati, 1995). The concept of unit root test can be easily explained by assuming a first order autoregressive model $y_t = \delta y_{t-1} + \mu_t$ where μ_t is white noise error term. We subtract y_t-1 from both sides,

$$y_t - y_{t-1} = \delta y_{t-1} - y_{t-1} + \mu_t$$
$$y_t - y_{t-1} = (\delta - 1) y_{t-1} + \mu_t$$
$$\Delta y_{t-1} = \varphi y_{t-1} + \mu_t$$
$$\varphi = (\delta - 1)$$

Where Δ is first difference operator. We may test the null hypothesis like H_o: $\varphi = 0$ or $\delta = 1$ i.e. there is a unit root against the alternative hypothesis H_1: $\varphi < 0$ and in case H_o is not rejected then y_t follows a pure random walk model and the time series under consideration is non-stationary. In order to resolve the problem of spurious regression

caused by non-stationary series. The series is successively differenced till Stationarity is achieved, the stationary time series can then be used for regression analysis. A series which is differenced one times with respect to time and becomes stationary is said to be integrated of order one. Similarly when a series is differenced d times to make stationary is integrated of order d. so I (0) means d=0 and series is stationary.

5.2 Auto Regressive Distributed Lag (ARDL) Approach

Auto Regressive Distributed Lag (ARDL) approach is developed by Peseran and Shin (1996), Peseran and Peseran (1997), Peseran and Smith (1998), and Peseran *et al.* (2001). ARDL approach avoids the pre-testing problem associated with standard cointegration which requires that the variables be already classified into I (1) or I (0) (Peseran *et al.* 2001). Endogeneity problems or the inability to test hypothesis on the basis of estimated coefficients in the long run which are associated with the Engle-Granger methods, are avoided and the long run and short run parameters are estimated simultaneously with ARDL model.

Another desirable property of ARDL model is that a dynamic Error Correction Model (ECM) can be derived from it through simple linear transformation (Banerjee *et al.* 1993) which integrates the short-run dynamics with the long run equilibrium without losing long run informations. It is also argued that ARDL approach helps to avoid problems of non-stationary time series data (Shrestha, 2005). By considering these advantages we use bounds testing approach to cointegration within ARDL framework.

5.3 ARDL Representation of the Model

The variables included in this study are: real GDP, financial development indicator, share of investment in GDP, and real interest rate. The ARDL representation of economic growth and its determinants as outlined in equation (19) can be expressed by means of the following unrestricted error correction model.

$$\Delta(LY) = \alpha_0 + \sum_{i=1}^{p} \phi_i (\Delta L) Y_{t-i} + \sum_{i=0}^{p} \theta_i \Delta(LSI) + \sum_{i=0}^{p} \lambda_i \Delta(R)_{t-i} + \sum_{i=0}^{p} \gamma_i \Delta(LF)_{t-i}$$
$$+\delta_1 (LY)_{t-1} + \delta_2 (LF)_{t-1} + \delta_3 (LR)_{t-1} + \delta_4 (LSI)_{t-1} + \nu_t$$

Where (LY), (LF), (LR),), (LSI) are the natural log of real GDP, natural log of financial development indicator, real deposit rate and share of investment respectively, Δ is first difference operator and p is the optimal lag length. ,,, and , are the coefficients of the first differenced variables. They are shown with summation sign to represent the short run effects. The coefficients,,, and represent long run parameters. We estimated the same model for all the countries included in the sample to test the long run relationship between the variables concerned.

The F-test is used for testing the existence of long run relationship. The F test has an asymptotic non standard distribution under the null hypothesis of no Cointegration between the observed variables which depends on certain characteristics (1) whether variables included in the model are I (0) or I (1). (2) The number of regressors, and (3) whether the model contains an intercept and/or a trend. We consider unrestricted Error Correction Model (UECM) for each equation and joint significance tests are performed as follows.

5.3.1 Cointegration Tests to Determine Long run Relationship

The bounds testing procedure is based on the *F*-statistic. The asymptotic distribution of the *F*-statistic is non-standard under the null hypothesis of no cointegration between the variables of interest, irrespective of whether the explanatory variables are purely I (0) or I (1). Pesaran, *et al.* computed two sets of critical values.. One set assumes that all variables are I (0) and other set assumes that they are all I (1). If the computed *F*-statistic exceeds the upper critical bounds value, then the H_0 is rejected. . If the *F* statistic lies below the lower critical bounds value, it implies no cointegration, however If the *F*-statistic falls into the bounds then the test becomes inconclusive.

For growth equation we conducted Wald test by imposing restrictions on the lagged level variables. The null hypothesis for no cointegration among variables in equation (19) is H_0: $\delta 1 = \delta 2 = \delta 3 = \delta 4 = 0$ against the alternative hypothesis H_1: $\delta 1 \neq \delta 2 \neq \delta 3 \neq \delta 4 \neq 0$. Given a relatively small sample size (only 32 observations) for each country we used the values calculated by Pesaran and Narayan (2004), relevant for small sample size between 30 and 80. To find the long run parameters, we divide the coefficient of the lagged level GDP on the coefficients of F, SI, and R.

5.3.2 Testing Stability of Parameters

The stability of coefficients of all Error Correction Model must be tested for stability because they may vary over the time, because unstable parameters lead to misspecification bias. We tested series for serial correlation, normality, functional form test and hetroscedasticity related to the model. Following Behmani Oskooee and Ng (2002), we applied (CUSUM) and (CUSUMSQ) on shortrun dynamics and longrun

coefficients against the null hypothesis (regression equation is correctly specified). This cannot be rejected if the plot remains within critical bounds of 5% level of significance.

Chapter 6

ANALYSIS OF RESULTS

In order to examine the relationship between financial liberalization and economic growth, ARDL test of cointegration is conducted for Bangladesh, India, Pakistan and Sri Lanka. This chapter is divided into two sections. First section discusses the order of integration for all variables used in the study by means of Augmented Dickey Fuller (ADF) unit root test. In the second section we discuss the results of ARDL cointegration test conducted along with causality analysis.

6.1 Unit Root Test

We used standard Augmented Dickey Fuller (ADF)[16] unit root test to check the order of integration of all the variables. Results are reported in Table 6.1.

Table 6.1:
Unit Root Test Results

Countries	*Variables*	*ADF at Level*	*ADF at First Difference*	*Decision*
Bangladesh	LY	0.2798	-5.6977*	I(1)
	LSI	-2.1056	-5.9470*	I(1)
	LF	-4.9874*	-5.7362*	I(0)
	R	-3.3930*	-8.5649*	I(0)
India	LY	1.2278	-4.7681*	I(1)
	LSI	0.6130	-5.5844*	I(1)
	LF	-0.4195	-4.6211*	I(1)
	R	-3.4701*	-6.8655*	I(0)
Pakistan	LY	0.379	-5.5134*	I(1)
	LSI	-1.899	-4.6015*	I(1)
	LF	-0.362	-5.1378*	I(1)
	R	-3.6130*	-5.8424*	I(0)
Sri Lanka	LY	0.6297	-4.0687*	I(1)
	LSI	-1.3461	-5.1287*	I(1)
	LF	-1.5177	-5.4146*	I(1)
	R	-4.8956*	-9.4188*	I(0)

Note: * indicates significance at 5 percent

[16] The null hypothesis is that series is non-stationary or contains a unit root and

The results given in Table 6.1 show that for Bangladesh the real GDP and share of Investment in GDP are non-stationary at their level and stationary at first difference, while real deposit rate and financial development indicator are stationary at their level. For India, the real GDP, financial development indicator, and share of investment are non-stationary at their level and stationary at first difference, while the real deposit rate is level stationary. In case of Pakistan, the real GDP, financial development indicator, and share of investment are non-stationary at level and stationary at first difference, while real deposit rate is level stationary. While for Sri Lanka real GDP, financial development indicator, and share of investment are non-stationary at their level and stationary at first difference, while real deposit rate is level stationary. These mixed results provide justification for the use of Auto Regressive Distributed Lag (ARDL) cointegration technique.

6.2 Cointegration Analysis: ARDL Approach

To determine the Cointegration between real GDP (LRY), share of investment (LSI), financial depth indicator (LF) and real deposit rate (R) we apply ARDL cointegration technique introduced by Pesaran *et al.* (2001). For the purpose of estimation, we choose one lag[17] for variables. In order to find the cointegration between LRY, LSI, LF and R we imposed zero restrictions on lagged level variables and variable redundant test (i.e. F-test is performed for all four countries). The results for the cointegration test are reported in Table 6.2. The results show that for each country the calculated F-test is greater than the upper

[17] Our data sample is relatively small and we selected one lag arbitrarily.

bound of the critical values and hence we reject the hypothesis of no cointegration between the variables at 5% level of significance.

Table 6.2
Results of Bound Test to Cointegration

Countries	F-Statistics	Probability
Bangladesh[1]	07.22 (3.67)	0.0063
India[2]	13.85 (3.67)	0.0000
Pakistan[3]	18.47 (4.01)	0.0000
Sri Lanka[4]	11.10 (4.01)	0.0001

Note: Figures in parentheses show the critical values taken from Pesaran, *et al.* (2002). Hypothesis of no cointegration is rejected if the calculated value of F-stat is greater than the critical value.
1= unrestricted intercept, no trend and number of regressors k=3
2= unrestricted intercept, no trend and number of regressors k=3
3= unrestricted intercept, unrestricted trend and number of regressors k=3
4= unrestricted intercept, unrestricted trend and number of regressors k=3

After establishing the evidence of cointegration, now we are in a position to estimate the long run and short run estimates for model specified in equation (20) chapter 4. The results of unrestricted error correction model for each country are reported below:

6.2.1 Bangladesh

We have estimated unrestricted error correction model (UECM) for Bangladesh over the period 1975-2007. The results are reported in Table 6.3 which show that financial development has significant negative effects on real GDP in short run, which indicates that credit allocation has not resulted in an increase of real investment which may be one of the reasons for lower economic growth and in addition to private sector credit there are other channels available which affects the economic growth in short run, moreover it represents a weak performance of financial intermediaries for mobilization of savings that did not match the total volume of loans, it can also be explained by the existence of inefficient entrepreneurs to get maximum benefits from financial sector. Moreover the

Credit expansion has not caused expansion in investment and hence negative effects on economic growth.

In short run share of investment to GDP has significant and positive effect which implies that investment exerts positive impact on real GDP which is supported theoretically. Real interest rate has also exerted positive impact on economic growth which implies that during financial reforms period, positive real interest rate attracted more financial savings, increase in savings has opened the possibility for productive activities of investment to attain more funds at competitive rates.

In the next step we normalized the coefficients of lagged level variables by dividing on the coefficient of LY taking all other coefficients zero and hence obtained the long run elasticities. The normalized equation is given here.

$$LY = -0.45 - 0.75\,LF^{*} - 0.35LSI^{*} - 0.03R^{*} + 0.1D90 \quad \ldots\ldots (6.1)$$

In long run equation financial development is negative and significant which shows that private sector is not efficient enough to attract and use resources taken as loans from banking side. Banking sector crisis worsened due to adoption of inappropriate banking sector policies, existence of non-performing loans, activities of labor union, and allocation of credit to priority sector. Furthermore, by inactive and prolonged privatization policies caused inefficient entrepreneurs who were not be able to receive more advantage from banking credit. Real interest rate and share of investment possessing expected positive signs showing significant effects on economic growth, positive real interest rate is an indication of high rate of return on deposits and low inflation rate in the long run. Bangladesh captured the positive and

significant link between real interest rate and saving which positively affect the economic growth in both short run as well as in long run.

The coefficient of the adjustment is significant and -0.20 which implies that a deviation from the long run following a short run shock is corrected by about 20 percent. These findings are in line with the findings for Bangladesh by Habibullah (2007), and Kabir (2002). The estimated model passes different diagnostic tests given in the Table 6.3 such as serial correlation LM test, test for hetroscedasticity, Ramsey RESET test to check functional form misspecifications, test for normality. The CUSUM and CUSUM of Square tests (given in Figure 1 and Figure 2) also verify the stability of our model over time as given in (Figure 6.5) . These figures show that estimated standard errors are well within bands.

6.2.2 India

We estimated long run and short run parameters for India over the period of 1975-2007 and results are reported in table 6.3. our major findings include that financial development indicator in case of India possesses positive and significant effect in short run which implies Real interest rate has positive and significant effects on growth in short run implying that following the financial reforms process, financial institutions have developed which mobilized funds to more productive investment opportunities, and hence caused a positive effect over the economic growth. Real interest rate have a positive and significant effect on real GDP so we can argue that following financial deregulation saving has risen and a linkage between higher saving and productive investment caused high economic growth, which is in accordance with the Mckinnon and Shaw hypothesis. Share of investment has

positive and significant effect on economic growth which is implies that through multiplier effect investment has caused positive effect over economic growth.

In the next step, we normalized the coefficients of lagged level variable by dividing on the coefficient of LY taking all other coefficients zero and hence we obtained the long run elasticties. The normalized equation is given in equation 6.2 below

$$LY = -3.852 + 0.78\,LF^{*} + 0.46\,LSI - 0.007R^{*} - 0.01D90 \quad (6.2)$$

In long run, financial development variable has positive and significant effect on real GDP in longrun. This positive effect is because of expansion of financial sector network and provision of wider services in financial sector which caused growth to be high. Moreover, long run effects of share of investment and real deposit rate are positive and significant indicating lower inflation rate in the long run and high deposit rate, along with better investment environment for productive investment. The coefficient of the adjustment is significant and -0.55 which implies that there exists a mechanism in the model that prevents error term to be large and deviation from the long run following a short run shock is corrected by about 55 percent which implies that adjustment process is at high rate. The results given in this study are in line with the study conducted by Subhash and Manasvi (1997), and Levine et al (2000).

The estimated model passes different diagnostic tests given in Table 6.3 such as serial correlation LM test, White test for hetroscedasticity, Ramsey RESET test to check functional form misspecifications, Jarque Berra test for normality and CUSUM and CUSUM of Square tests of stability((Figure 6.5)) also confirm that estimated model is

stable and we rejected the possibility of instability of parameters and Overall fit of the model is also good.

6.2.3 Pakistan

We estimated unrestricted error correction model (UECM) for Pakistan over the period of 1975-2007. The estimates are given in Table 6.3, results suggest that our estimates possess expected signs and financial development, real interest rate are significant at 5% level of significance. There is positive and significant effect of real interest rate on economic growth which support the idea presented by Mckinnon and Shaw that it affects savings which positively affects real GDP. Positive and significant effect of financial development indicator is due to better functioning of financial intermediaries for mobilization of funds which help to accelerate investment and hence economic growth. This effect exists which can be explained through ability of financial sector for mobilization of savings and availability of credit for efficient investment projects that generate good returns and consequently cause economic growth to be high. Our results are in line with the findings of Khan (2005), Levine et al (2000), Khan and Senhadji (2000). Coefficient of share of investment possess positive sign which implies that there is positive effect of increase in investment share on real GDP through the multiplier effect, however the relationship of share of investment with real GDP is statistically insignificant because share of investment in GDP has been lower in Pakistan in 2005 as compared to 1995.

In the next step, we normalized the coefficients of lagged level variable by dividing on the coefficient of LY taking all other coefficients zero and hence obtained the long run elasticties. The normalized equation is given here showing a positive and significant effect of financial development indicator on economic growth in long run. It was because credit was given to productive sectors, it is clear from the equation that magnitude of financial development is higher than magnitude of real interest rate so we may conclude that availability of credit to private sector is more important than cost of funds.

LY = 0.96 + 1.66 LF** + 0.795 LSI + 0.067R** - 0.12D..... (6.3)

High real interest rate is associated with better investment activities and it brings more returns on capital, which further accelerates higher rates of economic growth. Share of investment have positive but statistically weak effect on economic growth indicator which can be attributed to weak institutional structure, macroeconomic and structural instability, weak governance and weak performance of investment activities at public and private sectors Khan (2005). Adjustment coefficient is significant and with expected negative sign i.e. -0.08 which implies that a deviation from the long run equilibrium following a short run shock is corrected by about 8 percent. This adjustment process is at very slow pace. Moreover, results supported the McKinnon Shaw hypothesis that increased real interest rate is associated with high savings and economic growth.

The estimated model passes different diagnostic tests given in Table 6.3 such as serial correlation LM test, hetroscedasticity test; Ramsey RESET test, Jarque Berra test for normality and CUSUM and CUSUM of Square tests of stability ((Figure 6.5)) also confirm that estimated model is stable. These results are same as presented by khan *et al* (2005), Ma

and Jalil (2007) to check an evidence of long run relation between finance and economic growth.

6.2.4 Sri Lanka

The short run and long run estimates of unrestricted error correction model (UECM) for Sri Lanka over the period 1975-2007 are given below. The results reported in Table 6.6 give positive and robust effects of financial depth on economic growth of Sri Lanka in short run which is indicating better channelization of financial resources for productive investment and improvement in financial sector structure by the introduction of financial reforms and expansion of financial activities. Real interest rates have expected and significant result in short run indicating that savings are better attracted for productive investment projects while Share of Investment has affected positively and significantly.

In the next step, we normalized the coefficients of lagged level variable by dividing on the coefficient of LY taking all other coefficients zero and hence obtained the long run elasticties. The normalized equation is given here.

$$LY = 0.024 - 0.78\,LF + 0.313LSI - 0.024R^{*} - 0.49D94 \quad \ldots\ldots\ldots (6.4)$$

In long run, real deposit rate (R) affects positively and significantly while Share of Investment LSI have positive and insignificant results. Financial depth LF has negative and insignificant effects on economic growth in long run. The adjustment coefficient is significant and -0.08, which implies that a deviation from the long run equilibrium following a short run shock is corrected by about 8 percent. This adjustment process is at very low rate. The estimated model passes different diagnostic tests given in Table 6.8 such as ARCH test for serial correlation and White test for hetroscedasticity, Ramsey RESET test to check

functional form misspecifications, Jarque Berra test for normality and CUSUM and CUSUM of Square tests of stability (Figure 6.5) also confirm that estimated model is stable.

Table 6.3

Results of ARDL Cointegration

Variables	BANGLADESH	INDIA	PAKISTAN	SRI LANKA
Intercept	-0.09	2.119**	1.252*	-0.002
D(LF)	- 0.34**	0.43***	0.08*	0.815**
D(LSI)	0.15***	0.190	0.021	0.032
D(R)	0.005*	0.004*	0.006**	0.004**
LY(-1)	-0.20	-0.55**	-0.083**	-0.083**
LF(-1)	-0.15***	-0.322**	0.138**	0.065**
LSI(-1)	0.07***	0.254*	0.066**	-0.026
R(-1)	0.006*	0.004*	0.005**	0.002
D	0.02	0.006	0.01	0.041*
R^2_{adj}	0.67	0.44	0.64	0.51
Serial Correlation LM Test	1.4768(0.1193)	1.3210(0.2192)	1.01(0.382)	0.2334(0.762)
Heteroscedisticity Test	2.3356(0.0413)	2.2168(0.0345)	2.1356(0.0233)	2.21(0.055)
Ramsey Reset Test	1.3876(0.1988)	1.4740(0.2153)	1.3125(0.3453)	1.211(0.1776)
Jarque-Bera Test	1.5677(0.3675)	1.5626(0.4123)	1.2876(0.1565)	1.289(0.556)
DW stat	2.30	1.46	1.81	2.11
F- Stat	10.15	28.53	14.82	9.76
SE of Regression	0.02	0.04	0.02	0.03

Note: *significance at 1% level, **significance at 5%level. ***significance at 10% level.

financial development reforms were taken in all countries at the same time, as it can be seen from the table above that India, Srilanka and Pakistan got the highest benefit from financial reforms while the outcome remained less fruitful for Bangladesh.

6.3 Short run Causality

After discussing the estimation results for each country we now come to short run causality test based on VECM. Table 6.6 reports the short run causalities among economic growth indicator LY, financial depth indicator LF, share of investment LSI and real deposit rate R for each country separately. Results shown in Table 6.6 are summarized as follows: In Bangladesh, India and Pakistan there is no evidence of causality in any direction between financial depth and economic growth. For Sri Lanka, we found an evidence of one way-causality between financial depth and economic growth that runs from economic growth to financial depth.

In Bangladesh, we found an evidence of bidirectional causality between real deposit rate and real GDP, while for India, Pakistan and Sri Lanka we are not able to reject the null hypothesis of no causality from Real deposit rate and economic growth or there is no evidence of causality in any direction between these two variables. Finally for Bangladesh we found an evidence of unidirectional causation running from (i) LY to R; (ii) LF to R; (iii) LSI to LY (iv) LSI to LF; (v) R to LY. For India one way causation from (i) LSI to LY (ii) LSI to LF; and (iii) LSI to R, for Pakistan unidirectional causality is found among (i) LSI to LY; and (ii) LY to LF. While for Sri Lanka, one way causation between LY and LF is found.

Evidence of no causality between financial development and economic growth in Bangladesh, India and Pakistan can be explained by the view of "Independent hypothesis" by Lucas (1988), who argued that economies overstress the role of financial factors in economic growth, similar evidence is given by Chandavarkar (1992) that financial development is not

considered as a factor of economic growth (Mahrizal and Majid, 2007). Singh (1997) also argued that finance does not matter for economic growth.

Evidence of one way causality from financial development to economic growth in Sri Lanka is in line with the "supply leading hypothesis" which states that financial institutions have potential to mobilize funds from the surplus units to the deficit unit of economy. However the evidence of one way causality running from economic growth to finance is in accordance with the "demand following view", given by Robinson (1952). This view implies that when there is growth in the real sector of an economy, it causes the demands of financial sector to be high and hence growth of financial sector development in the economy.

While the occurrence of bidirectional causality is explained by "feedback hypothesis", which is of the view that financial sector development has a potential to raise economic growth through changes in technology via innovations in product market. These innovations lead to further high demand of financial institutions which in turn causes economic growth to be high, so we can conclude that interdependent relation leads to bidirectional causality between financial sector development and economic growth.

Overall our results show that results are different because these are country specific. The variation in results is due to the nature of different financial institutions in these countries. These are in line with the report of (World Bank, 1993) that success of economic policies depend upon the institutions of each country economic policies are country specific.

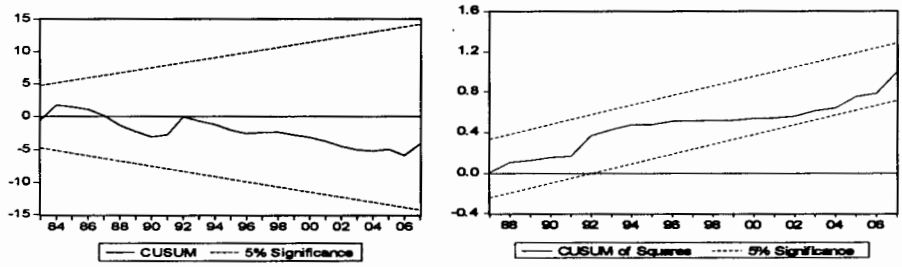
Table 6.7
Multivariate VECM Causality

	Dependent variable	*Table Independent variable*				
		ΔLY	ΔLF	ΔLSI	ΔR	ECT_{t-1}
Bangladesh	ΔLY	-	1.742	1.1278	24.577	-0.7134**
			(0.4186)	(0.5690)	(0.000)	(-2.1354)
	ΔLF	3.653	-	1.967	7.313	1.4321
		(0.1610)		(0.3739)	(0.0258)	(0.2134)
	ΔLSI	9.908	17.644	-	0.533	-0.3139
		(0.0071)	(0.0001)		(0.7660)	(-0.8283)
	ΔR	10.735	0.019	2.406	-	3.7621
		(0.0047)	(0.9903)	(0.300)		(0.1351)
India	ΔLY	-	0.404	20.677	0.9011	-0.1891
			(0.8171)	(0.0000)	(0.6373)	(-0.9933)
	ΔLF	0.304	-	11.220	2.097	1.3983
		(0.8587)		(0.0037)	(0.3505)	(0.2244)
	ΔLSI	1.374	-	-	0.071	-6.5881
		(0.503)			(0.9652)	(-0.6431)
	ΔR	0.694	3.566	8.577	-	-0.1891**
		(0.7070)	(0.1681)	(0.0137)		(-2.2610)
Pakistan	ΔLY	-	1.646	1.1032	4.839	-0.1960**
			(0.4391)	(0.5760)	(0.0889)	(-2.2621)
	ΔLF	3.566	-	2.221	0.626	0.1011
		(0.1681)		(0.0324)	(0.7311)	(1.5771)
	ΔLSI	1.646	0.079	-	2.231	0.1021
		(0.4391)	(0.9611)		(0.3278)	(1.2543)
	ΔR	2.781	0.684	1.409	-	-1.3252
		(0.2489)	(0.7103)	(0.4943)		(-0.9071)
Sri Lanka	ΔLY	-	3.586	2.593	2.701	-0.5031**
			(0.1665)	(0.2734)	(0.2590)	(-2.7001)
	ΔLF	18.913	-	2.509	0.5377	0.0385
		(0.0001)		(0.2851)	(0.7642)	(1.2651)
	ΔLSI	1.418	1.945	-	0.614	-0.1975
		(0.4922)	(0.3780)		(0.7357)	(-2.0431)
	ΔR	0.708	0.635	1.127	-	0.1865**
		(0.7018)	(0.7280)	(0.5694)		(2.2610)

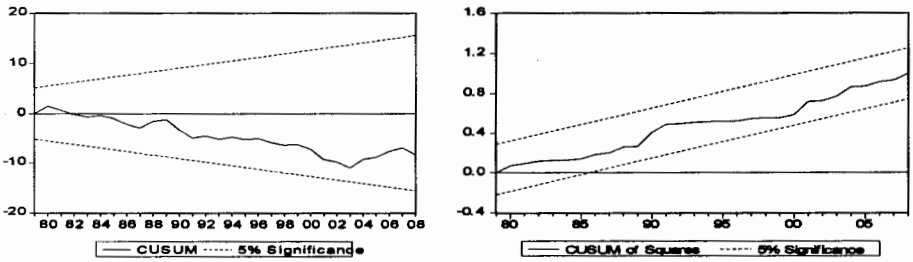
Note: *, ** and *** represent significance at 1%, 5% and 10% levels respectively. By normalizing the cointegrating vectors on the GDP as proxy for economic growth we derived ECT_{t-1}. *t-statistics* are given and values in parenthesis show probabilities for F-*statistics*, respectively.

Figure 6.5
Results of CUSUM and CUSUMSQ Test

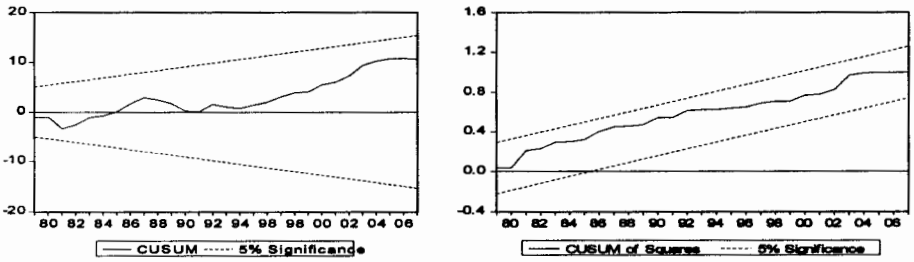
Bangladesh



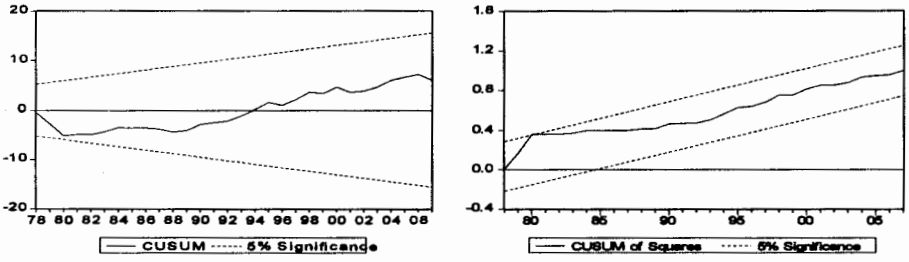
India



pakistan



Srilanka



Chapter 7

SUMMARY AND CONCLUSION

This study examined the link between financial development and economic growth, and discussed causality for four major SAARC countries namely Bangladesh, India, Pakistan and Sri Lanka over the period 1975-2007. The ARDL and vector error correction methodology is employed for empirical analysis. Our empirical findings show a mixed picture regarding the role of financial development and economic growth. Major findings of the study are summarized as follows:

For Bangladesh, financial development has significant and negative effects in short run as well as in long run. This shows the weakness of the banking sector in mobilization of financial resources, which did not match the total loan volume. Furthermore, the lack of proper infrastructure and business environment is also responsible for negative relationship between financial development and economic growth Habibullah (2002) and Kabir (2002). An evidence of positive and significant effect of real interest rate on economic growth is found which implies that real interest rate attracted more financial resources; increased savings opened the door to efficient activities of investment to receive funds at competitive rates, while share of investment possesses positive and significant effect on economic growth in short run. Moreover, no evidence of causality in any direction is found between financial development and economic growth.

For Indian economy, the results suggest that financial development has positive and robust effect in short run as well as in long run, implying a weakness of the banking sector in mobilization of savings that don't match loans volume. Real deposit rate along with capital output ratio are posing significant and positive impact on real GDP. Real interest rate has positive and significant effects on growth in short run and long run implying that saving has increased financial deregulation and a linkage between higher saving and productive investment has caused high economic growth.

For Pakistan, it is observed that financial development has positive and significant impact in short run but this effect is negative and insignificant in long run. Real deposit rates have the expected positive impact in both short run and long run. This implies that saving enhances investment and hence economic growth on deregulation has productive effects for growth. Causality results show that it runs from growth to financial sector.

For Sri Lanka, our results showed negative and insignificant effect of financial development on economic growth in the short run as well as in long run there is negative and insignificant effect due to inefficient state owned banking system. While real deposit rates have positive and significant effect in long run, the short run effect is positive but insignificant.

Overall, our results are in accordance with the supply leading growth hypothesis and Schumpeterian hypothesis implying that financial liberalization efforts have shown improvement in economic growth. On the basis of these results we conclude that the

financial reforms adopted by the countries since last two decades were not much as fruitful as expected to achieve good results for accelerating the economic growth either by efficiency improvement and competition or through raising resources for capital accumulation. There can be a number of reasons attributed to these findings and a few policy implications, which are given here:

- Most important implication of this study is that government should introduce long run policies for the economic growth of a country i.e. to modify and improve the structure of existing financial sector. Better financial institutions will provide the favorable environment for investment.
- The institutional environment, judicial system, law and order and quality of institutions, affect the economic activity and investment which in turn raises economic growth of the region. So a substantial attention may be given to improve them.
- A strong and healthy infrastructure is essential for successful and effective investment activities. Efforts should be made to improve and enhance investment friendly environment in these countries.
- There is a need for diversification of the modes of investment to enhance growth through raising the level of investment, enhancing competition, providing better environment for private sector's entry into the financial sector and reducing the share of government, providing easy access and opportunities for investment in human resources. There is also need to provide transparent and healthy legal environment for betterment of quality of institutions.

- These economies still lack modern financial instruments, required for enhancing the efficiency of the market in log run. In this context, there is need for provision of essential financial services. The government should play the role of supervision and provide adequate legislation for maintaining the volume of non-performing loans. Moreover government may accelerate privatization process further.
- Finally corporate governance is essential for an optimal functioning of the financial system and there is a need to accelerate the process of liberalization and to undertake the financial sector reforms on a middle scale. Furthermore, efforts should be made to introduce new technologies which will provide easy access to financial services in these countries.

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