

2005

Impact of Financial Sector Reform on Financial Intermediation in Bangladesh -An Empirical Assessment

Hassan, A.F .M. Kamrul

University of Rajshahi

<http://rulrepository.ru.ac.bd/handle/123456789/211>

Copyright to the University of Rajshahi. All rights reserved. Downloaded from RUCL Institutional Repository.

Impact of Financial Sector Reform on Financial Intermediation in Bangladesh – An Empirical Assessment



A thesis submitted to the Department of Finance and Banking, University of Rajshahi in partial fulfillment for the Degree of Master of Philosophy in Finance and Banking.

Supervisor

M. Mohsin Ali, Ph.D
Professor
Dept. of Economics
University of Rajshahi
Bangladesh

Submitted by

A.F.M. Kamrul Hassan
Assistant Professor
Dept. of Finance and Banking
University of Rajshahi
Bangladesh

Department of Finance and Banking
University of Rajshahi
Rajshahi, Bangladesh

March 2005.

Statement of Authorship

Except where reference is made in the text of the thesis, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis by which I have qualified for or been awarded another degree or diploma.

No other person's work has been used without due acknowledgement in the main text of the thesis.

This thesis has not been submitted for the award of any degree or diploma in any other tertiary institution.

A handwritten signature in green ink, followed by the date '01.03.2005' written in green ink. The signature is stylized and appears to be 'A.F.M. Kamrul Hassan'.


A.F.M. Kamrul Hassan

March 01, 2005

Certificate

I have the pleasure to certify that the dissertation entitled “Impact of Financial Sector Reform on Financial Intermediation in Bangladesh-An Empirical Assessment” is the original work of Mr. A.F.M. Kamrul Hassan. It is the candidate’s achievement and not a joint work. The dissertation is prepared under my direct supervision and guidance.

I also certify that I have gone through the draft and the final version of the dissertation and found satisfactory for submission to the Department of Finance and Banking, Rajshahi University for partial fulfillment of the requirements for the degree of Master of Philosophy in Finance and Banking.



M. Mohsin Ali (Ph.D)

Professor

Department of Economics

University of Rajshahi, Rajshahi,

Bangladesh

Acknowledgements

I would like to express my gratitude to my supervisor Dr. M. Mohdin Ali, Professor of Economics, University of Rajshahi for his invaluable suggestions and support throughout the process of writing this thesis. His insights and criticisms helped me greatly to improve this thesis. It would not have been possible for me to finalize the work without his heartiest cooperation.

I am greatly indebted to Mr. Shibley Sadique, Associate Professor of the Department of Finance and Banking, University of Rajshahi, for dedicating so much of his precious time in helping me understand Econometrics and econometric computer program *SHAZAM*.

I am also indebted to Dr. Muhammad Rafiqul Islam, Professor, Department of Finance and Banking, R.U. for helping me from time to time understand how to conduct research and write thesis.

I also thank all the seminar participants at the Department of Finance and Banking, R.U. for their valuable suggestions regarding the research work.

ABSTRACT

Financial sector of a country plays crucial role in the process of economic development by efficiently mobilizing financial resources among the most productive uses. This role of financial sector came in the forefront of development economics with the publication of two seminal works by McKinnon (1973) and Shaw (1973). Since then numerous empirical works supported the positive role of financial development in the process of economic development. Realizing this importance of financial sector, almost all developing countries in the world started reforming their financial sector since 1990 to make it more competitive and efficient.

Like other developing countries Bangladesh also started reforming its financial sector since early 1980s by privatizing two nationalized commercial banks. Formal Financial Sector Reform (FSR) was started by launching the Financial Sector Reform Project (FSRP) in 1990. This study makes an evaluation of FSR with respect to its impact on volume and effectiveness of financial development or intermediation. An econometric model is estimated for this purpose. Three measures of volume of financial intermediation used in the model as dependent variables are broad money (M2), private credit and bank deposit liabilities - all as percentage of Gross Domestic Product (GDP). Independent variables in the model are inflation, nominal exchange rate, interest rate differential, trade openness [= (Import + export)/GDP] and a dummy variable which takes '0' value for 1974-1989 and '1' for 1990-2002. Granger causality test shows that financial intermediation causes economic growth, for this reason economic growth is not included in the regression model as an independent variable. Before estimating the model time series property of the data series are examined and it is found that all variables are co-integrated, that is, long run equilibrium relationship exists among the variables. Two variables – exchange rate and trade openness – are found to be highly correlated. To avoid the problem of multicollinearity these two variables are included in regression model separately.

Estimation results show that financial intermediation deteriorated during the post reform period, i.e. during 1990-2002. Statistical test is conducted to examine whether effectiveness of financial intermediation, measured by the ratio of reserve money to total deposit and ratio of reserve money to quasi money, has been improved in the post-reform period and it is found that effectiveness of financial intermediation has not been improved during post reform period compared with pre-reform period. This deterioration of financial intermediation may be attributed to the stringent supervision on the banking sector in one hand and lack of effective legal support to recover bad debts on the other hand. Banks did not have suitable credit avenues that could be recovered without putting lending banks in trouble.

In order to make the intermediary functions of banks more effective and efficient, the study makes some recommendations which include (i) providing Bangladesh Bank with greater amount of autonomy so that it can conduct monetary operation independently; (ii) making legal procedure regarding loan recovery more easier and flexible; (iii) proper training of credit officials; (iv) seeking help from political organizations to prohibit unethical activities of Collecting Bargaining Agents (CBA); (v) ensuring law and order situation, corporate governance and accountability on the part of bank managements and; (vi) encouraging the development of more Non-bank Financial Institutions (NBFIs) to make the intermediary function of the financial sector, which is mostly comprised of commercial banks, more competitive, hence efficient and effective.

TABLE OF CONTENTS	Page
Statement of Authorship	i
Certificate	ii
Acknowledgement	iii
Abstract	iv
List of Tables	viii
Chapter 1 Introduction	1
1.1 Statement of the problem	3
1.2 Objectives of the study	5
1.3 Review of literature	5
1.4 Limitations of the study	23
1.5 Organization of the thesis	23
Chapter 2 Financial sector reforms in Bangladesh-An overview	25
2.1 Reasons for financial sector reforms in developing countries	25
2.2 Financial sector reform in Bangladesh-Background	28
2.3 Reform measures initiated under FSRP	32
Chapter 3 Methodology	52
3.1 Sources of data	52
3.2 Specification of model	53
3.2.1 Measures of financial intermediation	53
3.2.2 Determinants of financial intermediation	56
3.3 Diagnostic checking	63
3.3.1 Stationarity test	63
3.3.2 Autocorrelation test	64
3.4 Effectiveness of financial intermediation	65

Chapter 4	Findings of the study	66
4.1	Various tests	66
4.1.1	Granger-causality test	66
4.1.2	Stationarity test	67
4.1.3	Co-integration test	67
4.1.4	Multicollinearity test	68
4.2	Estimation results of finally selected regression models	69
4.3	Test of effectiveness of financial intermediation	74
4.4	Analysis of findings	75
Chapter 5	Summary, Conclusion and Recommendation	83
5.1	Summary and Conclusion	83
5.2	Recommendations	89
	References	95
	Appendix-2.A	101
	Appendix-2.B	108
	Appendix-2.C	112
	Appendix-3.A	119
	Appendix-4.A	123
	Appendix-4.B	127

LIST OF TABLES

Page

<u>Table</u>	<u>Title</u>	
--------------	--------------	--

2.1	Interest Rates on Deposits	29
2.2	Large Loan Limit	50
4.1	Unit Root Test	67
4.2	Correlation Matrix	68
4.3	Estimation Results of Regression equation 1a and 1b	70
4.4	Estimation Results of Regression equation 2a and 2b	72
4.5	Estimation Results of Regression equation 3a and 3b	73
4.6	Excess Reserve as a percentage of total deposit	78
4.7	Classified Loan: 1990/91 – 2001/02.	80
4.8	Aging Schedule for Suits Filed as on December 31, 2000.	81

Chapter – One

INTRODUCTION

Financial sector of a country plays a critical role in the process of economic development by efficiently mobilizing financial resources among the most productive uses. Development of financial sector, by reducing information asymmetry and transaction costs, encourages financial savings and investment. Since investment is critical for economic development, growth impact of financial intermediation (financial deepening) and development is significant. But this role of financial sector in the development process of a country was overlooked until mid-1970s. According to the early development economists, underdevelopment was caused primarily by market failure. So the policy prescription that follows this view was to impose economic regulation on financial sector in the form of interest rate ceiling (which is often referred to as 'financial repression'), selective credit allocation etc. This view of development economics came under severe attack with the publication of two seminal works by McKinnon(1973) and Shaw(1973). These two literatures generated a new dimension in the analysis of the relationship between economic development and financial deepening. They suggested that financial deepening or development (depth of financial intermediation) is an essential ingredient of the process of capital accumulation as reflected in savings and investment ratios and their productivity. This, in turn, contributes to economic growth. Financial Intermediation (FI) is best facilitated by a competitive financial system in which interest rates are market determined and administratively directed selective credit allocation is absent. It follows from this that both financial and real

sector development require a comprehensive package of financial liberalization that frees up interest rates to their market-clearing levels and eliminates administratively determined selective credit allocation (Chowdhury 2000).

Realizing this importance of financial sector, almost all countries in the world have been undertaking reform measures since 1970s. Motivation for reforming financial sector was different for developed and developing countries. In industrially developed countries it was triggered, to a large extent, by the phenomenon called “Globalization” of their banks and financial markets. But financial sector reform meant different thing in developing countries’ context. Due to adoption of interventionist development strategy by the government of developing countries during the period preceding the reform, mainly in terms of directing the resources of financial institutions (which were largely owned by the government) to state owned enterprises and priority sectors at below market interest rate, left them (financial institutions) financially ‘repressed’ or ‘distressed’ (Chowdhury, Moral and Banerjee, 2000). Therefore, the major aim of financial sector reform in developing countries were to liberalize the financial sector from repression with a view to improving saving-investment process, that is, improving financial intermediation and accelerating the process of economic growth through enhancing the efficiency of their financial sectors. Before 1990 Bangladesh had a financially repressed economy. So, like other developing countries, Bangladesh also started adopting a number of financial sector reform measures since 1990 with a view to enhance the efficiency of its financial system to mobilize financial resources and channel them in profitable investment opportunities. In this backdrop, this research study attempts to assess

whether the financial sector reform measures undertaken have been instrumental in bringing about positive change in financial intermediation. In other words, this study attempts to evaluate the impact of financial sector reform measures on financial intermediation in Bangladesh.

1.1 Statement of the problem

Traditionally economic growth has been analyzed within the macroeconomic framework where there is an obvious link between investment, savings and national production. Role of capital accumulation has been the most important determining factor of economic growth in all growth models. But no explicit inclusion of financial sector was made in those models. It is assumed that FI between savers and investors is perfect and costless. Challenges to this assumption assigned crucial role on FI in development process. It is argued that though FI does increase the transfer of funds across the economy, it is not costless and several types of leakages can occur between savers and investors (Gross, 2000). Presence of financial intermediaries helps improve efficiency in the distribution of capital but not at zero costs. When FI is imperfect and costly, a proportion of savings is lost such that the whole saving is not available for investment. Hence costly and imperfect FI leads to a direct negative effect on growth process. Thus FI occupies the central role in channeling saving into investments in economic development process of a country. This role of FI in economic development has received both theoretical and empirical support. However, the literature does not unanimously support this link of FI with economic growth where FI causes growth. Some studies support the view that there is no cause-effect relationship between FI and growth. According to this view the

observable between FI is merely the result of historical accident.

As economies grow, so their financial sectors, but where each is influenced by separate external variables (Graff, 2001). The view that FI cause growth is known as 'supply-leading finance theses'. According to this view the direction of causation is from financial development to growth. The findings in McKinnon (1973) Shaw (1973) and King and Levine (1993 a,b,c) support this view. In contrast to the supply-leading thesis there is 'demand-leading thesis' which views that the demand for financial services as dependent upon the growth of real output and the commercialization and modernization of agriculture and other subsistence sectors. Thus, financial system adapts itself to the financial needs of the real sector and fits in with its autonomous development, playing a passive role in the growth process (Garcia and Liu 1999, Berthelemy and Varoudakis, 1996a). Still there is another view towards the link between FI and growth. According to this view, a reciprocal relation exists between FI and growth. The reasoning underlying this view is that economic growth makes the development of FI system profitable. The establishment of an efficient financial system in turn permits faster economic growth. Thus there is a two-way cause-effect relationship between FI and growth.

From the above discussion it is clear that whatever the direction of causality, FI has been empirically proved to be an important factor in the growth process of an economy. Improved FI reduces cost and information asymmetry and keeps the wheel of the economy greasy. This efficient FI is possible only when a well

functioning, competitive financial system is present. Without a well functioning financial system efficient FI is not possible and without efficient FI society's savings cannot reach the right investment. Therefore, for a country that has undertaken financial sector reform measures, it is of paramount importance whether those reform measures have improved the FI in the economy. From this point of view the present research study aims to examine the impact of financial sector reform program on financial intermediation in Bangladesh.

1.2 Objectives of the study

The main objective of this study is to examine the impact of financial reform measures on the intermediative role of the banking sector in Bangladesh. In other words, this paper will investigate whether the financial reform measures have improved the intermediative efficiency of the banking sector. In doing so, two dimensions of financial intermediation will be examined – volume of intermediation and effectiveness of intermediation. Therefore, the specific objectives of this study may be outlined as under:

1. To examine whether the volume of financial intermediation has been increased in the reform period as compared to the pre-reform period.
2. To examine whether the effectiveness of financial intermediation has been improved in the reform period as compared to the pre-reform period.

1.3 Review of literature

Reforms of financial sector have been pursued over the last two decades in many developing countries as a part of broader structural adjustment programs. Reforms

of financial sectors were expected to bring about significant economic benefit, in particular, through a more effective mobilization of domestic savings and a more efficient allocation of resources. Reforms of financial system aimed at strengthening the role of market forces and competition in financial market through liberalization of interest rates and the introduction of indirect monetary policy instruments, by enhancing banks' financial soundness, and by promoting equity market. A number of studies have been conducted nationally and internationally, examining the impact of Financial Sector Reform Project (FSRP) on different aspects of economy. These research studies mainly focused on whether FSR measures have brought about any significant positive change in the desired fields of economy. This section presents the review of some literature related to the FSR in Bangladesh, then reviews some studies conducted on other developing countries.

Ahmed (1993) discusses various aspects of interest rate flexibility introduced in the banking sector since 1990 and its impact on savings and investment. By analyzing interest rate structure in Bangladesh for the period from 1985 to 1992 he shows that financial markets remains largely repressed even after flexibility introduced in determining interest rate on 1990 through Financial Sector Reform Project (FSRP). He observes that in the pre-flexible interest rate regime the real deposit or interest rate was negative, that is, nominally fixed interest rate lagged behind the prevailing inflation rate. In the administered interest rate period real return on savings was positive for the term-deposit, almost at par for saving deposit and negative for overall deposit when weighted average interest rate is considered. The same was also true for the post-flexible interest rate regime (1990-1992). In this

period though the rate of interest on one-year term deposit fell by 1 to 1.5 percent compared to that in the pre-flexible rate period, the weighted average rate of interest rate went up by 0.50 to 1 percent. In this period the inflation rate went down. Thus he argues that there was not much repression in money market in terms of interest rate for term and saving deposit in the post-flexible period. Ahmed concludes that flexibility of interest rate did not stimulate saving rate. He noted several reasons for this unexpected outcome: the flexible interest rate though seemed to be responding with the market forces, in reality it was not responding that way, the rates were periodically fixed up by the banks through informal discussion among them; also flexible interest rate alone could not bring the desired results, they could only bring it in conjunction with other rates in the money market, such as, bill rates and foreign exchange rates. He suggests that to make flexible interest rate functional, the authorities must introduce different short-term monetary instrument so that investors get the option to choose from and also money can change hands easily. He also notes that there should be an organized formal repurchase market where monetary instruments will bought and sold after the first issue. Interest rates fluctuate in competition with the other money market rates in a dynamic money market. If other reform measures are not brought forth, the flexible interest rate will be partially effective in influencing saving and investment decision.

Hassan (1997) examines the accomplishments of FSR measures undertaken in Bangladesh in four areas, namely (a) bad debt and loan recovery, (b) market reform and interest rates, (c) privatization of Nationalized Commercial Banks (NCBs) and development of private sector banking and (d) central bank autonomy. He examines

loan recovery situation in Bangladesh for the period 1989-1994 by analyzing data from (i) NCBS' loan classification data and (ii) Credit Information Bureau (CIB) data for the entire banking sector. He finds that in agriculture sector the rate of performing loan declined at an annual rate of 1.17% during the period 1989-1994 whereas loan portfolio grows at an annual rate of 11.07% in the same period. The loan default rate, however, improved from 36.58% in 1990 to 25% in 1994. Term loan grew at 30% per year and performing loan increased from 48% to 81% during the period 1989-1994. The non-repayment of loan declined from 20% in 1989 to 11.40% in 1994. Export lending grew at 33% during the period while performing loan increased from 80% to 87% from 1989 to 1994. Non-repayment rate varied from 0 to -0.25% in 1994 implying improved loan recovery position. Commercial lending grew at 9% over the study period. Non-repayment increased from -0.16% in 1991 to 6.62% in 1992. However it declined to 4.27% in 1994. Small industry loan increased at 23% during 1989-1994 period. Performing loan increased from 28% in 1989 to 35.72% in 1994. Non-repayment rate increased from 11.56% in 1989 to 56.62% in 1993 and declined to -27.60% in 1994. The overall portfolio (all sector combined) grew from Tk 90 billion to Tk 139 billion during the period 1989-1994 recording an annual growth rate of 11.60%. The study finds that domestic private banks increased their market share from 20% in 1986 to 27% in 1993. It also finds that private banks are better in terms of rendering services. However, denationalized banks were found to share many of the same problems as NCBs. Performance of private sector banks are generally found better than NCBs in terms of productivity and operational efficiency criteria but worse than NCBs in terms of allocative and distributive criteria.

In evaluating the impact of FSR on interest rates Hassan (1997) finds that the consequences of changes in interest rates are remarkable. The inflation dropped sharply which led to an unexpected increase in real interest rate. The high real interest rate for loan reduced demand for credit, while corresponding high rate on deposit rate increased flow of funds into banks. However due to rigidities in financial system, the desired flexibility of nominal interest rates and stability of real interest rate have not been achieved. The study concludes that the pricing by banks of their loan is not truly competitive. Finally the study discusses the twin issues of autonomy and independence of central bank of Bangladesh, Bangladesh Bank, which are very much essential from the perspective of financial sector in Bangladesh and forwarded some suggestions in order to make Bangladesh Bank a truly autonomous and independent institution.

Raquib (1999) makes an overall evaluation of different measures of FSRP. He notes that because of psychological rigidities to accept anything new, the speed of adaptability to reform was much slower than expected. Although initially included in the agenda, the restructuring of NCBs received less or slower attention. Continuous increase in the number of new private sector banks with rapid expansion of their branch network on the one hand and limiting further expansion of the NCBs on the other hand are found to be quite in line with the public banking policy of the government to promote free market oriented, competitive, sound and effective banking system in the country. But at the same time Raquib observes that the performance of the private sector banks as a whole are not up to the expectation in terms of quality of lending, non-performing loan, loan classification status and

overall management, as to create greater confidence among the customers, which, he notes, is responsible for not being able to capture the desired market share in the banking sector, although they offer better and qualified services. The study finds that substantial headway has been made in the areas of interest rate structure, monetary policy, bank regulation and supervision in establishing a market determined interest rate system in deposit banking and lending operation, activation of money market and foreign exchange market with least intervention of central bank. Despite these improvements benefits of market determined interest rates are yet to accrue to the depositors and new borrowers due to high interest rate spread (about 6% to 7%). In the area of bank supervision and regulation the impact of adoption of up-to-date modern supervisory technique both in off-site and on-site area and close monitoring of problem banks by Bangladesh Bank have arrested further deterioration in overdue and classified loan position of banks. At the same time the study observes that with the operation of task force of each bank including Bangladesh Bank for recovery drive the loan recovery position and quality of new lending have been improving. However, Raquib opines that a reform should have been made first to have a strong autonomous and independent Central Bank for a sound effective financial sector.

Chowdhury (2000) looks at the outcome of the FSRP from a different perspective. According to him success of any institutional reform largely depends upon the improvements of the moral norms that guide transactions among social agents. The study finds that some improvements have been recorded in competition and operational efficiency in banking sector. In the mid-1980s the NCBs had a share

of 69% in total deposits and 56% in total advances. Due to increased competition with private sector banks this shares declined to 60% and 51% respectively by the mid 1998. On the other hand private sector banks have increased their market share of deposit from 20% to 27% over the period from 1986 to 1998. With regard to efficiency, foreign commercial banks (FCBs) are found to have the best performance although they are not directly comparable with domestic banks as they have better technology and they serve niche market. Net profit per employee is found to be highest in FCBs with PCBs and NCBs in the second and third positions respectively. FCBs and PCBs are found to have better operational efficiency and productivity than NCBs and denationalized commercial banks (DNCBs). Deposit per employee in FCBs and PCBs are almost twice that in NCBs. An examination of cost structure shows that wages and salaries dominate NCBs expenditure, whereas it is interest payment that dominates PCBs and FCBs expenditure. Thus study finds positive impact of FSRP on efficiency, competition and productivity of banking sector. At the same time the study finds the performance of the banking sector in the area of loan default unsatisfactory. About 72% of total classified loan was categorized as bad as on 30 June 1997. The proportion of classified loan attributable to NCBs was about 66% in 1997. The study also finds urban bias in loan allocation and shift of resources away from the rural sector. Share of rural advance in total advance gradually declines, whereas share of rural deposit in total deposit secularly increased indicating a transfer of funds from rural to urban areas. The study also finds that there is a decline in rural branches, while the number of urban branches increased by nearly 8% during 1998.

In assessing the outcome of the reform measures Chowdhury (2000) cites political interference as the main obstruction in the area of loan recovery. He argues that without moral norms that guide transactions among social agents, donor-engineered formal institutional reforms become meaningless. He also emphasizes the role of civil society organizations in creating and maintaining ethical social behavior, especially when state agents themselves are involved in fraudulent activities. He also notes that in the absence of generalized morality and in a society where transactions are still guided predominantly by relationships, perhaps market oriented policy reforms may increase transaction costs. He concludes that effective implementation of an optimal policy mix depends on complex political and institutional factors- both formal and informal.

Stability of money demand function is a pre-requisite for the successful and sound operation of monetary policy having monetary aggregates as intermediate target. Latif and Bashar (2000) performed an econometric test of the impact of financial reform measures on the stability of money demand function in Bangladesh. They used quarterly data from International Financial Statistics (IFS), a publication of IMF for the period from 1974:2 to 1998:2. They used a very simple money demand function wherein aggregate real cash balances at time t is the function of nominal interest rate and aggregate real GDP at time t . The study uses both narrow and broad definition of money but reported only the estimation result using narrow money because statistical result obtained through using broad money was not satisfactory. Measured income and quarterly average time deposit rate are used as aggregate real GDP and interest rate variable respectively. In order to test the

stability of money demand function Chow's test of stability and CUSUM tests were conducted. Assuming that money demand might have become unstable since 1982 they split the sample in the 1982:2 for stability test. The first sub-sample is then extended by 2 years each time. Both short-run and long-run income elasticity are calculated for each sub-sample. They find that only for break points of 1982:2 and 1990:2 the Chow test statistic reject null hypothesis of parameter stability at 5% and 10% level of significance respectively. They also examined the pattern of change throughout the 1980s and 1990s using CUSUM and CUSUM SQ tests. They find that plotted cumulative residuals for the narrow money cross the upper critical limit at 5% level during 1982-87 and again during 1992-98. Thus their econometric estimation shows that real income and interest rate are the major determinants of money demand in Bangladesh and it also shows that money demand function became unstable during mid-1980s and during 1990s. However, they conclude that since the effects of financial reform measures are yet to complete, the stability of the money demand function should not be taken as guaranteed.

Introduction and implementation of FSR measures was a turning point in the conduct of monetary policy in Bangladesh. Khan (2002) assesses the impact of FSRP on different instruments of monetary policy operation. Bank rate, an important monetary policy instrument, has been changed more frequently after introduction of FSRP. It was changed only once during the period from FY 1973-74 to FY 1979-80, five times during FY 1980-81 to 1989-90. But after FSRP is launched it was changed fifteen times during FY 1990-91 to FY 2001-02. Thus after FSRP Bangladesh Bank used this monetary policy instrument more frequently than before to control

monetary aggregates. Reform in financial sector was expected to increase competition in banking sector. But Khan finds that competition in banking sector in terms of interest rate spread was in lesser degree as compared to pre-reform period. The spread between weighted average rate on advances and deposits increased from 5.87% in 1989-90 to 7.44% in 1993-94 and to 7.08% by the end of 2000. Thus he observes that interest rate spreads is increasing over the years in Bangladesh indicating lack of competitiveness in banking sector. With respect to Cash Reserve Requirements (CRR) and Statutory Liquidity Ratio (SLR) Khan finds that the use of reserve requirements as tool of monetary management was infrequent in Bangladesh before FSRP. Impact on loan classification of FSRP was found to be positive. The implementation of new loan classification procedure introduced transparency in the preparation of Profit and Loss statements and bank Balance Sheets. The capital adequacy standard of the banking system as a whole in found to have increased from 5.81% in 1992 to 6.30% in 1995 and further to 7.54% in 2000. This increase is impressive in case of Private Commercial Banks (PCBs), from 5.00% in 1992 to 11.29% in 2000, whereas in case of NCBs, it increased from 4.29% in 1992 to 5.36% in 1996 but further declined to 5.04% in 2000. Financial Loan Court and The Bankruptcy Act, enacted in 1990 and 1997 respectively, were intended to reduce loan default tendency. But Khan finds that by the end of 1999 the banks could recover only 9.41% of total litigated amount. The Bankruptcy Court at Dhaka settled 97 cases out of 177 suits up to December 2000. Out of 97 cases only 44 cases were declared bankrupt. Khan notes that big and influential defaulters remain outside the legal framework because of known reasons.

Choudhury, Moral and Banarjee (2000) made an evaluation of the impact of reforms in financial sector in Bangladesh. The objectives of their work were to study the pre-reform situation in the financial sector of Bangladesh, to examine reform objectives and measures, to evaluate the impact of reform measures and to offer suggestions for achieving the goal of financial discipline with operational efficiency in the banking sector. The study is conducted over the period 1990-1995. After a brief review of pre-reform situation in financial sector and different financial sector reform (FSR) undertaken, they review examine the impact of FSR on the financial sector, specially, on the banking sector. They evaluate the impact of FSR on the banking sector in terms of interest rate liberalization, capital adequacy requirements, loan classification, indirect monetary policy instruments, bank supervision, private sector banks, deposit growth, financial deepening, operational efficiency, profitability and productivity.

FSRP gave the banking sector almost full freedom to determine their own deposit and lending rates. In case of lending rates, banks enjoy full autonomy not only to determine their own rates for different borrowers, but also to charge different rates for different borrowers of the same lending class depending on the risk involved and maturity factors. The study observes that despite these flexibility and autonomy in fixing interest rates, the desired degree of competition is yet to be appreciably visible in the banking sector. The long practice of controlled and directed banking is cited as one of the important reason for this lack of competition. The study next evaluates FSRP's impact on capital adequacy and classification and provisioning of loans. Capital position of both NCBs and PCBs are found to have

improved in the post-reform period but it was still below the required level. Capital shortfalls as on 31-12-94 were around 8% and 13% on the part of the NCBs and PCBs respectively. This improvement in NCBs capital position was due to huge amount of capital injection (Tk 3000 crore) by the government. With regard to classified loan, it increased from 27% to 35% of total outstanding loan over the period 1990-1994. At the same time provisioning shortfalls increased from 32% to 40% of required provision. The study notes that the overall deterioration in respect of loan classification and provisioning was due to the inability in bringing about 'financial discipline' in the banking sector.

One important aspect of reform was strengthening of Bangladesh Bank in respect of introducing indirect monetary policy instrument and supervision over banks. The study observes that FSRP was instrumental in introducing indirect monetary management by way of providing technical assistance and training to Bangladesh Bank executives. The banking supervision by Bangladesh Bank has been restructured giving emphasis more on prudential aspects, than on economic aspects and off-site surveillance function. Improvement in the operation of NCBs was one of the important aspects of FSRP in Bangladesh. To achieve this objective FSRP introduced a number of effective and new management and operational tools, such as, Lending Risk Analysis (LRA), Large Loan Reporting System (LLRS), New Loan Ledger (NLL), Performance Planning System (PPS), Management Information System (MIS) etc. The study mentions that as on July 1995 around 15000 new large loans (of NCBs) have been sanctioned by applying LRA technique, 78% of new large loans have been covered under LLRS, 2400 branches are using NLL system, 4700

bankers are actively using computers and 225 personal computers (PCs) have been installed, monthly MIS reporting has been started and around 54000 days of training on various aspects of FSRP tools have been imparted. In evaluating FSRP's objective of expanding banking in private sector, the study finds that over the period from 1989-90 to 1993-94, the share of PCBs in total number of branches increases from 14.85% to 16.37%, in case of deposit, from 25.62% to 24.28%.

It is also observed that financial development, measured as the ratio of M_2 to GDP has increased in the post-reform period-from 30.23% in 1989-90 to 35.16% in 1993-94. But the study did not find any improvement in the performance of the banking sector in the context of branch and branch related variables - such as, growth rate of branch, urban-rural proportion, population coverage, effective coverage - all remained standstill. In terms of operational efficiency, profitability and productivity both declined in the post reform period. The overall finding of Choudhury, Moral and Banarjee (2000) was not very encouraging. *"The banks and bank managements are yet to be guided adequately by the market forces, financial discipline has not yet been brought back (rather deteriorated in terms of loan classification and provision), legal framework is still inadequate, especially in terms of enforcing lenders' resources on defaulting borrowers,... appreciable change in management attitude, operational efficiency of NCBs, and share of PCBs are yet to be seen, overall financial development/deepening has been observed but overall efficiency in terms of making the total banking system profitable is yet to be achieved"*.

Baden (1996) raises the gender issue in financial liberalization (FL) and financial sector reform (FSR). He argues that FL and FSR are not gender-neutral and

therefore, gender analysis has a place in the design and implementation of financial sector restructuring. He analyzed gender biases in financial markets in terms of borrowing, saving and lending. In general access to formal credit is limited for the non-corporate sector in developing countries (i.e. household, small enterprises and farms). Women's access to the formal credit is known to be even lower than this general low level. He showed that in Peru, India, Zaire, Chile, Morocco and Kenya women's share in credit ranged from merely 12% to 20% only. With regard to saving, limited access to formal financial institutions prevents women's savings from being used productively. Biases against women opening of savings account and women's need to have regular access to savings in order to meet emergency household expenses may exclude them from using interest bearing deposit accounts. With regard to lending, Baden (1996) mentions women's weaker position relative to men in recovering credit from male borrowers. As a result women lender supply credit to other women suggesting a market-segmentation along gender lines. Gender bias is also observed in the structure and organization of lending institutions and credit programmes, for example, the composition of staff by gender; the relative status and conditions under which women and men work; and the nature of interactions with potential and actual clients. Baden (1996) opines that these issues should be addressed while designing financial sector reform programmes to remove biases against women.

Brownbridge and Gayi (1999) evaluates the achievements, limitations and constraints of financial sector reform in eight Least Developed Countries (LDCs), namely, Madagascar, Malawi Tanzania, Uganda and Zambia in sub-sharan Africa

and Bangladesh, Laos and Nepal in Asia. The study finds that financial depth, as measured by bank deposit and M_2 as percentage of GDP, were facilitated in three Asian countries-Bangladesh, Nepal and Laos- after financial sector reform measures were undertaken. In Bangladesh bank deposit/GDP ratio rose from 20.84% to 28.90% and M_2 /GDP ratio rose from 24.55% to 33.80% between 1985 and 1995. But in the African countries, it did not occur. This positive impact of financial sector reform on financial depth in Asian countries is attributed to greater macroeconomic stability in these countries. All the LDCs experienced some new entry from private sector banks. For example, there were 20 private banks in Bangladesh in the mid-1990s with 28% share in the deposit market. But the increase in competition and its impact on efficiency was limited. The study identified some reasons for this limited impact; such as greater market power of the state-owned banks, slow pace of reform, private sector and/or foreign banks' reluctance to extend credit in rural areas, segmented credit market etc.

In examining the impact of financial sector reform on lending, the study finds that bank credit to the private sector as a percentage of GDP expanded strongly in Nepal since the mid-1980s and in Laos in the 1990s, while there was a small increase in this ratio in Bangladesh. But, except Uganda, that registered a small increase, all four African countries suffered sharp decline in private sector credit in the 1990s. Thus the overall impact of financial sector reform on financial system in the eight LDCs was not up-to the expectation. The study agrees that despite reform all LDCs face a number of constraints to the effective regulation and supervision of the financial system. Supervision is impeded by human resource constraints and there is

a shortage of qualified professionals in developing countries. Political interference is also cited in the study as another constraint. However, the study forwarded some suggestions in order to make future policy more effective, first, new entry by banks and non-bank financial institutions (NBFIs) should be allowed through cautious licensing procedure to ensure the probity and expertise of new entrants and to avoid supervisory capacities being overwhelmed by the number of financial institutions needing supervision, second, growth of different types of NBFIs to be encouraged to serve the segments of financial markets which are unattractive to the commercial banks, third, Micro Finance institutions (MFIs) to be encouraged to serve small scale borrowers without collateral, fourth, government commercial banks should be closed down or sold to private sectors whatever parts of them are saleable, because, with the exception of Malawi, none of the distressed government commercial banks in the sample countries is found to have demonstrated conclusively that it can be commercially viable on a sustained basis, despite costly and lengthy restructuring programs. The study concludes that the reforms have to be accompanied by sound macroeconomic, monetary and fiscal policies designed to attain low and sustainable rate of inflation. In addition, the financial position of banks and other financial institutions must be strong and programs for re-capitalizing weak banks have to be agreed.

Research studies concerning financial sector reform in Bangladesh so far conducted mainly focus on the impact of different financial sector reform measures on the overall financial system. Hassan (1997) reviews the performances of FSRP on different financial sector aspects like interest rate, bad debt and loan recovery,

privatization of banks, central bank autonomy etc. Raquib (1999) makes an overall evaluation of FSRP. Brownbridge and Gayi (1999) assess the progress, constraints and limitations of FSRP in some selected LDCs including Bangladesh. Choudhury, Moral and Banerjee (2000) evaluate the impact of reform in financial sector on the financial sector of Bangladesh, especially, on the banking sector. Chowdhury (2000) studies effects of national politics on the outcome of FSRP. However specific attention has also been given in some studies. Khan (2002) examines the evolution of monetary policy in Bangladesh in the pre and post reform period. Ahmed (1993) looks at the outcome of FSRP in respect of interest rate liberalization measure. Latif and Basher (2000) studied the impact of FSRP on the stability of money demand function in Bangladesh. Among these, no study paid special attention to the issue of financial intermediation. Although two studies (Brownbridge and Gayi, 1999 and Choudhury, Moral and Banerjee, 2000) discuss the impact of FSRP on, among other aspects, financial depth, it was in very limited form. They simply took the ratio of M_2 to GDP and compare them between pre- and post-FSRP period. No model building and econometric estimation of financial intermediation have been done so far. So it is seen that the existing literature seem to lack research works on some other aspects of financial sector reform in Bangladesh. Following issues still remain open to future research

- (i) In order to enhance the efficiency of bank personnel FSRP introduced a management tool called Performance Planning System (PPS), which comprises of setting a concrete goal on the part of a banker based on his

priorities to be achieved by well-defined action plan. Implementation and success of PPS still remains an untapped area of research;

- (ii) FSRP placed greater emphasis on proper training of bank personnel. How far this objective has been achieved deserves sincere research;
- (iii) Financial sector reform has important effect upon savings. No study covered this area so far.
- (iv) Baden (1996) raises the gender issue in financial liberalization (FL) and financial sector reform (FSR). He argues that FL and FSR are not gender-neutral and therefore, gender analysis has a place in the design and implementation of financial sector restructuring. In the context of Bangladesh, this aspect has not yet been examined.
- (v) Although two studies (Brownbridge and Gayi, 1999 and Choudhury, Moral and Banerjee, 2000) discuss the impact of FSRP on financial depth, it was in very limited form. They simply took the ratio of M_2 to GDP and compare them between pre and post FSRP period. But no research work focused on financial intermediation alone.

The role of financial intermediation in economic growth process is a recognized fact. So, this issue deserves serious attention. Moreover, financial intermediation has not been examined through econometric modeling in the context of Bangladesh. Thus it remains an area yet to be investigated in detail. From this view point, present study is an attempt to fill up this research gap.

1.4 Limitations of the study

The study is based on secondary data over the period 1974-2002, that is, 29 yearly observations are used. Thus the study is a small sample study. Data for longer period is not available. So the inferences made on the basis of econometric estimation would have been more reliable if the sample period were longer. Unavailability of data for longer period is a major limitation of the study. Another data related limitation of the study is frequency of observations. Annual observations on data are used in the study because of unavailability of data in shorter frequency. In case of shorter frequency data, such as quarterly or monthly, the econometric estimation procedure becomes more reliable and efficient. Besides, time constraint was another important limitation of the study. Had more time been devoted, quality of the research work would have been improved.

1.5 Organization of the thesis

The focus of this thesis is to explain the behavior of financial intermediation in Bangladesh before and after financial sector reform programs initiated by the Government in 1990. The whole thesis is organized in five chapters as follows:

Chapter One: In this chapter, after an introductory section, statement of the problem is narrated followed by objectives of this study. Next review of literature is presented which includes research work conducted at home and abroad in the related field. From this review research gap is pointed out and rationale of the present study is focused. Finally some limitations of the study is outlined.

Chapter Two: An overview of financial sector reform in Bangladesh is presented in this chapter. After brief discussion of the reasons for financial sector reform in

developing countries, background of financial sector reform in Bangladesh is discussed. Next different financial sector reform measures under Financial Sector Reform Project (FSRP) and Commercial Bank Restructuring Project (CBRP) are discussed.

Chapter Three: Chapter three presents methodology of the study. This chapter includes data sources, econometric model specification and different econometric diagnostic tests. In the specified model, financial intermediation is treated as the dependent variable and one period lag value of financial intermediation, inflation, interest rate differential, trade openness and financial sector reform are taken as independent variables. Thus the specified model turns to be an autoregressive model. Unit root and autocorrelation test procedures are described examining stationarity of time series and correlation among disturbances.

Chapter Four: Empirical results are presented in this chapter. Estimated coefficient of the regression model indicates the deterioration of financial intermediation after financial sector reform started in 1990. The chapter also presents empirical result of test of difference of efficiency in financial intermediation between pre and post reform period. The result shows that efficiency has deteriorated during post reform period.

Chapter Five: This is the concluding chapter of the thesis. The chapter begins with the summery and conclusion of the thesis. After summery and conclusion some specific recommendations are made so as to improve the volume and efficiency of financial intermediation in Bangladesh. The chapter and hence the thesis is concluded presenting some guideline for further research in this study related field.

Chapter – Two

FINANCIAL SECTOR REFORMS IN BANGLADESH- AN OVERVIEW

Financial sector reform that was started in Bangladesh in the 1980s gets momentum in the early 1990s by the introduction of FSRP. This chapter discusses different financial sector reform measures undertaken so far. The chapter begins with the identification of some reasons for initiating financial sector reforms in developing countries. Then the background of financial sector reform in Bangladesh is discussed followed by the descriptions of different reform measures undertaken so far in Bangladesh.

2.1 Reasons for Financial sector reform in developing countries

Since the early 1980s many developing countries started liberalizing their financial sector as a part of wider structural adjustment programs that included fiscal consolidation, reforms of exchange rate and foreign trade system, price liberalization, deregulation activities and other reforms with a view to enhance the functioning of their economy. The prime impetus behind liberalizing financial sector was financially repressed economy characterized by interest rate ceiling, government directives over allocation of credit and government ownership of financial institutions.

Financial markets subject to excessive controls are often termed as repressed financial system because such controls generally impede development of financial

sector. Authorities of developing countries often favor a repressed financial system since it allows them to exercise control over resource allocation. Beside direct and indirect interest rate control, other forms of interventions in the financial sector include large directed credit programs, public ownership of financial institutions and sizable public sector borrowing. In a financially repressed economy interest rates remain below its market-clearing figure thereby generating less than optimum amount of savings and thus detracting from the pool available for investment (McKinnon, 1973 and Shaw, 1973).

Ceiling on interest rate are maintained partly to encourage investment, partly to redistribute income and partly because government itself wishes to borrow cheaply. These ceiling in some countries have resulted in high negative real interest rate, especially in countries with rapid inflation. The negative real interest rate that many countries experienced during the 1970s discouraged the holding of financial assets (Hanson and Neal, 1985). Ceiling on interest rate hinders the growth of financial savings and reduce the efficiency of investments.

Another aspect of financially repressed economy is government intervention in credit allocation in order to direct credit toward the sectors that are to be at the forefront of development. Main instruments include required lending by financial institutions to specific activities, central bank rediscounting of credits to key sectors often at subsidized rates and the control of the financial intermediaries through direct ownership. The evidence suggests that government intervention in credit allocation has been an inefficient way of redistributing income. A World Bank study

has also found that the paucity of financial savings, due to government rationing of available credit to so-called priority sectors, has an adverse effect on economic growth by reducing both the volume and productivity of investment (World Bank, 1989).

Political institutions in developing countries are not transparent. They politicized the credit allocation process, which often lead to leakages of resources from the target groups or sectors. In many developing countries rapid credit expansion in priority sectors as per government directives without due attention to the quality of loans have left financial intermediaries unprofitable and in many cases insolvent. Weakened by large losses many financial institutions in developing countries have become less able to provide the various services desired from them. Their diminished capacity to improve allocation of resources has hampered growth and undermined some counties' attempts at structural adjustment (Long and Evenhouse, 1989).

Thus financially repressed economy characterized by administered interest rate, directed credit allocations and government ownership of financial institutions necessitated introduction and implementation of financial sector reform measures in developing countries. The most significant liberalization programs feature an interest rate policy, either in the form of interest rate liberalization or a more flexible management of administered interest rate. Many countries have curtailed their directed credit programs while few have eliminated them entirely. Competition among financial institutions has been prompted by opening domestic market to

foreign banks and easing restrictions on entry by domestic banks and non-bank financial institutions (Huda, 1992).

2.2 Financial sector reform programme in Bangladesh-Background¹

Until the early 1980s, Bangladesh had a highly repressed financial sector characterized by administered interest rate, government ownership of financial institutions, directed credits etc. In the early 1980s denationalization of public banks and permitting banks in private sector were introduced, but administered interest rate policy was in operation until introduction of FSRP in 1990. Lending interest rate was same for all banks, irrespective of ownership (public, private or foreign) though the factors influencing interest rate (i.e. cost of funds, risk involved, administering expenses etc) were different for different banks. Borrowing rates was also fixed for all banks. The fixed borrowing rates for all banks ignored the varying liquidity preference/ requirements for different banks (Rashid, 1994). The main demerit of administered interest rate is that it often leads to negative real interest rates. During the pre-reform period, nominal interest rates were lower than the prevailing inflation rate, i.e., real interest rate was negative. Ahmed (1993) showed that the financial sector was repressed in terms of real interest rates on savings through banks. He showed that during the period 1986-89 real interest rate on savings deposit was zero, it was positive in case of one-year term deposit and negative for overall deposit when weighted average rates are considered (This is shown in Table-2.1).

¹ Structure of the financial sector in Bangladesh is presented in Appendix-2.A

Table-2.1: Interest Rates on Deposits

Year	Rates on Saving Deposit	Rates on 1 Yr. Term Deposit	Weighted Average Interest Rates	Inflation	Real Interest Rate
1986-87	10%	14%	8.30%	10%	(1.70%)
1987-89	10%	13.25%	8.55%	10%	(1.45%)

Source: Ahmed (1993).

Until early 1980s there was no private domestic bank in the country. The government owned all banks. After liberalization, banks operating in Bangladesh (except those incorporated abroad) were nationalized. These banks were merged and grouped into six commercial banks, namely, Agrani, Janata, Sonali, Rupali, Pubali and Uttara Bank. Of these six commercial banks, Pubali and Uttara Bank Ltd. were subsequently transferred to private sector in the early 1980s. Due to this monopolistic existence, government intervened extensively in the credit allocation programs. These programs designated priority sectors, imposed compulsory lending targets and established refinancing facilities.

It has been recognized that the system of credit ceilings, refinancing (at concessionary rates) of loans to priority sectors and administered interest rate structure have been inimical to resource mobilization and efficient credit allocation. Credit had been largely disbursed in publicly directed sectors without commercial considerations. Administrative interest rates and rigid monetary policies created a non-competitive environment, which discouraged efficiency and service oriented banking (Huda, 1997). Financial sector was being used to service the need of the government and a few business houses with concomitant consequences of shallow financial system. The demand management aspect of macroeconomic variables was not properly taken care of. 'The internal control system of banks was weak, the

books of accounts did never reflect the actual health of the banks, the quality of assets of banks was never evaluated on strict accounting principles, the MIS was virtually non-existent in the banking sector, profitability and liquidity aspects of portfolio management was unfamiliar concept among the bank management personnel, the element of capital adequacy for banking operation were never given due weight' (Raquib, 1999). Along with this poor management aspect of banking sector, unwise government intervention in credit allocation and fixation of interest rates made the quality of asset portfolio of banks very weak. Lending rates, specially, in priority sectors, were kept at such a lower rate that did not cover risk factor and actual cost factors. As a result a huge proportion of asset portfolio became overdue. Moreover debt recovery performance was also poor due to inadequate law for debt recovery and ineffective efforts on the part of the bank officials themselves. All these led to decline in the profitability of the NCBs (Choudhury and Moral, 1999). With this background the government of Bangladesh started taking reform measures in the banking sector in the form of denationalization and privatization of commercial banks since the early 1980s. As a result two NCBs – Pubali and Uttara Banks were transferred to private sector with effect from January 1985² and Rupali Bank was partly denationalized in 1986 and 8 new private commercial banks (PCBs) were permitted to function in the banking sector (Choudhuri and Choudhury, 1993). It was believed that this reform would bring about competition and efficiency in the banking sector. But as the regulatory structure and legal framework for debt recovery was not reformed, the post-1982 period witnessed further deterioration in operational efficiency. Undue influence of vested interest groups in the credit

² Schedule Bank Statistics, January-March Issue, 2003

decision-making process of banks, both NCBs and PCBs, was also prevalent in the same period, which gave rise not only to misallocation but also no-repayment of credit. Banks were not even required to report the status of their asset portfolio (loan classification, provisioning and loan losses) in their financial statements. The profitability of banking institutions declined from 0.32% to 0.11% during 1982-83 to 1989-90 period (Choudhury, Moral and Banerjee, 2000). In short banking structure in Bangladesh during 1972-89 was characterized by excessive government interference, absence of prudential and information regulations in the overall regulatory structure and inadequate legal support for debt recovery, which ultimately reflected in declining profitability of the banking system (Choudhury and Moral, 1999). Consequently need for a structured reform measures was felt which was resulted in the appointment by the government of National Commission on Money, Banking and Credit (NCMBC) in 1984 in order to identify the problems and suggest means for efficient management of the banking system in Bangladesh. The NCMBC submitted its report to the government in 1986 identifying the problem areas in the financial sector with specific recommendations to bring about the structural, institutional, policy and legal reforms. Subsequently a World Bank Mission made an in-depth study of the banking sector and suggested reforms relating to (a) fixation of interest rates on deposit and advances, (b) classification of overdue credits, (c) restructuring of capital of NCBs and PCBs and Market orientation of banking transactions (Task Force Report-1991). In response to the above reports the government of Bangladesh launched the Financial Sector Reform Project (FSRP) in 1990 under a financial sector adjustment credit of the International Development

Agency (IDA) (Chowdhury, 2000). The first phase of which is completed in 1996. The financial sector reform is a continuous process, which is being carried out in its second phase under the name of Commercial Bank Restructuring Project or CBRP (Raquib, 1999).

2.3. Reform measures initiated under FSRP

Although reforms in banking sector in Bangladesh started in the early 1980s through privatizing banking institutions, the first comprehensive and well designed reform process started by launching FSRP in 1990. It took into account the then problems in the banking sector and addresses the following issues:

- Interest rate liberalization,**
- Loan Classification and provisioning,**
- Capital adequacy,**
- Indirect monetary management,**
- Legal reforms,**
- Strengthening of central bank,**
- Strengthening of bank supervision,**
- Improving operational efficiency of commercial banks.**

Interest rate liberalization: The single most important aspect of FSRP was to liberalize the interest rate policy. In January 1990 Bangladesh Bank introduced a flexible, market oriented approach to interest rate determination with lending rates that better reflect cost of lending and deposit rates that better reflect market forces in place of centrally administered interest rate policy. It also abolished

sector specific concessional refinance facilities. Under the liberalized interest rate policy, individual banks were allowed to fix their own rate of interest freely within the interest rate band prescribed for different types of loans, advances and deposits. Lending band were determined on the basis of shadow rates, i.e., on the basis of cost of funds, returns on capital, risks and operating costs and deposit rate bands were determined taking into consideration the expected rate of inflation so that the real rates of interest become positive. In 1992 (vide BCD Circular No.7, dated 09-03-1992) this interest rate band system was withdrawn except for three sector-export, agriculture and small & cottage industries. Now banks are free to fix the interest rates for lending on the basis of commercial and financial considerations. Banks are also allowed to charge differential interest rates on the basis of risks attached to the borrowers and term loans on the basis of maturity periods (Chowdhury, 2000). In 1997, vide BRPD Circular No.01, dated 11-02-1997, Bangladesh Bank removed the floor rate on deposits and at present banks are free to fix up their deposit rates on the basis of market forces.

Loan Classification and provisioning³: There is always a requirement for banks to systematically and realistically identify their problem assets and provide adequate reserves for possible losses. But, in the past, the commercial banks did not follow any norms to classify their bad and non-performing loans and there was no uniform system with regard to interest suspense. Banks did not keep provisions for their poor quality assets. As a result the balance sheets did not reflect the banks' actual condition and the income statements overstated profits

³ A review of loan classification and provisioning is presented in Appendix-2.B

upon which dividends and taxes were paid (Moral, 2000). To get rid of this problem Bangladesh Bank issued guidelines in 1989, vide BCD Circular No. 34, dated 16-11-1989, regarding the classification and provisioning procedure. Loans are classified into four categories: unclassified, substandard, doubtful and bad loss.

Capital Adequacy: Capital is an important internal insurance to cover losses of loans and capital adequacy is the measure of the soundness and financial health of a bank which deserves very much importance in current competitive and innovative banking to command credibility with bankers and customers at home and abroad (Moral, 2000). Before introduction of FSRP this importance of capital adequacy of banking institutions in Bangladesh was not given due attention. Almost all banks were under capitalized and because of provision shortfall and deteriorating condition of asset quality, the banking sector faced further erosion of capital. Keeping in mind the importance of capital in the banking business, minimum capital adequacy guidelines based on Capital-to-Liabilities was incorporated in section-13 of the Banking Companies Act, 1991 which necessitated banks to maintain 6% of total time and demand deposit as capital. But very few of the banks could fulfill this requirement (Raquib, 1999). Hence to safeguard the interest of the depositors and bring about a universally accepted status of the banking sector, risk weighted capital adequacy requirement is introduced in January 1996 (vide BPRD Circular No.01, dated 08-01-1996), which made it mandatory for banks to maintain 8% of the assets in risk weighted

manner.⁴ The risk based capital system primarily deals with credit risk and explores the possible ways to handle other risks. It is, in fact, a significant prudential regulatory instrument in assessing banks' capital position and disciplining their market behavior (Moral, 2000).

Indirect Monetary Management: Prior to 1990, Bangladesh Bank relied upon certain direct controls to execute monetary policy such as administered interest rates on lending and borrowing, credit quotas and ceiling, margin on imports etc. FSRP emphasized on the movement toward more flexible control of monetary instruments. It emphasized on the introduction of indirect instruments of monetary management to mop up excess liquidity of banks to contain inflationary pressure of the economy. Accordingly 91-day Bangladesh Bank Bill was introduced in December 1990 to fulfill this objective. Banks, financial institutions, corporate bodies and individuals are allowed to purchase these bills through tender.

Legal Reforms: A suitable and effective legal framework is of crucial importance for the central bank in order to enforce prudential regulation on the financial institutions in the economy. Because, if, due to lack of suitable and effective legal framework, banks cannot take necessary actions against default borrowers, flow of credit in the financial system would be disrupted. In order to enable financial institutions, especially banks, to resort to legal actions in case of non-payment of loan, a variety of legislations were enacted. These legal reform are as follows:-

⁴ Risk-based Capital Adequacy Plan is presented in Appendix-2.C

- i. Before 1990 banking companies in Bangladesh were guided by the Bank Companies Act-1962 which became outdated with respect to meet the needs of private banks and NCBs in the changed environments and called for a change. As a result it was replaced by the Bank Companies Act-1991, which provides with wide range of power to Bangladesh Bank to deal with banking sectors' monitoring, regulation and supervision.
- ii. Financial Institutions Act-1993, replacing Non-Bank Financial Institution Order-1989, was formulated to deal with the affairs of Non-Bank Financial Institutions (NBFIs). As per provision of this Act, cautious approach is taken to issue license for new NBFIs and monitoring and supervision of the existing NBFIs are made to ensure their sound operation.
- iii. In addition to the above, the Money Loan Court Act-1990; the Securities and Exchange Commission Act-1993; the Depository Bill-1999 and the Bank Depository Insurance Act-1999 have also been enacted to deal with problems in respective areas. Adequate number of financial loan court has been created to deal exclusively with bank loan defaulters.
- iv. Besides, suitable amendments of Bangladesh Bank Order-1972 were done to ensure Bangladesh Bank's regulation over all banking and non-banking financial institutions (NBFIs). The Bank Companies Act-1991, the Money Loan Court Act-1990, the Securities and

Exchange Commission Act-1993 and the Negotiable Instruments Act of 1881 were amended in the light of the experience of their applications and as, the Insolvency Act-1920, the Insolvency Act, Dhaka-1909 were found to be totally inadequate to deal with the problem of bankruptcy, a new Bankruptcy Act was passed in 1997 (Choudhury 2000).

Strengthening of Central Bank: For efficient monetary management existence of a strong Central Bank is of crucial importance. FSRP placed due emphasis on this aspect of monetary affairs of the economy. A full-fledged new department, called Monetary Management and Technical Unit, is established with the responsibilities of formulating monetary, credit and reserve money programs, interest rates and exchange rate policies. The unit also monitors the developments in the fields of money and banking. A Credit Information Bureau (CIB) has been set up to provide ready information on default borrowers to the banks. The following steps were taken to strengthen the institutional capability of Bangladesh Bank:-

- v. The Bangladesh Bank has been empowered to issue license, monitor and supervise the activities of NBFIs through the Financial Institutions Act-1993;
- vi. The appointments of Chief Executive Officer (CEO) of PCBs have been made subject to the approval of Bangladesh Bank and Bangladesh Bank has been given the power to remove the

directors/board of directors of PCBs under the Bank Companies Act-1991;

- vii. The appointments of chairmen, managing directors and directors of NCBs and government owned financial institutions have been made subject to the approval of Bangladesh Bank and Bangladesh Bank has been given the authority to recommend the removal of members of the board of directors of NCBs;
- viii. Approval from Bangladesh Bank has been made necessary in cases of large loan exposures of banks and financial institutions, and
- ix. The Bangladesh Bank has been empowered to impose penalty without resorting to court proceedings.

Strengthening of bank supervision: Bank supervision is necessary to ensure the intermediation function of banking institutions properly. Before 1990, bank supervision focused on the implementation of economic directives, or to ensure banking activities in compliance with government directives (Choudhury *et al* 2000). Since 1990 bank supervision has become concerned more with prudential aspects and less on economic aspects. FSRP introduced a number of measures to strengthen the bank supervision function of Bangladesh Bank. Some important aspects of bank supervision introduced by FSRP are as follows:-

1. Off-site supervision has been introduced and a unit has been set up for this purpose in the Department of Banking, Operation and Development. Off-site supervision is conducted through monitoring reports and statements submitted by banks to Bangladesh Bank. The

central issue of off-site supervision is to ensure overall soundness of the banks. The banking system in Bangladesh suffered a serious set back due to widespread loan default which resulted in a substantial capital erosion. This trend is a serious threat to the viability of the banking system and as such early warning system on the basis of CAMEL rating has been introduced by Bangladesh Bank, which form the most essential element of Off-site supervision (Moral, 2000). According to CAMEL, overall strength of a bank is determined on the basis of information collected from individual bank with respect to Capital adequacy, Asset quality, Management effectiveness, Earning performance and Liquidity, which is known as CAMEL rating. On the basis of this rating Bangladesh Bank has started giving Early Warning Signal (EWS) to banks with unsatisfactory rating.

2. To help in asset quality supervision, one Credit Information Bureau (CIB) has been set up in Bangladesh Bank. The main function of CIB is to supply report to the commercial banks about the status of a borrower with regard to his liabilities outstanding with any other banks before considering his loan proposal. The aim of CIB report is to avoid duplication of credit facility, to avoid credit facilities to defaulters and to justify the status of the borrowers.
3. Lending Risk Analysis (LRA), another aspect of bank supervision, is a new management and operation tool for improving the credit risk calculation initiated by FSRP in 1993. It focuses on the determination of

the degree of risk of non-repayment of loan by a particular loanee and thus has been helping bank managements in taking loan decisions on the basis of this analysis. It has been made mandatory for all banks to follow this technique for loan above Tk. 1.00 crore. Even some banks are using this technique for granting loan below this limit. Sonali and Janata banks have reduced the LRA limit from Tk.1.00 crore to Tk.50.00 lac. Agrani bank uses this technique for loans above Tk.25.00 lac, followed by National Bank Ltd. for Tk.20.00 lac, Rupali bank has reduced this limit to Tk.75.00 lac (Moral, 2000). According to FSRP's own estimate, as on July, 1995, around 1500 new large loans (of NCBs) have been sanctioned by applying LRA technique (Choudhury *et. al*; 1996). Through determining a particular risk level, the LRA technique is supposed to ensure that low risk borrowers should pay lower lending prices and high-risk borrowers should pay higher prices as risk premium.

4. One of the prime causes of loan default is extending credit to privileged group. This group may consist of insider parties or individuals or firms connected through ownership or with the ability to exert control-directly or indirectly. Such credits generally do not meet the same standard as that extended to outside borrowers and the amount of credit often exceed prudent limit. In order to supervise this issue and prelude the problem of connected lending Banking Companies Act has been amended suitably.

Improving operational efficiency of commercial banks: Improvement of operational efficiency of commercial banks was one of the important aspects of financial sector reform in Bangladesh. Because first line of defense against bank insolvency and financial system distress is the quality and character of management of banks (Polizatto, 1992). The major aim of FSRP stationed at Bangladesh has been to improve the operations of NCBs through development of new banking technologies, computerization of banking operations, up gradation of the skills of human resources of the banks, changing the back-dated internal banking practices and corporate and credit cultures etc. (Choudhury *et. al.*, 2000). Under FSRP following measures were introduced for improving operational efficiency of banks:-

1. *Performance Planning System (PPS)*: It is a management tool under which NCB managers are required to develop a small number of clearly defined and quantifiable goals for the year. The manager sets goals on the basis of his priority followed by a well-defined action plan to achieve those goals. Through this goal statement and action plan, not only the concerned banker can keep himself up to date in terms of his performance, but it also facilitates his boss to monitor the progress of his subordinates including those concerning loans and advances. PPS has been introduced in all NCBs for recovery and other functions. Sonali Bank introduced PPS in 1993 and covered 1233 branches, Janata Bank introduced it in 1994 and covered all 893 branches except overseas branches, Agrani Bank introduced PPS in 1993 and covered

903 branches, Rupali Bank Ltd. introduced it in 1995 and covered 517 branches except overseas branches (Moral, 2000).

2. New Loan Ledger Card (NLLC): It is system that requires bankers to keep account-by-account records which was not in practice in the pre-reform period. NLLC is a post disbursement tool for monitoring loan and advances. It was observed that the old loan ledgers of the NCBs did not contain adequate data to monitor their credit portfolio effectively. To facilitate monitoring FSRP designed the NLLC for repairing those old records kept on the basis of account-by-account data.
3. Large Loan Reporting System (LLRS): LLRS has been introduced by FSRP to monitor large loans more closely on a regular basis. Bangladesh Bank has established a Large Loan Review Cell (LLRC) to review all newly sanctioned, renewed and rescheduled loans by scheduled banks over Tk.1.00 crore (Moral, 2000). Such review will see whether the any loan carries undue risk. If a loan is found to carry undue risk the LLRC will advise the respective bank to take appropriate action immediately.

Besides, FSRP has placed due importance on the introduction of Management Information System (MIS), computerization and staff training for improving operational efficiency of commercial banks.

Financial Sector Reform Project (FSRP), a part of a continuous process of financial sector reform measures ended in 1996. Choudhury and Moral (2000) judged the effectiveness of FSRP to restore financial discipline in banking sector in terms of

capital adequacy and classification and provisioning of loans. Till 1995 banks were required to maintain 6% of total time and demand deposit as capital. As on December 1994, even after injection of a large amount of fresh capital, capital shortfall in NCBs was 8%. At that time this figure was 13% in case of PCBs. Since 1996 Bangladesh Bank started calculating capital of commercial banks as per international standard of 8% of risk-weighted assets. According to new requirement capital shortfall in NCBs and PCBs increased to 30% and 20% respectively. Classified loan as a percentage of total outstanding loan increased from 29% to 33% and 25% to 35% on the part of NCBs and PCBs respectively during 1990-1996. Provisioning shortfall increased from 32% to 55% and 36% to 46% for NCBs and PCBs respectively during 1992-96. As FSRP was not so instrumental in bringing about financial discipline, the government, just before the expiry of FSRP, formed a Banking Reform Committee (BRC) to evaluate the situation in NCBs and place recommendations to the government for bringing back financial discipline and improving efficiency of NCBs. In May 1997 a Commercial Bank Restructuring Project (CBRP) is undertaken to take stock of progress on key issues and identify urgent actions that need to be taken for the development of commercial banks in Bangladesh. BRC/CBRP placed some recommendation for improving the overall situation of banking sector which may be put into following headings:-

- A. Supervisory and Regulatory Restructuring;
- B. Reforms of Bangladesh Bank;
- C. Restructuring of NCBs; and
- D. Restructuring of Legal Framework.

A. Supervisory and Regulatory Restructuring: BRC/CBRP placed a great deal of importance on restructuring supervisory and regulatory aspect of the banking sector to bring about financial discipline because ineffective and inefficient supervision and regulation had been one of the main reasons for the past banking problems. BRC/CBRP emphasizes on coordination among different departments of Bangladesh bank engaged in bank examination, coordination between on and off site supervision, rationalization of small branches and good banks examination, formulation of action plan for implementation of examination findings, strengthening of Problem Bank Unit and convert it into a Problem Bank Division, enforcement of Memorandum of Understanding (MOU) on problem banks, creation of special Investigation Division, formation of an expert group under Bank Supervision Committee to suggest amendments time to time and posting of qualified bank examiners and imparting training to them.

B. Reforms of Bangladesh Bank: Central Bank autonomy is essential for effective bank supervision. Not only bank supervision, but also the appropriate monetary management of a country largely depends on Central Bank autonomy. BRC/CBRP recommendations in this regard are as follows in brief:-

- i. Reduction of the number of government officer in the Bangladesh Bank Board from 3 to 1 and appointment of all other members by

the government from the list determined by the Banking Sector Management Selection Committee (BSMSC).⁵

- ii. BSMSC will also prepare a list of persons to be chosen by the government as Governor, Deputy Governor, Board Members and Managing Directors of Nationalized banks.
- iii. It is proposed not to appoint any government officer as Governor.
- iv. It is also proposed not to interfere with the affairs of Bangladesh Bank Board and to set a clear-cut guideline for deficit financing on the part of the government from Bangladesh Bank.
- v. The BRC/CBRP has also suggested some important measures for improving human resource quality of Bangladesh Bank such as retrenchment and rationalization Bangladesh Bank staff, complete prohibition of Collecting Bargaining Agent (CBA) activities, drastic change in the *direct-promotee* composition in the structure of officer, preferences of merit and qualification to seniority in case of promotions, appropriate training and incentive packages for the officers formation of Human Resource Division (HRD) at Bangladesh Bank etc.

C. Restructuring of NCBs: BRC/CBRP suggested some measures for NCBs restructuring which include autonomy of the NCBs' board, aggressive branch and staff rationalization programs, improvement of loan management including loan workout skills, automation programs, solving union problems,

⁵ This is a committee proposed by the CBRP for selection of management personnel in the banking sector of Bangladesh.

revamping compensation packages with sound personnel policy and human resource development in line with Bangladesh Bank, formation of an Asset Management Company for carving out bad loans or appointment of recovery agents, financing large loan through syndication/consortium, increase of fee based income etc.

D. Restructuring of Legal Framework: BRC/CBRP recommended training for the judges of courts that deals with loan defaulters. Besides, to prevent connected lending some new amendments have been proposed by BRC/CBRP, such as

- i. the directors who are removed for being loan defaulter will not be reinstated before loan repayment;
- ii. the loan defaulter director should be compulsorily notified by the concerned bank management within 60 days of overdue, failing which will entail a punishment of one month imprisonment or a fine of Tk.25,000.00;
- iii. rescheduling of directors' loan more than two times without the permission of Bangladesh Bank has to be prohibited;
- iv. interest waiver not only for directors but also for other parties has also been suggested to be prohibited;
- v. BRC/CBRP also suggested penalizing the violation of Bank Companies Act-1991 with regard to interest waiver and providing loans to directors.

In the light of the above financial sector reform initiatives/measures, Bangladesh Bank, from time to time, has taken necessary actions/steps to bring about discipline in the banking sector. Some important measures are described under:-

- a. In order to monitor loan and advances extended to different government institutions, autonomous and semi-autonomous bodies, non-financial public enterprises and their units, Bangladesh Bank made it mandatory for all banks to submit monthly statements of loans and advances given to these bodies to Bangladesh Bank (BCD Circular Letter No.31, December 14, 1992).
- b. Maximum limit of credit facility for directors of private banks or their relatives is determined to be Tk. 50.00 lac in case of contingent credit in the form of performance bid, bid bond or guarantee and Tk.10.00 for cash facility in the form of cash credit, overdraft, pre-shipment credit etc., provided total of cash and contingent credit must not exceed Tk.50.00 lac (BCD Circular Letter No.02, 13-01-1993).
- c. Quarterly statement of credit facilities extended to directors of private banks is made mandatory for all private banks (BCD Circular Letter No.07, 02-03-1993). Private banks are also instructed to give undertaking to the effect that no director or his affiliated establishment has availed of any credit facility other than mentioned in the quarterly statement (BCD Circular Letter No.10, 16-03-1993).
- d. A uniform New Loan Ledger Card (NLLC) was introduced under FSRP to monitor loan after disbursement. But the implementation of this system was not encouraging. Instead of uniform NLLC, Bangladesh Bank allowed

individual banks to maintain each loan account bringing about change in NLLC so that three column are maintained to show principal, interest and total outstanding (BRPD Circular Letter No.03, 19-04-1999).

- e. Bangladesh Bank specified some conditions (vide BRPD Circular Letter No.11, dated 04-05-1999) while appointing advisers of any bank to be followed by each banking institution in order to enhance the operational efficiency of banking companies and prohibit connected lending. Conditions that mention worthy are:

- i. The person nominated for the post of advisor must have minimum 15 years of experience in any bank/financial institution as executive and minimum 10 years of experience in a higher management position;
- ii. Office bearer of any political party shall not be deemed to qualified for the post of advisor;
- iii. The person nominated for the post of advisor must not have any criminal record in his career.
- iv. A person cannot hold the position of advisor more than two years.
- v. In case of such appointment prior written permission must be obtained from Bangladesh Bank

- f. As a part of interest rate deregulation following changes are made in 1999:

Interest rate bands on credit to agriculture, export and small & cottage industries were determined by Bangladesh Bank vide BCD Circular No. 07, dated 25-04-1994. Determination of interest rates on small &

cottage industries (vide BRPD Circular Letter No.05, dated 12-07-1999) and export (vide BRPD Circular No.06, dated 26-07-1999) are left on individual banks.

- g. Bangladesh Bank imposed restrictions on credit extended to the directors of private banks or to their relatives in such a way that directors or their relatives shall not be allowed credit more than 50% of their subscribed capital. In case of credit exceeding this amount, prior permission from Bangladesh Bank is made essential (BRPD Circular Letter No.07, 05-08-1999). Bangladesh Bank also imposed restriction on release of security of directors of private banks or their relatives against credit extended to them without prior permission from Bangladesh Bank (BRPD Circular Letter No. 11, 20-09-1999).
- h. To strengthen bank supervision Bangladesh Bank decided to prepare off-site supervision statement on quarterly basis instead of semi-annual basis (DBOD Circular Letter No.03, dated 07-12-1999).
- i. To strengthen loan monitoring Bangladesh Bank, has made it mandatory for all banks to collect CIB report before sanctioning, renewing and re-scheduling of large loan in favor of any borrower (BRPD circular No.13, dated 26-10-2000).
- j. When loans and advances of a bank are concentrated in a certain person or group of person and when those loans are not regularly repaid risk of that bank increases to a large extent. For this reason Bangladesh Bank imposed restriction (vide BRPD Circular Letter No.13, dated 10-10-2000) on the limit of large loan on the basis of total classified loan of respective banks as follows:

Table:2.2: Large Loan Limit

Percentage of classified loan	Maximum amount of large loan as a percentage of total loans and advances
Up to 5%	80%
From more than 5% to 10%	60%
From more than 10% to 15%	40%
From more than 15% to 20%	30%
More than 20%	20%

Source: BRPD Circular Letter No.13.

That is, a bank whose classified loan is not more than 5% of total loan can sanction large loan up to 80% of its total loans and advances. Similarly if more than 20% loan of any bank become classified, it can sanction maximum 20% of its total loans and advances as large loan.

- k. In order to encourage good borrowers and discourage bad borrowers Bangladesh Bank introduced differential interest rates on different borrowers on the basis of risk attached to them. Maximum amount of interest rate differential between a good borrower and a bad borrower was set (vide BCD Circular Letter No. 2/B/1. dated 12-06-1991) to be 2%. This rate is increased to 3% in 2001 (vide BRPD Circular Letter No. 21, dated 01-11-2001).
- l. Fund diversion is an important source of loan default. When a borrower uses fund in the purpose other than the purpose the loan is granted for, the loan becomes classified due to non-payment of outstanding amount. To prevent this sort of loan default from taking place Bangladesh Bank, vide BRPD Circular Letter No. 01, dated 13-01-2003, instructed all banks not to consider the application for rescheduling of this type of loan.
- m. Ensuring capital adequacy was an important aspect of FSRP. In this respect the latest amendment of Bank Company Act-1991 is enacted in March 10,

2003 as Bank Company Act-2003 wherein, by amending section-13 of Bank Company Act-1991, it is made compulsory for all banking companies functioning in Bangladesh to maintain Tk.100.00 crores as subscribed capital and reserve fund. However, if any bank does not meet this requirement, it has to make up the shortage of capital in the following manner:

- i. 50% of capital shortage will have to be made up within one year;
- ii. The rest 50% will have to be made up within the next one year;
- iii. No bank shall be allowed to distribute dividend during the period it runs capital shortage.
- iv. In case of foreign banks, they shall not be allowed to repatriate profit and their capital shortage will have to be made up by importing capital from abroad.

Besides, banks can consider issuing IPO or right shares or merging with other banking company to meet up the capital shortage (BRPD Circular Letter No.10, dated 30-03-2003).

The reform measures described above are not exhaustive. It is a continuous process. As a part of this continuous reform initiative another project has been approved by the World Bank entitled “Central Bank Strengthening Project” for Bangladesh on June 19, 2003. The objective of the project is to achieve a strong and effective regulatory and supervisory system for Bangladesh’s banking system, which will be accomplished by supporting the overall strengthening of Bangladesh Bank to enable it to play its due role as the country’s monetary authority and bank regulator and supervisor (www.wb.org).

Chapter – Three

METHODOLOGY

This chapter contains methodology of the research study. The objectives of the study are to examine the behavior of financial intermediation in terms of volume and efficiency before and after 1990. After describing data sources, theoretical framework of the regression model for volume of FI is described. After specifying the econometric model, two diagnostic tests procedures are presented. Finally statistical procedure to test the difference of efficiency of FI before and after 1990 is described.

3.1 Sources of data

This research study is based on published data. Majority of data have been taken from various issues of Economic Trend, published by Statistics Department, Bangladesh Bank. Some data have also been taken from International Financial Statistics (IFS)-2003 online edition (www.imf.org). Data that have been taken from Economic Trend are (i) Broad Money (M2), (ii) Private Credit (iii) Demand Deposit, (iv) Time Deposit (Quasi-Money), (v) Reserve Money, (vi) Nominal Exchange Rate, (vii) Deposit Rate (Weighted average deposit rate of different types of deposits) and (viii) Lending Rate (Weighted average lending rate of different types of loans and advances). Data that have been taken from International Financial Statistics are (i) Export of Goods and Services, (ii) Import of Goods and Services, (iii) Gross Domestic Product (GDP) and (iv) GDP Deflator (1995=100).

All data are of annual frequency. Quarterly or monthly data on GDP is not available in Bangladesh. The analysis would have been improved had higher frequency GDP

data been available. All other data are available in quarterly frequency. But as GDP data is not available, yearly data from 1974 to 2002 are used in the analysis.

3.2 Specification of the model

3.2.1 Measures of financial intermediation

Any attempt to assess the relationship between FI and other macroeconomic variables faces a definitional problem – what FI is. According to Levine *et al* (2000) an ideal measure of financial development or FI should reflect the ability of different financial systems to research and identify profitable ventures, monitor and control managers, ease risk management and facilitate resource mobilization. According to this view a single indicator is not sufficient to reflect the function of FI. 'In most empirical studies some electivity is usually exercised in choosing which measures to employ since some are more acceptable than others for different countries and in some cases poor data may further constraint the choices' (Aziakpono, 2003). On the basis of the availability of data following measures of FI are considered primarily:

- i. Money as a percentage of GDP
- ii. Bank Deposit Liabilities as a percentage of GDP
- iii. Domestic Credit as a percentage of GDP
- iv. Private credit as percentage of GDP

(i) Money as a percentage of GDP (MG): The most commonly used measure of FI is the share of some broad measure of money stock, usually M2, in the nominal income, i.e. nominal GDP (King and Levine, 1993a, 1993b; Wood, 1993; Murinde and Eng, 1994; Lyons and Murinde, 1994; Agung and Ford 1998). The measure shows the

real size of a growing economy in which money provides valuable payment and saving service. The narrow money stock (M1) best reflects the payment service while the broad money stock (M2) reflects the saving and precautionary functions. Narrow money balance should rise with economic transactions but broad money should rise at a faster pace if financial deepening is occurring (Lynch, 1996). As noted by Wood (1993) an increase in the share of M2 in GDP reflects a higher degree of division of labor and specialization in both real and financial sector.

Though commonly used these measures and especially the use of narrow money aggregate have a number of limitations that may make them poor indicator of the volume of FI. Aziakpono (2003) noted that the use of narrow money as a percentage of income (GDP) as a proxy for FI could be criticized on the ground that a high level of monetization is most likely the result of financial underdevelopment, while a low level of monetization is the result of a high degree of financial sophistication which allows individual to economize on their money holding. Lynch (1996) noted that monetary aggregate might be misleading, since they may indicate monetization rather than financial sophistication. Bearing in mind some of these limitations, De Gregorio and Guidotti (1995) suggest the use of a less liquid monetary aggregate (M2 or M3) as a proxy for financial intermediation. In the present study, broad money (M2) as a percentage of GDP (MG) is used as the proxy for the volume of FI.

(ii) Bank Deposit Liabilities as a percentage of GDP(BDG): This provides an alternative to MG especially when dealing with developing economies. This is

because in developing countries a large component of broad money is in the form of currency held outside the banking system. Therefore a rising share of M2 in GDP may reflect the more extensive use of currency than an increase in the volume of bank deposit. Therefore, bank deposit liabilities which excludes currency outside the banking system from the broad money may provide a better measure of financial depth and thus of the overall size of FI. Despite its improvement over MG, this measure has been criticized on the ground that it may not accurately gauge the effectiveness of the financial sector in ameliorating information asymmetries and easing transactions costs (Levine et al, 2000). However under the assumption that the size of financial intermediary sector is positively correlated with the provision and quality of financial services, many researcher have used this measure of FI (Goldsmith,1969; King and Levine, 1993a; and McKinnon 1973). In the present study sum of demand and time deposit is used to denote total bank deposit liabilities.

(iii) Domestic Credit as a Percentage of GDP(DCG): This proxy for FI represents domestic assets of the banking sector. This is the major item on the asset side of the consolidated balance sheet of the financial sector. It tries to capture the uses of deposits with the financial sector. It is expected to increase in response to improved price signals represented primarily by the establishment of positive real interest rate.

(iv) Private Credit as a percentage of GDP(PCG): This is closely related to DCG. It provides a more direct measure of the volume of FI than DCG. It isolates credit issued to the private sector from credit issued to government agencies and public enterprises. It also excludes credit issued by central bank (Levine et al, 2000). The

underlying assumption is that credit extended to the private sector generates increases in investment and productivity to a much larger extent than do credit to the public sector. It is also argued that loans to the private sector are given under more stringent conditions and that the improved quality of investment emanating from financial intermediaries' evaluation of project viability is more significant for private sector credits (Levine and Zervos, 1998; Levine, 1998). In general this measure of FI is preferred to DCG.

Considering the practical importance, three measures of FI discussed above (excluding DCG) are used in this study as dependent variables.

3.2.2. Determinants of Financial Intermediation

Two approaches are commonly used in analyzing the determinants of financial intermediation, namely (i) Institutional/structural approach and (ii) Macroeconomic approach. The institutional approach focuses on such factors as capital adequacy ratio, minimum reserve requirements, non-performing loans, property rights, legal environments, accounting standards, transparency and taxation issues, concentration ratio and inside information problems. On the other hand macroeconomic approach focuses on such factors as income growth, interest rate measures, inflation, exchange rate etc. (Rother, 2000; and Garcia and Liu, 1999). Though both institutional and macroeconomic approaches are important for analyzing financial intermediation, accurate data relating to institutional approach are difficult to obtain in developing countries like Bangladesh. For example data on property rights, legal environment, accounting standards, transparency and specially, inside information are not available in desired form and accuracy. For this

reason the present research study follows macroeconomic approach in analyzing financial intermediation in Bangladesh. Following macroeconomic variables are considered as the determining factors of financial intermediation.

(i) **Economic growth(GR):** A large and growing body of literature have demonstrated the strong link between financial sector and economic growth over the last two decades. But opinion differs on the direction of causality. Because high rate of economic growth is positively associated with a higher rate of financial intermediation, it does not follow that high FI is the cause and economic growth is the effect (McKinnon,1989). Four school of thoughts are found on this issue:

a. FI and economic growth are not causally related: According to this view observed correlation between FI and economic growth is merely the result of a historical accident. As economies grow, so do their financial sectors, where each is influenced by separate external factors. While modern economic growth is governed by real factors, the financial development is rooted in the history of financial institutions. This view is supported by Graff (2001).

b. FI causes economic growth: According to this view effective FI causes accelerate economic growth. Financial sector transfers resources from low-growth sectors to modern high growth sectors and thereby accelerate economic growth by promoting and stimulating entrepreneurial responses in those high-growth sectors. Provided that there is no real impediment to economic development, sophisticated financial system can generate high and sustained rates of economic growth. This is known as *Supply side Hypothesis* as resources required for economic growth are supplied

though financial system. McKinnon (1973), Shaw (1973) and King and Levine (1993a, 1993b, 1993c) support this view.

c. FI follows economic growth: This school of thought views the demand for financial services as dependent upon the growth of real output. Thus the creation of modern financial institutions and financial services are the responses to the demand for these services by investors and savers in the real economy. The financial system adapts itself to the financial needs of the real sector and fits in with its autonomous development playing a relatively passive role in economic growth process (Garcia and Liu 1999; Berthelemy and Varoudakis 1996).

d. Relationship between FI and economic growth is reciprocal: According to this view economic growth makes the development of FI system profitable. The establishment of efficient financial system in turn permits faster economic growth. By specializing in fund pooling, risk diversification, liquidity management, and project evaluation and monitoring, the financial system improves the efficiency of capital allocation and increases the productive capacity of the real sector (Aziakpono, 2003)

From the above discussion it is clear that there exists high positive correlation between FI and economic growth, but there is differing views as to the direction of causality. However in order to get rid of this confusion, Granger causality test is performed to ascertain whether economic growth causes financial development. Accordingly following regressions are run to test the causality between economic growth and FI:

$$Y_t = \sum_{i=1}^n \alpha_i Y_{t-i} + \sum_{j=1}^m \beta_j FI_{t-j} + u_{1t} \quad \dots\dots\dots (i)$$

$$FI_t = \sum_{i=1}^n \alpha_i Y_{t-i} + \sum_{j=1}^m \beta_j FI_{t-j} + u_{1t} \quad \dots\dots\dots (ii)$$

Where, Y_t = GDP growth rate in real term

FI_t = Indicator of financial intermediation

As Granger causality test is very sensitive to the number of lags used in the analysis (Gujarati 1995), optimum lag length are determined by applying Schwarz criterion (SC). According to this criterion optimum lag length m is found by minimizing the function

$SC = \ln \hat{\alpha}^2 + m \ln n$, where $\hat{\alpha}^2$ is the maximum likelihood estimate of α^2 (RSS/n).

The analysis shows that there is unidirectional causality from FI to Y. For this reason, the variable economic growth is not included in the regression model.

(ii) Interest Rate Differential (ID): Interest rate differential or interest rate spread, as measured by the difference between lending and borrowing rate, is a measure of competitive financial system. In a competitive system the spread represents the cost of FI and is good measure of efficiency in the banking sector as it describes the transaction costs in the sector (Graff 2001). A competitive banking sector facilitates FI, so there exists a negative relationship between FI and interest rate differential that is, higher spread means less competitive banking sector and less FI and the vice versa.

(iii) Exchange Rate (ER): Bangladesh followed fixed exchange rate policy until it moved into flexible exchange rate regime recently. From time to time Bangladesh

taka has been devalued against dollar. Inclusion of nominal exchange rate in the model is based on the premise that devaluation of currency has important influence on real sector. There is an impressive body of literature that shows that devaluation lowers both aggregate demand and supply and thus the level of output (Agenor and Montiel 1996; Kamas 1992; Lizondo and Montiel 1989). Devaluation lowers aggregate demand through different channels. For example it raises price level and creates a negative real balance effect (Bruno 1979; Gylfason and Schmid 1983; Gylfason and Radetzki 1985; Hanson 1983), it also raises nominal interest rate and lowers investment (Bruno 1979; van Wijnbergen 1986). Devaluation also lowers output through a number of channels, for example it increases the cost of imported input (Bruno 1979; Gylfason and Schmid 1983; Gylfason and Radetzki 1985; Hanson 1983), it increases the cost of working capital because of reduction in working capital (Bruno 1979; van Wijnbergen 1986) and it increases wages due to indexation to goods prices (Edwards 1986; Gylfason and Risager 1984; Hanson 1983; van Wijnbergen 1986).

On the other hand arguments have also been placed in favor of devaluation. World Bank and IMF has a strong faith in devaluation as an instrument for both expanding output and reducing trade deficit in developing countries (Hossain 2000). According to *The Australian Dependent Economy Model* of devaluation developed by Trevor Swan (1960) and W. Salter (1959), devaluation expands output by both inducing an efficient allocation of resources from non-tradable sector to tradable sector and changing the composition of private spending between domestic and foreign goods and services (Agenor and Montiel 1996). Starting from a situation of

sub-optimal allocation of resources, any shift of resources from the non-tradable to tradable sector would be productive enhancing (Hossain 2000). The reason is that the tradable sector remains under international competitive pressure, and this leads to the introduction of productive enhancing technology, management practices and skilled labor in the production process (Sachs and Larrain 1993). The World Bank and IMF are also optimistic that devaluation is effective in improving the trade balance position of a developing country by increasing export and lowering imports.

The impact on the real sector of an economy of exchange rate devaluation, as explained by different studies mentioned above, will be reversed when currency is revalued, i.e. when the number of domestic currency per foreign currency is reduced. Therefore, the impact of exchange rate on FI is not clear *a priori*. It might have positive or negative relationship with exchange rate.

(iv) Inflation (I): In general inflation is considered as a measure of macroeconomic stability/volatility. Theoretically macroeconomic volatility will have negative impact on FI. Savers have low incentive to save as they expect a fall in the value of their wealth with rising inflation. On the other hand borrowers tend to demand more credit since they expect to pay less in real terms in future. However, banks in an attempt to cover the cost of inflation while providing additional FI will tend to increase lending interest rate, which in turn reduces demand for credit. Several empirical studies have confirmed this prediction by obtaining a significant negative relationship between inflation and FI (For example Boyd, Levine and Smith 1996; Garcia and Liu 1999 and Rother 2001).

(v) Trade Openness(XM): Ginebri, Petrioli and Sabani (2001) find trade openness to have significant positive effect on financial development. Theoretically trade openness should have indirect effect on FI through its effect on growth, but Ginebri, Petrioli and Sabani (2001), while working on Italian and Spanish data, find that trade fosters financial development even when growth is kept constant. Thus trade openness evolves as an important determinant of FI. Due to various liberalization measures undertaken, Bangladesh economy is experiencing growing trade openness. So, this study includes the trade openness variable assuming a positive relationship with FI.

(vi) FSRP: Finally the model includes FSRP as a dummy variable (D) representing financial sector reform measures undertaken since 1990. FSRP is expected to enhance FI and hence a positive relationship is postulated between FI and FSRP.

From the above description, the following linear regression model is specified for estimation purpose:

$$FI_t = \alpha_1 + \beta_1 FI_{t-1} + \beta_2 ID_t + \beta_3 ER_t + \beta_4 I_t + \beta_5 XM_t + \mu_t \text{ ----- (1)}$$

$$(\beta_1 \beta_5 > 0 \text{ and } \beta_2 \beta_4 < 0 \text{ and } \beta_3 > 0 \text{ or } < 0)$$

where,

FI = Measures of the volume of financial intermediation

ID = Interest Rate Differential (difference between lending and borrowing rate)

ER = Nominal exchange rate, i.e. number of units of taka per US dollar

I = Inflation, measured by the growth rate of GDP deflator

XM = Trade openness (the sum of total export and import as % of GDP)

In order to capture the effect of financial sector reform measures, dummy variable method is applied in the study. The main objective of this study is to examine whether financial sector reform has brought about any change in financial intermediation in Bangladesh, that is, whether financial sector reform has brought about any structural change in the regression equation (1). This structural change can be due to a difference in the intercept values or the slope values or both. As the number of observation is small, this study performs the test of whether the intercept has been changed between the pre and post reform period (Details in Appendix-3.A). The dummy variable is included in the regression model as under:

$$FI_t = \alpha_1 + \beta_1 FI_{t-1} + \beta_2 ID_t + \beta_3 ER_t + \beta_4 I_t + \beta_5 XM_t + \beta_6 D_t + \mu_t \text{ ----- (2)}$$

($\beta_1 \beta_5 \beta_6 > 0$ and $\beta_2 \beta_4 < 0$ and $\beta_3 > 0$ or < 0)

where,

D = A dummy variable representing Financial Sector Reform, which takes value '0' for the period 1974-1989 and '1' for the period 1990-2002.

3.3 Diagnostic checking

3.3.1 Stationarity Test: The estimation procedure begins with the examination of stationary property of the underlying time series data. By stationary it is meant that the mean and variance of a time series data do not vary systematically over time. In contrast a time series data is said to be non-stationary if its means and variance are variant with time. Besides, there may be serial correlation between time series variables if the data is non-stationary. Thus OLS estimation providing biased and inconsistent estimation of the parameters decreases the credibility of the regression output. So the first step is to examine the data for stationarity. Statistical tests that

are available for identifying stationary property of time series data are Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF), Phillips-Peron test, KPPS test. As Phillips-Peron test is the most powerful out of these tests, the present study relies upon this test. If data have unit roots, the regression result will be reliable if data are co-integrated. Engle-Granger (EC) co-integration test is conducted as under to check whether the data are co-integrated. Residual from regression (i) is obtained and DF unit root test is performed as under

$$\Delta\mu_t = \gamma\mu_{t-1} + \varepsilon_t \text{ where, } \Delta\mu_t = \mu_t - \mu_{t-1} \dots\dots\dots \dots\dots\dots \text{ (ii)}$$

If the estimated τ (tau) value (which is equivalent to t statistic in general OLS) exceeds Engle-Granger critical values at chosen level of significance, the conclusion would be that the estimated μ_t is stationary (i.e. it does not have a unit root), and, therefore, dependent and independent variables are co-integrated.

3.3.2 Autocorrelation Test: One major problem often encountered while working with time series data is autocorrelation. As the sample data in the present study is not large Breusch-Godfrey (BG) test, also known as Lagrange Multiplier (LM) test, is employed here to examine whether autocorrelation exist in the data series because it has been suggested that BG test is statistically more powerful not only in large samples but also in finite or small samples (Gujarati 1995). The BG test assumes that the disturbance term μ_t is generated by the following p th order autoregressive scheme

$$\mu_t = \rho_1 \mu_{t-1} + \rho_2 \mu_{t-2} + \rho_3 \mu_{t-3} + \dots\dots\dots + \rho_p \mu_{t-p} + \varepsilon_t \text{ ----- (iii)}$$

where ε_t is a purely random disturbance with zero mean and constant variance. The Null Hypothesis H_0 is: $\rho_1 = \rho_2 = \rho_3 = \dots\dots\dots = \rho_p = 0$

The procedure of the test is as follows:

1. First, regression models (1) is estimated and residuals (μ_i) are obtained;
2. Next these residuals (μ_i) are regressed against all the regressors plus the lagged values of the estimated residuals. In choosing the number of lag of the residual Schwarz (1978) Criterion (SC) is followed.
3. Finally regression (iii) is estimated by taking lag(s) of residual. The BG statistic, given by $(n - \rho) \cdot R^2$ (where R^2 is obtained from step 2), follows χ^2 distribution with ρ degrees of freedom. In case BG statistic exceeds χ^2 critical value at the chosen significance level, the null hypothesis is rejected, which means there is autocorrelations in the residuals.

3.4. Effectiveness of financial intermediation

Effectiveness of financial intermediation is the efficiency of the banking sector in mobilizing deposits and measured by both the (i) ratio of reserve money to total deposit and (ii) reserve money to quasi-money. In order to examine whether effectiveness of financial intermediation has been improved in the post-reform period, total period covered by the study is divided into two sub-periods: 1974-1989 and 1990-2002. It is assumed that mean values of the measure of effectiveness of financial intermediation of these two periods are μ_1 and μ_2 respectively. Then statistical test for differences between means (small sample) is conducted to test the null hypothesis that there is no difference between the means that is $\mu_1 = \mu_2$ against the alternative hypothesis that $\mu_1 \neq \mu_2$. It is assumed that the observations are normally distributed with equal variance.

Chapter- Four

FINDINGS OF THE STUDY

Specification of regression model for estimation purpose is followed by some tests, such as Granger causality, unit root, co integration and multi- co linearity tests. Granger causality test is performed to ascertain the direction of causality between economic growth and financial intermediation and this is done in order to determine whether economic growth variable will appear as an independent variable in regression model. As the models are linear models and will be solved by Ordinary Least Square (OLS) method, some assumptions regarding the data set are examined. As the data is of time series nature, it is essential the data series to be stationary. So unit root test is performed for this purpose. It is assumed the data are free from the problem of heteroscedasticity. If some of the independent variables are highly correlated reliable estimation is not possible to obtain. So multicollinearity is examined through correlation matrix. Then autocorrelation problem is checked in finally selected individual models. The following analysis has been divided into two parts. In the first part different tests used to conduct the study have been considered. In the second part the estimated results have been analyzed.

4.1. Various Tests

4.1.1 Granger-causality test: Granger causality test results are presented in Appendix-4.A. From these results it is confirmed that economic growth does not Granger causes financial intermediation, rather financial intermediation Granger causes economic growth. That is financial intermediation precedes economic growth, so economic growth can not appear as an independent variable in the regression

models. Accordingly economic growth (EG) variable is excluded from the regression models and three regression models are specified for estimation purpose as under:

$$MG_t = a_1 + \beta_1 MG_{t-1} + \beta_2 ID_t + \beta_3 ER_t + \beta_4 I_t + \beta_5 XM_t + \beta_6 D_t + \mu_1 \quad (1)$$

$$PCG_t = a_2 + \beta_1 PCG_{t-1} + \beta_2 ID_t + \beta_3 ER_t + \beta_4 I_t + \beta_5 XM_t + \beta_6 D_t + \mu_2 \quad (2)$$

$$BDG_t = a_3 + \beta_1 BDG_{t-1} + \beta_2 ID_t + \beta_3 ER_t + \beta_4 I_t + \beta_5 XM_t + \beta_6 D_t + \mu_3 \quad (3)$$

Where ($\beta_1 \beta_5 \beta_6 > 0$ and $\beta_2 \beta_4 < 0$ and $\beta_3 > 0$ or < 0)

4.1.2 Stationarity Test: Next data series are checked for their stationarity property.

Phillips-Peron unit root test is performed for this purpose and the test results are presented in Table-1.

Table-4.1 : Unit Root Test

Variable	Test Statistic	
	Without trend	With trend
MG	0.015082	-1.7975
PCG	-0.52730	-1.9015
BDG	-0.67072	-2.4989
I	-2.4475	-2.5924
ID	-2.4743	-3.7068
XM	-0.60693	-2.5942
ER	-0.13070	-2.4217
Asy. Critical value at 10% significance level	-2.57	-3.13

From Table-1 it is clear that only ID (with trend) is stationary. All other variables are non-stationary at level, that is, all other variables have unit root.

4.1.3 Co-integration Test: Unit root test results call for testing the long-run equilibrium relationship between the variables. In other words, it will be examined whether the variables are co-integrated. So Engle-Granger co-integration test is conducted and the following results are obtained:

$$\begin{aligned}
\Delta\mu_t &= -0.98404\mu_{t-1} \quad (\text{Model-1}) \\
\tau &= (-5.201) \\
\Delta\mu_t &= -0.83023\mu_{t-1} \quad (\text{Model-2}) \\
\tau &= (-4.454) \\
\Delta\mu_t &= -1.0980\mu_{t-1} \quad (\text{Model-3}) \\
\tau &= (-5.756)
\end{aligned}$$

Engle-Granger 1%, 5% and 10% critical values of τ (tau) statistic are, -2.5899, -1.9439 and -1.6177 respectively. Since in absolute term the calculated τ values in the four cases (5.201, 4.295, 4.456 and 5.756) exceed all of these critical values, the conclusion is that the estimated μ 's are stationary (i.e. they do not have unit root) and therefore, the variables in the models are co-integrated.

4.1.4 Multicollinearity Test: Examinations of estimation results of regression model 1 to 3 (presented in Appendix-4.A) raise the possibility of having high correlation between some of the independent variables, because despite high R^2 and significant F ratios, some t ratios are highly insignificant. To check this, correlation matrix, presented in Table-4.2, is examined.

Table-4.2: Correlation Matrix

Inflation	1.0000			
Exchange Rate	-0.37022	1.0000		
Interest rate differential	0.12357	0.071235	1.0000	
Trade openness	-0.49039	0.88142	-0.065166	1.0000
	Inflation	Exchange rate	Interest rate differential	Trade openness

From this correlation matrix it is seen that there is high correlation between trade openness (XM) and exchange rate (ER) ($r^2_{XM,ER}$ is 0.88142). To avoid this

problem of multicollinearity, XM and ER are included in each model separately and following regressions models are specified accordingly:

$$MG_t = a_1 + \beta_1 MG_{t-1} + \beta_2 ID_t + \beta_3 ER_t + \beta_4 I_t + \beta_5 D_t + \mu_1 \dots (1a)$$

$$MG_t = a_2 + \beta_1 MG_{t-1} + \beta_2 ID_t + \beta_3 I_t + \beta_4 XM_t + \beta_5 D_t + \mu_2 \dots (1b)$$

$$PCG_t = a_3 + \beta_1 PCG_{t-1} + \beta_2 ID_t + \beta_3 ER_t + \beta_4 I_t + \beta_5 D_t + \mu_3 \dots (2a)$$

$$PCG_t = a_4 + \beta_1 PCG_{t-1} + \beta_2 ID_t + \beta_3 I_t + \beta_4 XM_t + \beta_5 D_t + \mu_4 \dots (2b)$$

$$BDG_t = a_5 + \beta_1 BDG_{t-1} + \beta_2 ID_t + \beta_3 ER_t + \beta_4 I_t + \beta_5 D_t + \mu_5 \dots (3a)$$

$$BDG_t = a_6 + \beta_1 BDG_{t-1} + \beta_2 ID_t + \beta_3 I_t + \beta_4 XM_t + \beta_5 D_t + \mu_6 \dots (3b)$$

4.2 Estimation results of finally selected regression models: Estimation results of regression models specified above are presented in Table:4.3 through Table:4.5.

Estimation results of regression model (1a) and (1b) are presented in Table:4.3. Result of model (1a) shows that one period lag value of the ratio of broad money to GDP (MG_{t-1}), inflation (I_t), exchange rate (ER_t) and financial sector reform dummy (D_t) are highly significant indicated by respective their 't' ratios. Only interest rate differential (ID_t) is insignificant as its 't' ratio is very low. Except financial sector reform dummy and interest rate differential, coefficients of all other significant variables have expected signs. Lag value of MG has the highest amount of positive impact on current value of MG. A 1% increase in MG at time (t-1) causes MG to increase by 0.73% in period 't'. Exchange rate has the second highest positive impact on MG_t . 1% increase in exchange rate (i.e. number of taka per US dollar) or devaluation increase MG_t by 0.22%. Inflation has negative impact as expected. 1% increase in inflation rate reduces MG_t by 0.13%. Though not significant, interest rate

differential has positive sign, which is in contrary to the expectation. Financial sector reform dummy has negative sign, which is also contrary to the expectation. Results show that after financial sector reform measures are undertaken, MG_t has been reduced almost 4.50%, which was supposed to have positive sign.

The model is free from autocorrelation, because χ^2 value with 2 degrees of freedom (i.e. optimum lag length is 2, see Table-4.A.7 in Appendix-4.A) and at 5% significance level is 5.99147, that is, BG statistic (4.6950) does not exceed critical χ^2 value in which case null hypothesis of autocorrelation is rejected. This model also performs well in terms of its explanatory power as indicated by high R^2 (0.9574) and adjusted R^2 (0.9477).

Table-4.3: Estimation Result of Regression equation 1a and 1b

Variable/constant	Equation-1a		Equation-1b	
	Coefficient	't' ratio	Coefficient	't' ratio
CONSTANT	1.5634	0.2541	-1.2954	-.1948
MG_{t-1}	0.73217	4.835*	0.95410	8.069*
I_t	-0.13279	-5.360*	-0.15244	-5.585*
ER_t	0.22283	2.388**		
ID_t	0.30096	0.3883	0.45766	0.5421
XM_t			0.11365	1.077
D_t	-4.4815	-2.908*	-2.1605	-1.746***
R^2	0.9574		0.9490	
Adjusted R^2	0.9477		0.9375	
BG statistic ⁶	4.6950		0.1328	

Note: *: Significant at 1% , **: Significant at 5%, ***: Significant at 10%

In model (1b) exchange rate variable is dropped and trade openness (XM) is introduced. In this model, except interest rate differential and trade openness, all other variables are found to have statistically significant impact on MG. Like model (1a), coefficients of significant variables, except financial sector reform dummy and

⁶ Optimum lag length of residual in calculating BG statistic for all models are given in Table-4.A.7 in Appendix-4.A

interest rate differential, have expected signs. A 1% increase (t-1) period's MG contributed to 0.95% increase in current period's MG_t . 1% increase in current period's inflation rate decreases MG_t by 0.15%. Coefficient of interest rate differential, though not significant, is positive, which is contrary to the expectation. Financial sector reform dummy also has negative sign, which was postulated to be positive. After financial sector reform, MG has decreased by 2.16%.

This model is also free from the problem of autocorrelation, as BG statistic does not exceed critical χ^2 value at 5% significance level. High R^2 and adjusted R^2 values indicate that the independent variables explain the behavior of the dependent variable fairly well.

Estimation results of regression (2a) and (2b) are presented in Tabe-4.4. In model (2a), all variables, except interest rate differential, have significant impact on the ratio of private credit to GDP (PCG). A 1% increase in PCG_{t-1} increases PCG_t by 0.66%. Inflation's impact, though significant, on PCG is not so high. A 1% increase in inflation reduces PCG by only 0.04%. Exchange rate's impact is considerably higher. 1% devaluation of taka against US dollar increases PCG by nearly 0.29%. Coefficient of Interest rate differential is neither significant nor has expected sign. Financial sector reform exerts negative impact on PCG, that is, PCG has been reduced by 4.35% after financial sector reform.

Table-4.4: Estimation Result of Regression equation 2a and 2b

Variable/constant	Equation-2a		Equation-2b	
	Coefficient	't' ratio	Coefficient	't' ratio
CONSTANT	-2.0019	-0.3376	-6.9947	-1.127
PCG _{t-1}	0.65798	4.253*	0.90058	8.832*
I _t	-0.040055	-2.022***	-0.037279	-1.725***
ER _t	0.28919	3.048*		
ID _t	0.13954	0.1600	0.80749	0.9285
XM _t			0.23955	2.644**
D _t	-4.3586	-2.973*	-2.5470	-1.873***
R ²	0.9662		0.9635	
Adjusted R ²	0.9585		0.9552	
BG statistic	1.05854		0.6265	

Note: *: Significant at 1%, **: Significant at 5%, ***: Significant at 10%

In model (2b) all variables, except, interest rate differential, have significant impact of PCG and coefficients of all variables, except interest rate differential and financial sector reform, have expected signs. PCG_{t-1} has the highest impact on PCG_t. A 1% increase in PCG_{t-1} leads to 0.90% increase in PCG_t. Impact of inflation on PCG_t, is, like model (2a), is very low here too. 1% increase in inflation causes PCG_t to decrease by only 0.037%. Trade openness (XM) contributes to PCG significantly as per expectation. 1% increase in trade openness increases PCG by almost 0.24%. Financial sector reform measures did not improved PCG, rather it was reduced in the post reform period. In the post-reform period PCG has been reduced by nearly 2.55%.

BG statistics in both the models, which do not exceed critical χ^2 value at 5% significance level, indicate absence of autocorrelation in data. High R² and adjusted R² in both models imply that the models are quite reliable in terms of their explanatory power.

Estimation results of regression model (3a) and (3b) are presented in Table-4.5. In model (3a) coefficients of all variables, except interest rate differential (ID), are statistically significant. Coefficients of interest rate differential variable and financial sector reform dummy (D) do not have expected signs. One period lag value of bank deposit as a percentage of GDP (BDG_{t-1}) has the highest impact (0.70%) on its current period's value. Inflation's (I_t) impact is quite low. A 1% increase in inflation rate leads to 0.098% decrease in BDG_t . Exchange rate has moderate impact on BDG_t . A 1% devaluation increases BDG_t by 0.21%. Interest rate differential has higher impact (0.35%) than exchange rate, but it is statistically insignificant. Result shows that financial sector measures reduced BDG_t during the post reform period by 4.21%.

Table-4.5: Estimation Result of Regression equation 3a and 3b

Variable/constant	Equation-3a		Equation-3b	
	Coefficient	't' ratio	Coefficient	't' ratio
CONSTANT	0.44543	0.08947	-2.1123	-0.3647
BDG_{t-1}	0.70359	5.543*	0.95792	9.203*
I_t	-0.09889	-5.482*	-0.11694	-5.432*
ER_t	0.21629	3.034*		
ID_t	0.35295	0.5459	0.57155	0.7642
XM_t			0.087774	1.036
D_t	-4.2112	-3.464*	-2.1362	-1.887***
R^2	0.9668		0.95792	
Adjusted R^2	0.9592		0.9448	
BG statistic	4.5974		0.01266	

Note: *: Significant at 1%, **: Significant at 5%, ***: Significant at 10%

In model (3b) interest rate differential and trade openness are found to have insignificant impact on BDG_t , of which trade openness has the expected sign. All other variables are found to be statistically significant. Except financial sector reform

dummy, all coefficients have expected signs. Out of these variables, 1% increase in BDG_{t-1} causes BDG_t to increase by 0.96%. Inflation's impact is not so large. 1% increase in inflation rate leads to 0.12% decrease in BDG_t . Though insignificant and have wrong sign, interest rate differential's impact is quite substantial. 1% increase in interest rate differential leads to 0.60% increase in BDG_t . Impact of trade openness (XM_t) is very minimum and insignificant. 1% increase in trade openness causes BDG_t to increase only by 0.09%. Financial sector reform measures reduce BDG_t significantly (2.14%) in the post reform period.

Both models are free from autocorrelation problem as their BG statistics does not exceed critical χ^2 value at 5% significance level. Also the models have quite high explanatory power as indicated by their R^2 and adjusted R^2 values.

4.3 Test of Effectiveness of Financial Intermediation

Effectiveness of financial intermediation is measured by both the (i) ratio of reserve money to total deposit and (ii) ratio of reserve money to quasi-money. If these ratios decrease in the post reform period, it will be concluded that the banking system achieved greater efficiency in mobilizing deposits, that is, effectiveness of financial intermediation has been improved in the post reform period. In order to examine whether effectiveness of financial intermediation has been improved in the post-reform period, total period covered by the study is divided into two sub-periods: 1974-1989 and 1990-2002. It is assumed that mean values of the measure of effectiveness of financial intermediation of these two periods are μ_1 and μ_2 respectively. Then statistical test for differences between means (small sample) is

conducted to test the null hypothesis that there is no difference between the means that is $\mu_2 = \mu_1$ against the alternative hypothesis that $\mu_2 \neq \mu_1$. It is assumed that the observations are normally distributed with equal variance. The tests results (presented in Appendix-4.B) show that in case of ratio of reserve money to total deposit null hypothesis $H_0: \mu_1 = \mu_2$ is rejected at 1% significance level against the alternative hypothesis $H_1: \mu_1 > \mu_2$ which means effectiveness of financial intermediation as measured by this ratio has been deteriorated in the post reform period. In case of the ratio of reserve money to quasi money null hypothesis $H_0: \mu_1 = \mu_2$ is not rejected at 1% significance level against the alternative hypothesis $H_1: \mu_1 < \mu_2$ which means effectiveness of financial intermediation as measured by this ratio has not recorded any improvement during the post reform period. Thus no measure does present any evidence that financial sector reform measures undertaken have improved the efficiency of the banking sector in mobilizing deposits.

4.4 Analysis of findings

In general all models performed quite well in terms of their explanatory power as indicated by the adjusted R^2 . With regard to variables only interest rate differential is found to be insignificant and has sign contrary to expectation in all specifications. This result indicates that deposits and advances are not interest sensitive. For that reason, measures of financial intermediation does not have statistically significant expected relationship with interest rate differential. Another factor is also noteworthy in this respect. Interest rate on deposit and advances are not determined by market forces in Bangladesh. The behavior of commercial banks in the determination of interest rates on deposits and advances indicates that banks as a

group fix their interest rates at a uniform level with minor deviations among the group of banks (Khan, 2001). Had interest rates been determined by market forces, financial intermediation would have shown clear and predictable relationship with interest rate differential.

Inflation has statistically significant negative impact on all measures of financial intermediation as expected. This implies that increased macroeconomic instability reduces the volume of financial intermediation. It has also negative impact on economic growth. From Granger-causality tests it is found that financial intermediation Granger causes economic growth. Therefore, inflation exerts its negative impact on economic growth indirectly through financial intermediation.

Positive and statistically significant impact of exchange rate on all measures of financial intermediation supports the view that devaluation expands output by both inducing an efficient allocation of resources from non-tradable sector to tradable sector and changing the composition of private spending between domestic and foreign goods and services (Agenor and Montiel 1996). This positive impact on output of devaluation is channeled through financial intermediation.

Trade openness has statistically significant positive impact on private credit as a percentage of GDP. This is because increased imports and exports necessitate increased amount of credit in these sectors. Private credit is needed to finance importation of capital machinery and raw materials for production at home. On the other side, exporting firms also need credit to facilitate production required to meet increased export demand. For this reason trade openness has positive impact on

financial intermediation as measured by the private credit as a percentage of GDP. Trade openness also contributed to the increased volume of broad money and total bank deposit, but they were not statistically significant.

Coefficients of financial sector reform indicate that the volume of financial sector reform has been decreased in the post-reform period as compared to the pre-reform period. Tests of effectiveness of financial intermediation also indicate that no improvement has been recorded in the effectiveness of financial intermediation during the post reform period. Even the effectiveness has been deteriorated when measured by the ratio of reserve money to total deposit during the post reform period. The reform measures were taken to enhance the efficiency of the financial system, mainly banking sector, by smoothing its intermediative function. But that objective has not been fulfilled. This failure of financial sector reform measures to enhance financial intermediation may be assigned to the stringent regulation imposed on banking institutions with regard to classification, provisioning, capital adequacy etc. on one hand and lack of effective legal support to recover bad debts on the other hand. As banks do not have effective authority to recover their bad debts, they became reluctant to extend credit to avoid the risks of being classified as problem bank by central bank as per its off-site (CAMEL rating) and on-site supervision. This can be explained with the help of Table-13 below:

Table-4.6: Excess Reserve as a percentage of total deposit

(Amount in Tk. Cr)

Year	Total Deposit	Excess Reserve	Excess Reserve as % of TD
1973-74	913.4	39.9	4.368294
1974-75	969.4	38	3.91995
1975-76	1067	36.4	3.411434
1976-77	1383.6	28.8	2.081526
1977-78	1636.7	17.4	1.063115
1978-79	2146.7	36.7	1.709601
1979-80	2551.5	106.8	4.185773
1980-81	3221.2	89.7	2.784677
1981-82	3671.2	56.9	1.549902
1982-83	4759.7	0.6	0.012606
1983-84	6829.5	34	0.49784
1984-85	8811.3	135.2	1.534393
1985-86	10385	106.8	1.028406
1986-87	12278.2	294.4	2.397746
1987-88	13993	277.9	1.985993
1988-89	16462.5	191.8	1.165072
<i>Average</i>			<i>2.106021</i>
1989-90	19109.3	114	0.596568
1990-91	21392.6	389	1.818386
1991-92	24453.3	619.3	2.532583
1992-93	27055.5	2290.1	8.464453
1993-94	30987	3095.2	9.988705
1994-95	35647.2	1753.1	4.917918
1995-96	38561	1125.9	2.919789
1996-97	43136.4	1674.4	3.881641
1997-98	47715.7	2002.1	4.195894
1998-99	54340.1	2611.3	4.805475
1999-00	64586.4	2906.6	4.500328
2000-01	75695.9	3271	4.321238
2001-02	86075.3	5957.2	6.920917
<i>Average</i>			<i>4.604915</i>

Source: Economic Trend, various issues.

Excess reserve as a percentage of total deposit increased during the post-reform period. During the period 1973/74 - 1989/90 excess reserve, on average, was around 2% of total deposit (demand deposit plus time deposit), but this figure increased to around 5% during the period 1990/91 to 2001/02. This implies that banks do not have enough suitable credit avenues that could be recovered without

putting the lending banks in trouble. This point is also supported by Choudhury, Moral and Banarjee (2000) as follows:

Financial measures give greater freedom and autonomy to the banks in the form of financial discipline (such as loan classification and provisioning, applying LRA etc) to improve their quality of lending. The “autonomy” measures are supposed to raise the aggregate lending of banks. But, instead of raising, growth in lending has declined, because of more concerns of bankers regarding financial discipline.

Excess reserve also leads to decline in deposit growth, because if banks can not earn income by lending deposits to borrowers, they will not increase their interest expenses on deposit by accepting new deposits.

During the period 1990/91 – 2001/02 the situation of classified loan did not improve at all. From Table-4.7 below it is clear that classified loan as a percentage of total loans of the banking sector remained almost same in the years 1990/91 and 2001/02. Moreover, during the periods 1992/93 – 1999/00 it shows steady increase in the amount of classified loan. Revised provisioning system causes classified amount to be so high. Bulk of this classified loan was bad/loss, against which banks are required to maintain 100% provision, which, in turn, reduces their profit.

Table-4.7: Classified Loan: 1990/91 - 2001/02.

(Taka in billion)

Year	Total Loans	Total classified loan (TCL)	Classified loans as a % of total loans	Bad/loss as % of TCL
1990-91	177.12	46.21	26.09	NA
1991-92	185.60	46.54	25.00	NA
1992-93	214.36	65.74	30.67	NA
1993-94	244.28	85.16	34.86	NA
1994-95	262.78	91.56	34.85	NA
1995-96	310.29	99.42	32.04	74.56
1996-97	351.00	110.54	31.49	74.31
1997-98	462.27	173.32	37.49	80.42
1998-99	312.95	199.03	39.18	87.62
1999-00	342.04	238.79	41.11	86.47
2000-01	552.65	164.84	29.83	89.01
2001-02	641.64	169.35	26.39	88.53

N/A: Not available

Source: Adhikary (2003).

Had the legal environment relating to the recovery of bad loans been effective, banks could have extend loans and recovered them and kept their financial strength favorable enough to be considered as good banks.

Ineffective legal environment to deal with the default cases can be judged in terms of the performance of Artha Rin Adalat. Performance of Artha Rin Adalat (ARA), established as per Artha Rin Adalat Ain-1990 to exclusively try suits relating to recovery of loans dues to banks and financial institutions, is not satisfactory. Haque (2003) in his study on the performance of financial courts in Bangladesh finds that recovery of bad loans through ARA is very poor. For example, Agrani Bank, between December 1995 and December 2000 could recover only 8.00% of due amount through ARA. This legal process required to recover due loans consumes long time and huge amount of legal expenses. For Agrani Bank, cumulative legal

expenses for the above mentioned period was Tk.5.6 crores. Haque (2003) also shows the aging schedule of suits filed at ARA by Bangladesh Shilpa Bank (BSB).

Table-4.8: Aging Schedule for Suits Filed as on December 31, 2000.

Years Suits pending	No. of Suits	% of total	Amount claimed (Tk. Cr)	% of total claimed
10 years and above	1788	24.63	42.32	4.31
Above 7 and below 10 years	1161	16.00	163.16	16.62
Above 5 and below 7 years	1586	22.00	115.95	11.81
Above 3 and below 5 years	1898	26.14	212.80	21.67
Below 3 years	827	11.39	447.71	45.59
Total	7260	100%	981.97	100%

Source: Haque (2003).

From Table-4.8 it is seen that about one quarter of the suits filed are pending for more than 10 years and 88% of suits, filed for about 55% of total amount claimed, are pending for more than three years. During such a long period more asset stripping takes place by the borrowers and that is why so little is actually realized by banks (Haque 2003). Besides, in terms of present value the amount recovered is of much lower value to the bank. This is a reflection of the overall recovery situation in the banking sector. Due to this inefficient legal environment banks can not realize their due amount, which soar their bad loan portfolio.

So it is seen that after financial sector reform measures undertaken, effective legal support for the banking institutions were not built up. They do not take the risk of being classified as problem bank as per on-site and off-site supervision of Bangladesh Bank. If effective legal support is not available, negative effect of bad

loans are two fold: they raise the possibility of a banks categorization as problem bank and second, provision against bad loan reduces profit of the bank. Besides, the situation has been further aggravated by the government's branch rationalization program under which many loss making rural branches has been closed down (Bhattacharya and Titumir, 2001). All these aspects contributed to the decline in the volume of financial intermediation in the post-reform period.

Chapter- Five

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This concluding chapter contains summary and conclusion of the thesis and recommendations in the light of the findings of the study. The chapter begins with summary and conclusion of the thesis which narrates how the entire research work is conducted including methodology and findings. Next some recommendations are made based on empirical findings between FSR and FI in Bangladesh.

5.1 Summary and conclusion

Financial sector of a country plays a critical role in the process of economic development by efficiently mobilizing financial resources among the most productive uses. Development of financial sector, by reducing information asymmetry and transaction costs, encourages financial savings and investment. Since investment is critical for economic development, growth impact of financial intermediation (financial deepening) and development is significant.

But this role of financial sector in the development process of a country was overlooked until mid-1970s. According to the early development economists underdevelopment was caused primarily by market failure. So the policy prescription that follows this view was to impose economic regulation on financial sector in the form of interest rate ceiling (which is often referred to as 'financial repression'), selective credit allocation etc. This view of development economics came under severe attack with the publication of two seminal works by McKinnon (1973) and Shaw (1973). These two literatures generated a new dimension in the

analysis of economic development-financial deepening relationship. They suggested that financial deepening or development (depth or volume of financial intermediation) is an essential ingredient of the process of capital accumulation as reflected in savings and investment ratios and their productivity. This, in turn, contributes to economic growth.

Realizing this importance of financial sector, almost all countries, developed as well as developing, in the world have been undertaking reform measures since 1970s. The major aim of financial sector reform in developing countries were to liberalize the financial sector from repression with a view to improving saving-investment process, that is, improving financial intermediation and accelerating the process of economic growth through enhancing the efficiency of their financial sectors. Before 1990 Bangladesh had a financially repressed economy. So, like other developing countries, Bangladesh also started adopting a number of financial sector reform measures since 1990 with a view to enhance the efficiency of her financial system to mobilize financial resources and channel them in profitable investment opportunities.

Research studies concerning financial sector reform in Bangladesh so far conducted mainly focus on the impact of different financial sector reform measures on the overall financial system. Hassan (1997) reviews the performances of FSRP on different financial sector aspects like interest rate, bad debt and loan recovery, privatization of banks, central bank autonomy etc. Raquib (1999) makes an overall evaluation of FSRP. Brownbridge and Gayi (1999) assess the progress, constraints and limitations of FSRP in some selected LDCs including Bangladesh. Choudhury,

Moral and Banerjee (2000) evaluate the impact of reform measures on the financial sector of Bangladesh, especially, on the banking sector. Chowdhury (2000) studies effects of national politics on the outcomes of FSRP. Specific attention has also been given in some studies. Khan (2002) examines the evolution of monetary policy in Bangladesh in the pre and post reform period. Ahmed (1993) looks at the outcome of FSRP in respect of interest rate liberalization measure. Latif and Basher (2000) studied the impact of FSRP on the stability of money demand function in Bangladesh. Among these, no studies paid special attention to the issue of financial intermediation. Although two studies (Brownbridge and Gayi, 1999 and Choudhury, Moral and Banerjee, 2000) discuss the impact of FSRP on, among other aspects, financial depth, it was in very limited form. They simply took the ratio of M_2 to GDP and compare them between pre and post FSRP period. No model building and econometric estimation of financial intermediation.

The role of financial intermediation in economic growth process is a recognized fact now. So, this issue deserves serious attention. Moreover, financial intermediation has not been examined through econometric modeling in the context of Bangladesh. Thus it remained an area yet to be investigated in detail. In this backdrop, the objectives of this research study were to examine the impact of financial reform measures on the intermediative role of the banking sector in Bangladesh. In other words, this study investigated whether the financial reform measures have improved the volume and efficiency of financial intermediation of the banking sector in Bangladesh.

Since the early 1980s many developing countries started liberalizing their financial sector as a part of wider structural adjustment programs. The prime impetus behind liberalizing financial sector was financially repressed economy characterized by interest rate ceiling, government directives over allocation of credit and government ownership of financial institutions.

Although ceiling on interest rate are maintained partly to encourage investment, partly to redistribute income and partly because government itself wishes to borrow cheaply, these ceiling in some countries have resulted in high negative real interest rate, especially in countries with rapid inflation. Ceiling on interest rate hinders the growth of financial savings and reduce the efficiency of investments. The evidence suggests that government intervention in credit allocation, another aspect of financial repression, has been an inefficient way of redistributing income. Thus financially repressed economy characterized by administered interest rate, directed credit allocations and government ownership of financial institutions necessitated introduction and implementation of financial sector reform measures in developing countries. The most significant liberalization programs feature an interest rate policy, either in the form of interest rate liberalization or a more flexible management of administered interest rate.

Until the early 1980s, Bangladesh had a highly repressed financial sector characterized by administered interest rate, government ownership of financial institutions, directed credits etc. It started reforming its financial sector by denationalizing government owned bank and permitting private banks to operate in the financial sector in the early 1980s. But these reform measures could not bring

about desired level of competition and efficiency in the banking sector. As a result, as per suggestion made by two reports, one by World Bank Mission and the other by the National Commission on Money, Banking and Credit, Financial Sector Reform Project (FSRP) was launched in 1990, which ended in 1996. The issues addressed by the FSRP were (i) Interest rate liberalization, (ii) Loan Classification and provisioning, (iii) Capital adequacy, (iv) Indirect monetary management, (v) Legal reforms, (vi) Strengthening of central bank, (vii) Strengthening of bank supervision. (viii) Improving operational efficiency of commercial banks.

In May 1997 a Commercial Bank Restructuring Project (CBRP) is also undertaken to take the stock of progress on key issues and identify urgent actions that need to be taken for the development of commercial banks in Bangladesh. CBRP placed some recommendation for improving the overall situation of banking sector which may be put into following headings (i) Supervisory and Regulatory Restructuring; (ii) Reforms of Bangladesh Bank; (iii) Restructuring of NCBs; and (iv) Restructuring of Legal Framework.

As a part of this continuous reform initiative another project has been approved by the World Bank entitled “Central Bank Strengthening Project” for Bangladesh on June 19, 2003. The objective of the project is to achieve a strong and effective regulatory and supervisory system for Bangladesh’s banking system.

As the major and comprehensive reform measures of the financial sector of Bangladesh was started by launching Financial Sector Reform Project (FSRP) in 1990, this study takes the period prior to 1990 as pre-reform period and period onward

1990 as post reform period and examines the behavior of financial intermediation between these two periods. The study covers the period from 1974 to 2002. Two aspects of financial intermediation are examined - volume of financial intermediation (often called financial depth or financial development) and efficiency of financial intermediation. Three measures of volume of financial intermediation are used in this study - (i) Broad money (M2) as a percentage of GDP, (ii) Private credit as a percentage of GDP and (iii) Bank Deposit Liabilities as a percentage of GDP. In examining the behavior of the volume of financial intermediation a regression model is specified and solved by Ordinary Least Square (OLS) method. Independent variables in the regression model are (i) Interest rate differential, i.e. difference between lending and deposit rate, (ii) Inflation as measured by the growth rate of GDP deflator, (iii) Nominal Exchange Rate, (iv) Trade openness as measured by the sum of total export and import as a percentage of GDP. To capture the effect of financial sector reform a dummy variable is used in the model that takes '0' value for the period 1974-1989 and '1' for the period 1990-2002. As there is huge amount of debate over the causation between financial intermediation and economic growth, Granger causality test is performed to ascertain the causality. The test confirms the view that financial intermediation causes economic growth. For this reason the economic growth variable is not included in the regression model as an independent variable.

With regard to the effectiveness of financial intermediation two measures are used - (i) ratio of reserve money to total deposit and (ii) reserve money to quasi-money. In order to examine whether effectiveness of financial intermediation has

been improved in the post-reform period, total period covered by the study is divided into two sub-periods: 1974-1989 and 1990-2002. Statistical test for differences between means (small sample) is conducted to test the null hypothesis that there is no difference between the means. Data required for these econometric and statistical tests are taken from International Financial Statistics (IFS) – 2003 online edition and various issues of Economic Trend, a monthly publication of Bangladesh Bank.

Estimation results show that both volume and effectiveness of financial intermediation (as measured by ratio of reserve money to total deposit) has been statistically significantly reduced during the post-reform period as compared to pre-reform period and effectiveness of financial intermediation as measured by the ratio of reserve money to quasi money remains unchanged. Thus financial sector reform did not bring about any improvement in the volume and effectiveness of financial intermediation. This deterioration in financial intermediation may be attributed to the imbalanced legal supervisory structure in the banking sector. Stringent classification and provisioning system led to high default situation, but due to ineffective or less effective legal environment to recover those default loans made banks reluctant to accelerate the growth of their credit.

5.2 Recommendations

Therefore it is seen that financial sector reform measures undertaken since 1990 could not bring about desired result in our banking sector. Bad loan still remains a major problem in the banking sector, capital adequacy has not been achieved by NCBs, performance of financial courts are not satisfactory and competition is still

absent in the financial market as shown using interest rate spread (Bhattacharya and Titumir, 2001). In order to get rid of these problems following courses of actions are recommended:

- (1) Bangladesh Bank should be given autonomy so that it can work in an environment free of government intervention. Political intervention in loan decision making is a major problem in the banking sector. The main driving force behind the default culture in the country is the corrupted political institutions in the country. Mahmood (2000)⁷ noted that MPs, political leaders and union leaders influenced over 80% of bank loan to the private sector. He further noted that in 46% of cases, ministers used their influence to compel banks to sanction loans to their favored persons, while in 35% cases, MPs influenced the loan decisions of banks. A report by Banker (2004)⁸ depicted the similar picture. The report states that the majority percentage of loans of NCBs that are disbursed under the pressure from ministers, MPs or government supported trade union leaders become bad. Sobhan (2000) also observed the same phenomenon in the banking sector default culture. In his words, 'the country's political institutions are being increasingly dominated by a section of the affluent elite who exercise considerable influence on major political parties and the parliament. This in turn influences bank boards and their management to condone default by repeatedly rescheduling defaulted loans'.⁹ Thus it is seen that certain politically powerful groups play important role in producing bad debts. Therefore, in order for the banking institutions

⁷ The Daily Star, 29 May, 2000.

⁸ Banker (2004), No.4, pp.9

⁹ The Daily Star, 7 June, 2000.

to perform their financial intermediation function efficiently they should be freed from the grip of political influence so that banks can decide on their selection of credit portfolio independently and allocate the society's savings more productively. If it is done financial development will be more effective in accelerating economic growth in the country.

- (2) Legal complexities with regard to recovery of bad loans should be made effective and less time consuming, so that banks can recover their dues within a reasonable time period without incurring substantial amount of legal expenses. A weak legal infrastructure is largely responsible for non-recovery of default loan and thus deterioration of overall credit management in Bangladesh. Performances of financial courts are not satisfactory. For this reason, laws relating to loan recovery should be amended to make it more effective and quick. Some progress has been made in this respect. **Money Court Act-1990** has been amended and replaced by **Money Court Act-2003** to make the recovery process of non-performing loan more effective and quick. It is expected that this new Act will help improve the quality of banks' asset portfolio in their balance sheet to a great extent.
- (3) Only legal reform can not solve the problem of default loan. A lot more has to do by the individuals associated with processing loan application and disbursement. Lack of proper knowledge on the part of the concerned officer to screening loan application and assess risks associated with the loan, loopholes in the process of security documentation, loan disbursement before completing securities formalities etc. are some of the shortcomings on the

part of banks which are exploited by the borrowers. Therefore, proper training of the bank personnel and discipline in the internal management is essential to overcome these limitations. Use of Lending Risk Analysis (LRA) may help overcome these problems to a reasonable extent.

- (4) Privatizing commercial banks can not ensure competition in the banking sector alone. Problems ingrained in the NCBs should be also addressed with sincere efforts. It is a recognized fact that CBA (Collective Bargaining Agent) culture in NCBs has always been inimical to the proper functioning of the management. Misuse of resources of banks by the union leaders have become a norms. This has lead to higher operational cost of the NCBs. Unauthorized activities of CBA has been mentioned as one of the major problems of NCBs in Task Force Report-2001. But controlling the activities of CBA in NCBs is not possible without co-operation of major political parties as competing CBA groups are indirectly supported by them. So political parties should come forward and withdraw their support so that unauthorized activities of unions can be prohibited. To do so, Bangladesh Bank should hold talk with the leaders of major political parties and seek their sincere co-operation.
- (5) Financial sector reform measures are not enough to ensure proper intermediary function of banking sector. Other complementary aspects related to this are restoring law and order situation, ensuring good corporate governance, establishment of Non-bank Financial Institutions (NBFIs) etc. Improved law and order situation, good corporate governance will help boost investment climate in the economy, which, in turn, will increase the

volume of financial intermediation. Financial sector of Bangladesh is mainly comprised of banking institutions. NBFIs can play important role in enhancing competition in the financial sector. Although presently there are thirty (30) NBFIs operating in Bangladesh, they collectively do not even account for more than 4% of the total assets of the financial system (Debnath 2003). So policy should be formulated to increase their share in the financial system.

- (6) Lack of accountability is one of the major problems on the part of banks, specially, NCBs that needs to be improved. This issue can be addressed by publishing the financial condition of individual banks, such as CAMEL rating, publicly on regular basis. This is because people have the right to know how financially strong the bank they are dealing with. This will compel banks to become careful and serious in maintaining sound financial condition. Along with this, names of the defaulters should also be made public regularly. Defaulters take peoples' money and do not return. So people should know the person misusing their money. Socially defaulters will be degraded that will make them and others cautious about utilizing peoples' money.

Besides, some other aspects like capital adequacy of banks, proper cost-benefit analysis of investment projects, i.e. proper implementation of Lending Risk Analysis (LRA), allowing the market to determine interest rate, proper training of bank officials, restraining bank directors (owners) from intervening in the activities of

bank management etc., should be enforced in order for efficient functioning of the banks.

Financial sector reform (FSR) has multi-dimensional impact on an economy. One of them, impact on financial intermediation, is examined in this study. There are still other significant areas that deserve serious attention. One of such fields is the impact of FSR on saving behavior. Saving is one of the most important ingredients of growth. Higher investment required for rapid growth is possible when there is higher saving in the economy. Impact of FSR on saving may be positive or negative. If financial reform has favorable effect on the allocation of resources, it will generate increases in income, that will, in turn, increase saving. On the hand, increased access of the household to borrowing caused by FSR may reduce saving. So it remains an area that needs serious empirical investigation. Another area that is a potential candidate for further research is gender impact of FSR. Baden (1996) argued that financial liberalization and FSR are not gender neutral. Biasness against women in credit allocation has been empirically examined (Duggleby, 1995; Baydas *et al*, 1994) leading to the conclusion that financial market is not gender neutral. So there is huge room for further research on gender impact of FSR. Thus if the impact of FSR on different aspects of the economy can be identified, it would be easier for the policy maker to formulate policies for financial sector that is most effective and conducive to the growth of the economy.

REFERENCES

- Agenor, P.R. and P.J. Monteil (1996). "Development Macroeconomics", Princeton, New Jersey: Princeton University Press.
- Agung, F. and J. Ford (1998). "Financial Development, Liberalization and Economic Development in Indonesia, 1966-1996: Cointegration and Causality". University of Birmingham, Department of Economics, Discussion Paper No. 98-12.
- Ahmed, Abu (1993). "Financial Sector Reform: The Interest Rate Aspects". **Bank Parikrama**, vol. XVIII, no. 3 & 4, pp.38-50.
- Ahmed, A.K.N. (1997). "Of Deregulation and Central Bank Autonomy". The University Press Limited, Dhaka.
- Amable, B. and J.B. Chatelain (1996). "Endogenous Growth with Financial Constraint" in Hermes, N and R. Lensink (ed): **Financial Development and Economic Growth: Theory and experience from developing countries**. London: Routledge, Chapter 3, pp.53-62.
- Aziakpono, Meshach (2003). "Explaining the Behaviour of Financial Intermediation in the Southern African Customs Union Countries: Evidence from a Panel Data Analysis", paper presented in the **Eighth Annual Conference on Econometric Modelling for Africa**, July 1 -4, held in Department of Economics, Stellenbosch University.
- Baden, Sally (1996). "Gender issues in financial liberalization and financial sector reform". BRIDGE (development-gender) Report No. 39, Institute of Development Studies, University of Sussex.
- Baydas, M.M., R. Meyer and Nelson Alfred Aguilera (1994). "Discrimination against women in formal sector credit market: rhetoric or reality?" **World Development**, vol.21, no.71
- Beck, Thorsten; Ross Levine and Norman Loayza (1999). "Finance and Sources of Growth". **World Bank Policy Review working paper**, no. 2057.
- Becsi, Z.; Ping, W and M.A. Wynne (1998). "Endogenous Market Structures and Financial Development". **Federal Reserve Bank of Atlanta Working Paper Series**, vol. 98, issue. 15, pp.1-38.
- Bencivenga, V. and B. Smith (1991). "Financial Intermediation and Endogenous Growth". **Review of Economic Studies**, vo. 58, pp.195-209.
- Berthelemy, J.C. and A. Varoudakis (1996a). "Models of Financial Development and Growth: A Survey of Recent Literature", in Hermes, N and R. Lensink (ed): **Financial Development and Economic Growth: Theory and Experience from Developing Countries**. London: Routledge. Chapter 1, pp.7-29.

Bhattacharya, Debapriya (2001). "Bangladesh Economy in FY-2001: Macroeconomic Performance" in **Bangladesh Facing the Challenges of Globalization-A Review of Bangladesh's Development 2001**", Centre for Policy Dialogue & University Press Limited, Dhaka, pp. 30-30.

BIBM Bulletin. Vol.5, Nos. 2&3, April-September.

Brownbridge, Martin and Samuel Gayi (1999). "Progress, Constraints and Limitations of Financial Sector Reforms in the Least Developed Countries". **Finance and Development Research Programme working paper series**, paper no. 07, Institute for Development Policy and Management, University of Manchester, UK.

Bruno, M. (1979). "Stabilization and Stagflation in a Semi-Industrialized Economy", in R.Dornbusch and J. Frenkel (eds), **International Economic Policy: Theory and Evidence**, Baltimore: Johns Hopkins University Press.

Chowdhury, Anis (2000). "Politics, Society and Financial Sector Reform in Bangladesh". Working Paper No. 191, World Institute for Development Economics Research, The United Nations University.

Choudhury, Toufic A. and Md. Liakat Hossain Moral (1999). "Commercial Bank Restructuring in Bangladesh: From FSRP to BRC/CBRP". **Bank Parikrama**, vol. XXIV, no. 1, pp.92-123.

Choudhury, A.N.M. Nurul Islam and Dr. Toufic Ahmed Choudhury (1993). "Performance of Private Commercial Banks Vis-à-vis Banking Sector". **Bank Parikrama**, vol. XVIII, nos. 1&2, pp.52-63.

Choudhury, Toufic A., Md. Liakat Hossain Moral and Prasanta Kumar Banerjee (2000). "An Evaluation of the Impact of Reforms in the Financial Sector". **Studies in Bangladesh Banking**, Bangladesh Institute of Bank Management, Dhaka, pp.1-49.

De Gregorio, J. and P.E. Guidotti (1995). "Financial Development and Economic Growth". **World Development**, vol.23, no.3, pp.433-448.

Diamond D.W. (1984). "Financial Intermediation and Delegated Monitoring". **Review of Economic Studies**, vol.61 (July), pp.393-414.

Diamond D.W. and P. Dybvig (1983). "Bank Runs, Deposit Insurance and Liquidity". **Journal of Political Economy**, vol.85 (April), pp.191-206.

Duggleby, T. (1995). "Assisting African economic recovery: generating a stronger supply response from Africa's working poor as a part of economic and financial sector reform". A working paper presented at the Poverty Working Group, Special Programme for Africa, Submitted to Africa Technical Division, Human Resources Department, world Bank, August 31th.

Edwards, S. (1986). "Are Devaluation Contractionary". **Review of Economics and Statistics**, vol.68, pp. 501-508.

Engle, R.F. and C.W.J. Granger (1987). "Co-Integration and Error Correction: Representation, Estimation and Testing". **Econometrica**, vol.55, pp.251-276.

"Financial Sector Reform". **Report of the Task Forces On Bangladesh Development Strategies for the 1990s**, University Press Ltd, Dhaka-1991.

Garcia, V.F. and L. Liu (1999). "Macroeconomic Determinant of Stock Market Development". **Journal of Applied Economics**, vol.2, no.1, pp.29-59.

Ginebri, Sergio; Giacomo Petrioli, and Laura Sabani (2001). "Financial Deepening, Trade Openness and Growth: a Multivariate Cointegrated Analysis of the Complementary Effects". **CIDEI WP No. 62**.

Goldsmith, R.W. (1969). "Financial Structure and Development". Yale University Press, New Haven, CT.

Graff, M. (2001). "Financial Development and Economic Growth in Corporatist and Liberal Market Economies". Paper presented at the 30th Annual Conference of Economicists. Perth, September 24th.

Granger, C.W.J. (1969). "Investigating Casual Relations By Econometric Models and Cross-Spectral Methods". **Econometrica**, vol. 37, pp.24-36.

Green, E.J. and Ping, L. (2000). "Diamond and Dybvig's Classical Theory of Financial Intermediation: What's Missing?". **Quarterly Review**, Federal Reserve Bank of Minneapolis, Winter.

Greewood, J. and B. Jovanovic (1990). "Financial Development, Growth and Distribution of Income". **Journal of Political Economy**, vol.98, pp.1076-1107.

Gujarati, Damodar N. (1995). "Basic Econometrics", (3rd ed.), McGraw-Hill, Inc.

Gylfason, T. and M. Schmid (1983). "Does Devaluation Cause Stagflation?". **Canadian Journal of Economics**, vol.16, 641-654.

——— and O. Risager (1984). "Does Devaluation Improve the Current Account?". **European Economic Review**, vol.25, 37-64.

——— And M. Radetzki (1985). "Does Devaluation Make Sense in the Least Developed Countries?", Institute for International Economic Studies, University of Stockholm, IIES Seminar Paper No. 314, Stockholm.

Hanson, J.A. (1983). "Contractionary Devaluation, Substitution in Production and Consumption and the Role of Labor Market". **Journal of International Economics**, vol.14, pp.179-189.

_____ And C.R. Neal (1985). "Interest Rate Policies in Selected Developing Countries 1970-1982", **World Bank Staff Working Papers**, no. 753.

Hassan, M.K. (1997). "The Review of Financial Sector Reform in Bangladesh", in **Growth or Stagnation? A Review of Bangladesh's Development**, Dhaka: CPD/UPL. Chapter-3, pp. 55-98.

Hellwing, M.F. (2000). "Financial Intermediation with Risk Aversion". **Review of Economic Studies**, vol.67, pp.719-743.

Huda, Md. Nazrul (1997). "Bangladesh's Financial Sector: An Overview". **Bank Parikrama**, vo. XXII, nos. 3&4, pp-33-54.

Kamas, L. (1992). "Devaluation, National Output and the Trade Balance: Some Evidence from Colombia". **Weltwirtschaftliches Archive**, pp.425-444.

Khan, Syed Ahmed (2002). "An Evaluation of Monetary Policy before and after Financial Sector Reforms in Bangladesh". **Journal of the Institute of Bankers Bangladesh**, vol.48, pp.48-70.

King, Robert. G. and Ross Levine (1992). "Financial Indicator and Economic Growth in a Cross Section of Countries". **PRE Working Paper**, no. 819 (Washington: World Bank).

_____ (1993a). "Finance, Entrepreneurship and Growth: Theory and Evidence". **Journal of Economics**, vol.32, pp.513-542.

_____ (1993b). "Finance and Growth: Schumpeter Might Be Right". **Quarterly Journal of Economics**, vol.108, no.3, pp.717-37.

_____ (1993c). "Financial Intermediation and Economic Development" in Mayer, C. and Vives, X (Eds), **Capital Markets and Financial Intermediation**, Center for European Economic Policy Research, London.

_____ (1993d). "Finance and Growth: Schumpeter Might Be Right". **Quarterly Journal of Economics**, vol.108, no.3, pp.717-37.

Latif, Ehsan and O.H.M.N. Bashar (2000). "Financial Reforms and Stability of Money Demand Function: An Econometric Study of Bangladesh". **Bank Parikrama**, vol. XXV, nos. 2&3, pp. 22-30.

Leamer, E.E. (1985). "Vector Auto regressions for Causal Inference". In K. Brunner and A. Meltzer (eds), pp.255-304.

Levine, Ross (1991). "Stock Market, Growth and Tax Policy". **Journal of Finance**, vol.46, no.4, pp.1445-1465.

_____ (1998). "The Legal Environment, Banks and Long-Run Economic Growth". **Journal of Money, Credit and Banking**, vol.30, no.3, pp.596-613.

————— (2003). "More on Finance and Growth: More Finance, More Growth?". **Review**, Federal Reserve Bank of St. Louis, vol.85, no.4, pp.31-46.

Levine, Ross; Loayza, N and Beck, T. (2000). "Financial Intermediation and Economic Growth: Causality and Causes". **Journal of Monetary Economics**, vol.46, pp.31-77.

Levine, Ross and S. Zervos (1998). "Stock Markets, Banks and Economic Growth". **American Economic Review**, vol.88, no.3, pp.537-558.

Lizondo, J.S. and P.J. Monteil (1989). "Contractionary Devaluation in Developing Countries: An Analytical Overview". **IMF Staff Paper**, no.36.

Long, M. and F. Evenhouse (1989). "Restructuring Distressed Financial Systems". **Finance and Development**, vol. 25, no.3.

Lynch, D. (1996). "Measuring Financial Sector Development: A Study of Selected Asia-Pacific Countries". **Developing Economies**, vol.34, no.1, pp.3-33.

Lyons, S.E. and V. Murinde (1994). "Cointegration and Granger Causality Testing of Hypothesis on Supply-Leading and Demand Following Finance". **Economic Notes**, vol.23, no.2, pp.308-316.

Lucas, Robert E. Jr. (1988). "On the Mechanics of Economic Development". **Journal of Monetary Economics**, vol. 22, no.1, pp.3-42.

Maddala, G.S. (2002). "Introduction to Econometrics" (3rd Ed). John Wiley & Sons (Asia) Pte. Ltd., Singapore.

Meier, Gerald M. and Dudley Seers (1984). "Pioneers in Development". Oxford University Press.

McKinnon, Ronald (1973). "Money and Capital in Economic Development". The Brookings institution, Washington, D.C.

Miller, Merton H. (1998). "Financial Markets and Economic Growth". **Journal of Applied Corporate Finance**, vol. 11, no.3, pp.8-14.

Moral, Md. Liakat Hossain (2000). "Impact of New Loan Regulations on Loan Portfolio Management in Bangladesh". **Studies in Bangladesh Banking**, Bangladesh Institute of Bank Management, Dhaka, pp. 51-172.

Murinde, V. and F.S.H. Eng (1994). "Financial Restructuring and Economic Growth in Singapore". **Savings and Development**, vol.18, no.2, pp.225-246.

Patric, H.T. (1966). "Financial Development and Economic Growth in Underdeveloped Countries". **Economic Development and Cultural Change**, vol.14, no.2, pp.174-189.

Polizatto, Vincent P (1992). "Prudential Regulation and Banking Supervision" in Vittas, Dimitri **Financial Regulations: Changing the Rules of the Game**. The World Bank, Washington D.C.

Posen, Adam (1995). "Central Bank Independence and Disinflationary Credibility: A Missing Link?" **Staff Report No.01**, Federal Reserve Bank of New York.

Raquib, Abdur (1999). "Financial Sector Reform in Bangladesh-An Evaluation". **Bank Parikrama**, vol.XXIV, nos. 3 & 4, pp. 5-24.

Rashid, M. Mamudur (1994). "Financial Sector Liberalization in Bangladesh- The Impact of Interest Rate Flexibility". **Journal of Business Administration**, vol. 20, no.1&2, pp.59-74.

Rother, C.R. (2001). "Explaining the Behavior of Financial Intermediation: Evidence from Transition Economies". **Russian and East European Finance and Trade**, vol.37, no.3, pp.77-105.

Sachs, J.D. and A.M. Warner (1997). "Natural Resource Abundance and Economic Growth", (processed), Center for International Development and Harvard Institute for International Development.

————— and Larrain, F. (1993). "Macroeconomics in Global Economy", New York: Harvester Wheatsheaf.

Saint-Paul, G. (1992). "Technological Choice, Financial Markets and Economic Development". **European Economic Review**, vol. 36, pp.763-781.

Shaw, E. (1973). "Financial Deepening in Economic Development". Oxford University Press.

Wachtel, Paul (2003). "How Much Do We Really Know about Growth and Finance?". **Economic Review**, Federal Reserve Bank of Atlanta, vol.86, no.1, pp.33-47.

Wood, A. (1993). "Financial Development and Economic Growth in Barbados: Causal Evidence". **Savings and Development**, vol.17, no.4.

Appendix-2.A

STRUCTURE OF FINANCIAL SECTOR OF BANGLADESH

Structure of financial sector of Bangladesh composed of (1) Banks (2) Insurance companies (3) Non-Bank Financial Institutions (NBFIs) and (4) Stock Exchange.

(1) **Banks:** After liberation, the banks operating in Bangladesh (except those incorporated abroad) were nationalized. These banks were merged and grouped into six commercial banks. Of the total six commercial banks, Pubali Bank Ltd. were subsequently transferred to the private sector with effect from January, 1985. The two government owned specialized banks were renamed as Bangladesh Krishi Bank (BKB) and Bangladesh Shilpa Bank (BSB). In March 1987, BKB was bifurcated and another specialized bank emerged as Rajshahi Krishi Unnayan Bank (RAKUB) for Rajshahi Division. Bank of Small Industries & Commerce Ltd. (BASIC) started its operation as a private bank from September, 1988. Later on BASIC was brought under the direct control of the Government and was reckoned to as a specialized bank with effect from June, 1993. From July, 1995 again the BASIC was categorized as a private bank. In 1997, Government decided to treat this bank as a specialized bank again. So at present BASIC is a specialized bank. The structure of the banking sector in Bangladesh at present¹⁰ is as under:

A. Nationalized Comercial Banks:

- i. Agrani Bank
- ii. Janata Bank
- iii. Rupali Bank Ltd.
- iv. Sonali Bank

¹⁰ The list is taken from Schedule Bank Statistics, January-March quarter, 2003.

B. Specialized Banks:

- i. Bangladesh Krishi Bank (BKB)
- ii. Bangladesh Shilpa Bank (BSB)
- iii. Rajshahi Krishi Unnayan Bank (RAKUB)
- iv. Bank of Small Industries & Commerce Bangladesh (BASIC)
- v. Bangladesh Shilpa Rin Sangstha (BSRS)

C. Private Banks:

(a) Foreign Banks

- (i) American Express Bank Ltd.
- (ii) Standard Chartered Bank¹¹
- (iii) State Bank of India
- (iv) Habib Bank Ltd.
- (v) Citi Bank N.A.
- (vi) National Bank of Pakistan
- (vii) The Hongkong & Shanghai Banking Corporation (HSBC) Ltd.
- (viii) Woori Bank¹²
- (ix) Credit Agricole Indosuez
- (x) Shamil Bank of Bahrain E.C.

(b) Private Banks (Incorporated in Bangladesh excluding Islami Banks):

- (i) Arab Bangladesh Bank Ltd.
- (ii) National Bank Ltd.
- (iii) The City Bank Ltd.
- (iv) International Finance Investment and Commerce Bank (IFIC) Ltd.
- (v) United Commercial Bank Ltd. (UCBL)
- (vi) Pubali Bank Ltd.
- (vii) Uttara Bank Ltd.
- (viii) Eastern Bank Ltd.

¹¹ Standard Chartered Grindlays Bank was merged with Standard Chartered Bank from January-March quarter, 2003.

¹² The Hanvit Bank, a foreign private bank, was renamed as Woori Bank from October 2002.

- (ix) National Credit and Commerce Bank Ltd. (NCCBL)
- (x) Prime Bank Ltd.
- (xi) Southeast Bank Ltd.
- (xii) Dhaka Bank Ltd.
- (xiii) Dutch Bangla Bank Ltd. (Joint Collaboration).
- (xiv) Mercantile Bank Ltd.
- (xv) Standard Bank Ltd.
- (xvi) Bank Asia Ltd.¹³
- (xvii) One Bank Ltd.
- (xviii) EXIM Bank Ltd.
- (xix) Bangladesh Commerce Bank Ltd.
- (xx) Mutual Trust Bank Ltd.
- (xxi) Premier Bank Ltd.
- (xxii) The First Security Bank Ltd.
- (xxiii) The Trust Bank Ltd.
- (xxiv) Shahjalal Bank Ltd.
- (xxv) Jamuna Bank Ltd.
- (xxvi) BRAC Bank Ltd.

(c) Islamic Banks:

- (i) Islami Bank Bangladesh Ltd.
- (ii) Al-Baraka Bank bangladesh Ltd.
- (iii) Al-Arafah Islami Bank Ltd.
- (iv) Social Investment Bank Ltd.

(Source: Schedule Bank Statistics, January-March, 2003)

(2) **Insurance Companies:** Presently there are 44 general and 18 life insurance companies operating in Bangladesh.

(i) General Insurance companies:

1. Sadharan Bima Corporation
2. Bangladesh General Insurance Co. Ltd.

¹³ Muslim Commercial Bank was merged with Bank Asia Ltd. from the quarter January-March, 2002.

3. Peoples Insurance Co. Ltd.
4. United Insurance Co. Ltd.
5. Bangladesh Co-operative Insurance Co. Ltd.
6. Green Delta Insurance Co. Ltd.
7. Pragati Insurance Co. Ltd.
8. Eastern Insurance Co. Ltd.
9. Karnaphuly Insurance Co. Ltd.
10. Eastland Insurance Co. Ltd.
11. Janata Insurance Co. Ltd.
12. Phoenix Insurance Co. Ltd.
13. Federal Insurance Co. Ltd.
14. Central Insurance Co. Ltd.
15. Reliance Insurance Co. Ltd.
16. Rupali Insurance Co. Ltd.
17. Purabi Insurance Co. Ltd.
18. Prime Insurance Co. Ltd.
19. Pravati Insurance Co. Ltd.
20. Meghna Insurance Co. Ltd.
21. City General Insurance Co. Ltd.
22. Pioneer Insurance Co. Ltd.
23. Mercantile Insurance Co. Ltd.
24. Northern General Insurance Co. Ltd.
25. Bangladesh National Insurance Co. Ltd.
26. Nitol Insurance Co. Ltd.
27. Standard Insurance Co. Ltd.
28. Paramount Insurance Co. Ltd.
29. South Asia Insurance Co. Ltd.
30. Islami Insurance Bangladesh Ltd.
31. Islami Commercial Insurance Co. Ltd.
32. The Lloyds Insurance Co. Ltd.
33. Continental Insurance Co. Ltd.

34. Desh General Insurance Co. Ltd.
35. Agrani Insurance Co. Ltd.
36. Sonar Bangla Insurance Co. Ltd.
37. Global Insurance Co. Ltd.
38. Asia Pacific General Insurance Co. Ltd.
39. Express Insurance Co. Ltd.
40. Asia Insurance Co. Ltd.
41. Republic Insurance Co. Ltd.
42. Crystal Insurance Co. Ltd.
43. Union Insurance Co. Ltd.
44. Shears Insurance Co. Ltd.

(ii) Life Insurance Companies:

1. Jiban Bima Corporation
2. Americal Life Insurance Co. Ltd. (ALICO)
3. National Life Insurance Co. Ltd.
4. Delta Life Insurance Co. Ltd.
5. Sandhani Life Insurance Co. Ltd.
6. Meghna Life Insurance Co. Ltd.
7. Homeland Life Insurance Co. Ltd.
8. Rupali Life Insurance Co. Ltd.
9. Golden Life Insurance Co. Ltd.
10. Progressive Life Insurance Co. Ltd.
11. Pragati Life Insurance Co. Ltd.
12. Padma Life Insurance Co. Ltd.
13. Baira Life Insurance Co. Ltd.
14. Sun Life Insurance Co. Ltd.
15. Sunflower Life Insurance Co. Ltd.
16. Far East Islami Life Insurance Co. Ltd.
17. Popular Life Insurance Co. Ltd.
18. Prime Life Insurance Co. Ltd.

(3) Non-Bank Financial Institutions (NBFIs): There are thirty (30) NBFIs operating in the country. Out of them three are government owned and the rest is either private or joint-venture companies.

Three government owned NBFIs are

- (i) Bangladesh House Building Finance Corporation (HBFC)
- (ii) Investment Corporation of Bangladesh (ICB)
- (iii) Infrastructure Development Company Limited. (IDCL)

The list of the remaining NBFIs are as under:

1. Industrial Promotion & Development Company Bangladesh Ltd. (IPDC)
2. Saudi Bangladesh Industrial and Agricultural development Investment Company Ltd. (SABINCO) (Joint Venture)
3. Industrial development Leasing Company Bangladesh Ltd. (IDLC) (Joint Venture)
4. The UAE-Bangladesh Investment Company Limited (Joint Venture)
5. United Leasing Company Limited (Joint Venture)
6. Midas Financing Limited
7. Phoenix Leasing Company Ltd.
8. Uttara Finance and Investment Ltd. (Joint Venture)
9. Bangladesh Industrial Finance Company Limited
10. Bay Leasing and Investment Limited.
11. Delta Brac Housing Finance Corporation Limited (Joint Venture)
12. First Lease International Limited
13. G.S.P. Finance Company (Bangladesh) Ltd. (Joint Venture)
14. International Leasing and Financial Services Limited (Joint Venture)
15. Oman Bangladesh Leasing and Finance Limited (Joint Venture)
16. Peoples Leasing and Financial Services Ltd.
17. Prime Finance and Investment Ltd.
18. Vanik Bangladesh Limited (Joint Venture)
19. Union Capital Limited
20. National Housing Finance and Investment Limited

21. Bangladesh Finance and Investment Limited
22. Fareast Finance and Investment Ltd.
23. Fidelity Assets and Securities Company Ltd.
24. Industrial and Infrastructure Development Finance Company Limited
25. Islamic Finance and Investment Ltd.
26. Premeir Leasing International Ltd.
27. Self Employment Finance Ltd.

(Source: Debnath, 2003)

(4) **Stock Exchange:** There are two stock exchanges in the country:

- (i) Dhaka Stock Exchange (DSE)
- (ii) Chittagong Stock Exchange (CSE)

Appendix-2.B

LOAN CLASSIFICATION AND PROVISIONING SYSTEM

Loan Classification and Provisioning System, 1989:

In order to get a clear picture of the change in classification and provisioning system it is imperative to have a glimpse of the classification and provisioning system that prevailed before 1990. This is shown in Table-2.B.1

Table-2.B.1: Loan Classification and Provisioning System, 1989.

Length of Overdue	Status of Classification	Rate of Provision	Frequency of Classification
All loans except agriculture loan:			Annual
Loan overdue for less than one year	Unclassified	1%	
Loan overdue for one year and above but than three years	Substandard	10%	
Loan overdue for three years and above but than five years	Doubtful	50%	
Loan overdue for five year and above	Bad/ Loss	100%	
For agriculture loan:			
Loans not overdue for five years or more	Unclassified, substandard, Doubtful	5%	
Loans overdue for five years or more	Bad/ Loss	100%	

Source: BCD Circular No.34, 1989.

Loan Classification and Provisioning System after 1990:

In 1994 Bangladesh Bank introduced a revised policy on loan classification and provisioning system (vide BCD Circular No. 20, dated 27-12-1994) to be implemented in 5 (five) phases commencing from 31st December 1994. The introduction of this circular was aimed at bringing the loan-loss provisioning and

classification in line with the international standard by the end of 1998, the reference date of the final phase. The classification system and provisioning requirements are shown in Table-2.B.2 through Table-2.B.6 below:

Table-2.B.2: Loan Classification and Provisioning System, 1994.

Length of Overdue	Status of Classification	Rate of Provision	Frequency of Classification
All loans except agriculture loan:			Annual
Loan overdue for less than 12 months	Unclassified	1%	
Loan overdue for 12 months and above but than 36 months	Substandard	10%	
Loan overdue for 36 months and above but than 48 months	Doubtful	50%	
Loan overdue for 48 months or more	Bad/Loss	100%	

Source: BCD Circular No.20, 1994.

Table-2.B.3: Loan Classification and Provisioning System, 1995

Length of Overdue	Status of Classification	Rate of Provision	Frequency of Classification
All loans except agriculture loan:			Annual
Loan overdue for less than 9 months	Unclassified	1%	
Loan overdue for 9 months and above but than 24 months	Substandard	10%	
Loan overdue for 24 months and above but than 36 months	Doubtful	50%	
Loan overdue for 36 months or more	Bad/Loss	100%	

Source: BCD Circular No.20, 1994.

Table-2.B.4: Loan Classification and Provisioning System, 1996

Length of Overdue	Status of Classification	Rate of Provision	Frequency of Classification
All loans except agriculture loan:			Annual
Loan overdue for less than 9 months	Unclassified	1%	
Loan overdue for 9 months and above but than 24 months	Substandard	15%	
Loan overdue for 24 months and above but than 36 months	Doubtful	50%	
Loan overdue for 36 months or more	Bad/Loss	100%	

Source: BCD Circular No.20, 1994.

Table-2.B.5: Loan Classification and Provisioning System, 1997.

Length of Overdue	Status of Classification	Rate of Provision	Frequency of Classification
All loans except agriculture loan:			Quarterly
Loan overdue for less than 6 months	Unclassified	1%	
Loan overdue for 6 months and above but than 12 months	Substandard	15%	
Loan overdue for 12 months and above but than 24 months	Doubtful	50%	
Loan overdue for 24 months or more	Bad/Loss	100%	

Source: BCD Circular No.20, 1994.

Table-2.B.6: Loan Classification and Provisioning System, 1998

Length of Overdue	Status of Classification	Rate of Provision	Frequency of Classification
All loans except agriculture loan:			Quarterly
Loan overdue for less than 3 months	Unclassified	1%	
Loan overdue for 3 months and above but than 6 months	Substandard	20%	
Loan overdue for 6 months and above but than 12 months	Doubtful	50%	
Loan overdue for 12 months or more	Bad/Loss	100%	

Source: BCD Circular No.20, 1994.

The above tables (Table-2.B.1 - Table-2.B.6) show that the criteria for terming a loan as classified has been reduced from 12 months in 1989 to 3 months in 1998. During this period the length of overdue in case of doubtful has also been reduced to

6 months in 1998 from 36 months in 1989. In case of Bad/Loss status the length of overdue has been reduced to 12 months in 1998 from 60 months in 1989. Except loans classified as substandard, provision against all other types of classified loan have been remained unchanged. In case of substandard loan rate of provision has been increased from 10% in 1989 to 20% in 1998.

Afterward Bangladesh Bank issued BRPD Circular No.16 on 5th December 1998 with a view to classify all loans under four broad categories; i. Continuous loans, ii. Demand loans, iii. Fixed term loans and iv. Short term agricultural and micro credit loans. In 2001 vide BRPD Circular No. 9, dated 14-05-2001, Bangladesh Bank increased the prior length of overdue period from 3 months to 6 months for terming a loan as classified. Accordingly the classification and provisioning system in 2001 was as depicted in Table-2.A.7 below:

Table-2.B.7: Loan Classification and Provisioning System, 2001

Length of Overdue	Status of Classification	Rate of Provision	Frequency of Classification
Loan overdue for less than 6 months	Unclassified	1%	
Loan overdue for 6 months and above but than months	Substandard	20%	
Loan overdue for 9 months and above but than 12 months	Doubtful	50%	
Loan overdue for 12 months or more	Bad/Loss	100%	

Source: BRPD Circular No.9, 2001.

At present banking sector follows this classification and provisioning system to determine the status of their loan portfolio and rate of provision to be maintained against them.

Appendix-2.C

THE NEW RISK-WEIGHTED CAPITAL ADEQUACY PLAN FOR SCHEDULED BANKS.

Before 1990 banking sector of Bangladesh was mainly comprised of government owned commercial banks. Capital adequacy aspect of financial strength of commercial banks in Bangladesh did not receive that much attention before 1990 due to the assumption that banks and financial institutions owned by the government can overcome any crises. "This is not fair, because this sort of implicit government backing may create a 'moral hazard' problem for bank management and owners for which they may be encouraged to undertake imprudent risks at the cost of peoples' money" (Choudhury, Moral and Banarjee, 2000). Financial sector reform measures launched in 1990 paid due attention to this aspect of capital of the banking sector. Banking Companies Act-1991 made it essential for banks to maintain 6% of its total time and demand deposit as capital. This requirement is replaced by a new, risk-based arrangement for assessing the capital adequacy of banks in 1996 vide BRPD Circular No.1, dated 08-01-1996. According to this new arrangement capital adequacy of any bank is measured using a risk-ratio. This is calculated by dividing the bank's capital base by the total of its risk weighted assets.

Determination of Capital Requirement:

Total capital is divided into two categories: Core capital and Supplementary Capital. Core capital consists of **i.** Paid-up capital, **ii.** Non-repayable share premium account, **iii.** Statutory Reserve, **iv.** General reserve, **v.** Retained earnings, **vi.** Minority interest in subsidiary and **vii.** Non-cumulative irredeemable preference shares.

Supplementary capital consists of **i.** General provision (1% of unclassified loans), **ii.** Asset Revaluation Reserves, **iii.** All other Preference Shares, **iv.** Perpetual Subordinated Debt. Core Capital must be equal or more than 4% of the Risk-weighted assets of the bank. Each bank is required to keep minimum 8% of its risk weighted asset as capital (including 4% core capital).

Calculation of Risk-Weighted Assets

Risk weighted assets are calculated by assigning weights on Balance Sheet and Off-balance Sheet items according to broad categories of risk weights 0, 10, 20, 50 and 100, which are shown in Table-2.C.1 below:

Table-2.C.1: Balance Sheet Items and their respective weights

Items	Risk-weights
1. Cash in hand and banks (except bank abroad)	
a. Bangladesh Bank Notes	0%
b. Government Notes and Coins	0%
c. Balance with Bangladesh Bank	0%
d. Balance with Sonali bank as agent of Bangladesh Bank	0%
e. Balance with deposit money bank including Sonali bank	0%
f. Balance with Other Financial Institutions -Public	0%
g. Balance with Other Financial Institutions – Private	20%
2. Money at Call and Short Notice	
a. Deposit Money Banks (DMB)	0%
b. Other Financial Institutions – Public	0%
c. Other Financial Institutions – Private	20%
3. Foreign Currency Balance held	
a. Foreign Currency Notes in hand	0%
b. Balance with bank abroad	10%

Items		Risk-weights
c.	Foreign Currency clearing account balances with Bangladesh Bank	0%
d.	Bilateral Trade Credit	50%
e.	Wage Earners' (WES) account	0%
4.	Export and Other Foreign Bills	
a.	Export Bills	100%
b.	Other Foreign Bills	100%
5.	Foreign Investment	100%
6.	Import and Inland Bills	
a.	Government	
i.	Food Ministry	0%
ii.	Presidency, Prime Minister's Office, Parliament, judiciary and Non-Food Ministries	0%
iii.	Autonomous and Semi-Autonomous Bodies	20%
b.	Other Financial Institutions	
i.	Other Financial Institutions - Public	20%
ii.	Other Financial Institutions - Private	20%
iii.	Major Non-Financial Public Enterprises	50%
iv.	Other Non-Financial Public Enterprises	50%
v.	Local Authorities	20%
vi.	Private Sector	100%
vii.	Deposit Money Banks	20%
7.	Advances	
a.	Government	
i.	Food Ministry	0%
ii.	Presidency, Prime Minister's Office, Parliament, judiciary and Non-Food Ministries	0%
iii.	Autonomous and Semi-Autonomous Bodies	20%
b.	Deposit Money Banks	20%
c.	Other Financial Institutions	
i.	Other Financial Institutions - Public	20%
ii.	Other Financial Institutions - Private	50%
d.	Major Non-Financial Public Enterprises	50%
e.	Other Non-Financial Public Enterprises	50%
f.	Local Authorities	20%
g.	Private Sector	100%
h.	Classified Loans	100%
7.	Investment (As per book value)	
a.	Presidency, Prime Minister's Office, Parliament, judiciary and Non-Food Ministries	
i.	Treasury Bills	0%
ii.	Treasury Bills (Long Term)	0%
iii.	Bangladesh Sanchaya Patra/Pratirakhaya Sanchaya Patra	0%
iv.	Prize Bonds/Income Tax Bonds	0%
v.	Other Securities of Government	0%

Items	Risk-weights
b. Autonomous and Semi-Autonomous Bodies	20%
c. Other Financial Institutions	
i. Other Financial Institutions – Public	20%
ii. Other Financial Institutions – Private	50%
d. Major Non-Financial Public Enterprises	50%
e. Other Non-Financial Public Enterprises	50%
f. Local Authorities	20%
g. Private Sector	100%
h. Deposit Money Banks	20%
i. Negotiable Certificates of Deposits	20%
j. 90 days Bangladesh Bank Bill	0%
9. Head Office and Inter Branches Adjustments	0%
10. Other Assets	
a. Contingent assets as per contra	50%
b. Fixed Assets	50%
c. Valuation Adjustments	50%
d. Expenditure Account	0%
e. Other	100%

In case of off-balance sheet items, Credit Conversion Factor (CCF) are used to convert these items into balance sheet equivalent before assigning risk weights upon them. There are four CCF in use – 100%, 50%, 20% and 0%. If 50% CCF is used against any off-balance sheet item, 50% of that item will be treated as balance sheet item. Table-2.C.2 shows detail.

Table-2.C.2: Credit Conversion Factors (CCF) for Selected Off-Balance Sheet Items.

Off-balance sheet Item		CCF
1.	Direct credit substitutes, including financial guarantees, standby letters of credit serving as guarantees and bills endorsed under bill endorsement lines (but which are not accepted by, or have the prior endorsement of another bank).	100%
2.	Sales and repurchase agreements, forward asset purchase and placement of forward deposits.	100%
3.	Transaction related contingent items including performance bonds, bid bonds, warranties and standby letter of credit related to a particular transaction.	50%
4.	All note issuance facilities and revolving underwriting facilities; other commitments (e.g. formal standby facilities) with a residual maturity exceeding one year.	50%
5.	Short term self liquidating trade related contingencies (such as documentary letters of credit and other trade financing transactions).	20%
6.	Commitments with a residual maturity not exceeding one year, or which can be cancelled or revoked at any time (e.g. un-drawn overdraft and credit card facilities).	0%
For items not included above, credit conversion factors to be used should be discussed with Bangladesh Bank.		

But except private commercial banks and foreign banks, banking sector in Bangladesh is lacking behind the required amount of capital. This is evident from Table-2.C.3 below:

Table-2.C.3: Capital Adequacy in Bangladesh Banking Sector, 1998-2002
(In Billions of Taka)

Banks	1998	1999	2000	2001	2002
Total Bank Assets	1598	1866	2095	1619	1718
Nationalized Commercial Banks	1031	1211	1357	726	810
Specialized Banks	188	206	174	187	158
Private Banks	283	349	435	531	597
Foreign Banks	96	101	129	175	154
Risk-Weighted Assets	511	622	704	800	835
Nationalized Commercial Banks	242	307	322	346	369
Specialized Banks	117	130	151	159	132
Private Banks	118	147	190	249	286
Foreign Banks	35	39	41	46	47
Required Capital	41	52	61	69	68
Nationalized Commercial Banks	19	25	26	28	27
Specialized Banks	9	10	12	13	11
Private Banks	10	13	16	21	24
Foreign Banks	3	3	8	7	7
Actual Capital	38	46	47	53	63
Nationalized Commercial Banks	13	16	14	15	15
Specialized Banks	8	7	5	6	8
Private Banks	11	16	21	25	29
Foreign Banks	6	6	8	8	10
Capital Adequacy Ratio	7	7	7	7	8
Nationalized Commercial Banks	5	5	4	4	7
Specialized Banks	7	6	3	4	8
Private Banks	9	11	11	10	8
Foreign Banks	17	16	18	17	15
Actual Capital in Percent of Required Capital	91	89	77	78	92
Nationalized Commercial Banks	65	66	54	53	56
Specialized Banks	87	72	40	49	78
Private Banks	114	120	129	119	122
Foreign Banks	184	179	99	104	146

Source: IMF Country Report No. 03/194, June, 2003.

In September, 2002, Bangladesh Bank raised the minimum capital requirement for the banks to 9% of total risk-weighted assets, of which the core capital should not be less than 4.5%. This amended provision of capital requirement has to be maintained by the banks within June 30, 2003¹⁴.

¹⁴ Bangladesh Institute of Bank Management (BIBM) Bulletin (A Quarterly Periodical of BIBM), Vol.5, No.2&3, April-September, 2002.

Appendix-3.A

COMPARING TWO REGRESSIONS: THE DUMMY VARIABLE APPROACH

The present study examines the behavior of volume of financial intermediation in Bangladesh before and after financial sector reform measures launched in 1990. In other words, it examines whether there is any structural change in the regression model of financial intermediation due to introduction of financial sector reform measures in 1990. This change may take on three forms:

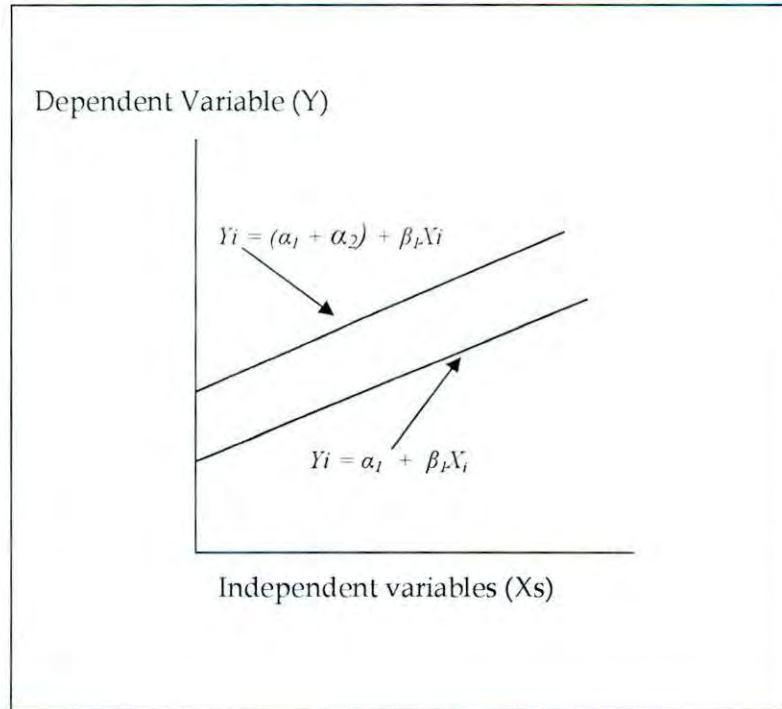
- i. Intercept of the regression equation may change,
- ii. Slope coefficients of the regression equation may change or
- iii. Both intercept and slope coefficient of the regression equation may change.

Change in intercept of the regression equation: In case any structural change that takes place through only change in intercept term, the regression equation takes the following form:

$$Y_i = a_1 + a_2D_i + \beta_1X_i + \mu_i$$

Here, Y is dependent variable, X is independent variable, D is dummy variable that assumes '0' before the event occurs (in present case before 1990, i.e. from 1974 to 1989) and 1 otherwise (from 1990 to 2002). If there is statistically significant change in the structure of the regression equation, the intercept before the event will be simply a_1 and after the event it will be $(a_1 + a_2)$. Graphically this looks like two regression lines as depicted in Figure-3.A.1 below. Here it is assumed that change in intercept is positive.

Figure- 3.A.1: Change in intercept of the regression equation

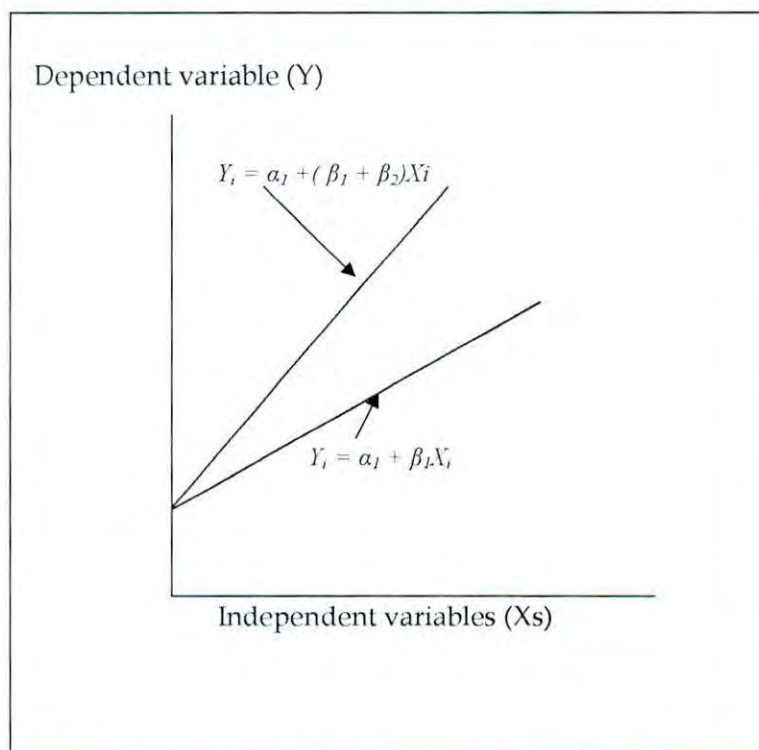


Change in Slope Coefficients of Regression Equation: Sometimes structural change may be in the form of change in slope coefficients of the regression equation without any change in intercept term. In this case the regression equation takes the following form:

$$Y_i = \alpha_1 + \beta_1 X_i + \beta_2 (D_i X_i) + \mu_i \text{ (Definitions of variables are same as before).}$$

In case change in slope is significant, the slope before the event will be β_1 and after the event it will be $(\beta_1 + \beta_2)$. Graphically this can be shown as in Figure-3.A.2. It is assumed here that change in slope coefficient is positive.

Figure-3.A.2: Change in Slope Coefficients of Regression Equation

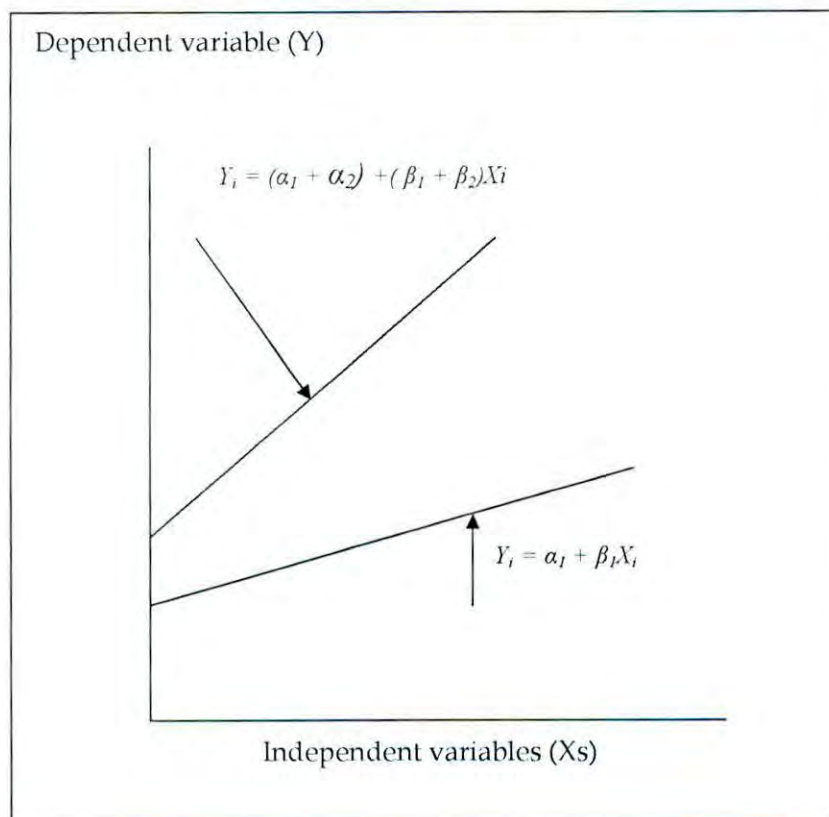


Changes in both intercept and slope coefficients: Structural change may also take by changing both intercept and slope coefficient of the regression equation. In this case the regression equation takes the following form:

$$Y_i = \alpha_1 + \alpha_2 D_i + \beta_1 X_i + \beta_2 (D_i X_i) + \mu_i \text{ (Definitions of variables are same as before).}$$

In case change in intercept and slope coefficients are statistically significant, intercept and slope coefficient before the event will be α_1 and β_1 respectively and after the event they will be $(\alpha_1 + \alpha_2)$ and $(\beta_1 + \beta_2)$ respectively. Assuming changes in intercept and slope coefficient are positive, it can be shown as in Figure-3.A.3

Figure-3.A.3: Changes in both intercept and slope coefficients



Out of these three possibilities present study assumes that impact of financial sector reform on the volume of financial intermediation is exerted through change in the intercept term of the regression model. This assumption is made due to the small sample size. There are five independent variables in the model of financial intermediation as specified in chapter three. If possibilities of differential slope coefficients are considered, dummy variable, D , will appear five times in multiplicative form in the regression model. This will consume additional five degrees of freedom in which case reliability of estimated coefficients will be questionable. For this reason only differential intercept is considered and the models are specified accordingly.

Appendix -4.A

GRANGER CAUSALITY TEST

Determination of optimum lag length: Optimum lag in dependent variable is determined as per SC and AIC criteria. Boldface rows in each table indicate the optimum lag and corresponding minimum SC, AIC and F values. For example in left-hand side regression (where GR is dependent variable) of Table-4.A.1 optimum lag length is three (3), because SC and AIC are minimum at lag 3 and the corresponding F value is 12.222. In the similar way optimum lag lengths are determined in Table-4.A.2 and Table-4.A.3. Numbers of optimum lag lengths are presented in each table in boldface letters.

Granger causality test results:

Granger causality tests between the measures of financial intermediation and economic growth are presented in Table-1 through Table-3.

Table-4.A.1: Granger causality test between GR and MG

$GR_t = \sum_{i=1}^n \alpha_i GR_{t-i} + \sum_{j=1}^m \beta_j MG_{t-i} + u_{1t} \text{ ----- (1)}$				$MGDP_t = \sum_{i=1}^n \alpha_i GR_{t-i} + \sum_{j=1}^m \beta_j MG_{t-i} + u_{2t} \text{ ----- (2)}$			
Lag	SC	AIC	<i>F</i>	Lag	SC	AIC	<i>F</i>
1	7.1664	6.5159	29.10435	1	11.698	10.636	0.101651
2	4.3214	3.5666	4.7726	2	8.9161	7.3587	2.748604
3	1.8395	1.3760	12.222	3	11.666	8.7267	0.63268
Critical	1%	5%	10%	Critical	1%	5%	10%
$F_{3,20}$ value	9.78	4.76	3.29	$F_{2,23}$ value	18.00	6.94	4.32

Left hand side of Table-4.A.1 shows that computed F value in equation (1) exceeds critical F value at 1%, 5% and 10% significance level. Therefore, MG Granger causes or precedes GR. On the other hand, right hand side of Table-1 shows that computed F value in equation (2) does not exceed critical F value at 1%, 5% and 10%

significance level. Therefore, it can be concluded that so GR does not Granger cause MG.

Table-4.A.2: Granger causality test between GR and PCG

$GR_t = \sum_{i=1}^n \alpha_i GR_{t-i} + \sum_{j=1}^m \beta_j PCG_{t-i} + u_{1t} \text{ ----- (1)}$				$PCG_t = \sum_{i=1}^n \alpha_i GR_{t-i} + \sum_{j=1}^m \beta_j PCG_{t-i} + u_{2t} \text{ ----- (2)}$			
Lag	SC	AIC	<i>F</i>	Lag	SC	AIC	<i>F</i>
1	9.3400	8.4922	16.28041	1	4.7093	4.2818	1.073087
2	5.0597	4.1759	2.398206	2	5.4495	4.4976	1.827492
3	1.7586	1.3155	13.09148	3	7.2108	5.3938	1.038317
Critical	1%	5%	10%	Critical	1%	5%	10%
<i>F</i> _{3,20} value	9.78	4.76	3.29	<i>F</i> _{1,26} value	98.5	18.5	8.53

Left hand side of Table-4.A.2 shows that computed F value in equation (1) exceeds critical F value at 5% and 10% significance level, so PCG Granger causes GR. On the other hand, right hand side of Table-2 shows that computed F value in equation (2) does not exceed critical F value at 1%, 5% and 10% significance level, so GR does not cause PCG.

Table-4.A.3: Granger causality test between GR and BDG

$GR_t = \sum_{i=1}^n \alpha_i GR_{t-i} + \sum_{j=1}^m \beta_j BDG_{t-i} + u_{1t} \text{ ----- (1)}$				$TDG_t = \sum_{i=1}^n \alpha_i GR_{t-i} + \sum_{j=1}^m \beta_j BDG_{t-i} + u_{2t} \text{ ----- (2)}$			
Lag	SC	AIC	<i>F</i>	Lag	SC	AIC	<i>F</i>
1	7.5407	6.8563	26.36	1	7.4242	6.7503	0.00026024
2	4.5550	3.7593	3.9382	2	6.4314	5.3080	2.6000314
3	1.7947	1.3424	12.69471	3	8.4906	6.3511	0.7430306
Critical	1%	5%	10%	Critical	1%	5%	10%
<i>F</i> _{3,20} value	9.78	4.76	3.29	<i>F</i> _{2,23} value	98.5	18.5	8.53

Left hand side of Table-4.A.3 shows that computed F value in equation (1) exceeds critical F value at 1%, 5% and 10% significance level, so BDG Granger causes

GR. On the other hand, right hand side of Table-3 shows that computed F value in equation (2) does not exceed critical F value at 1%, 5% and 10% significance level, so GR does not cause BDG.

Table-4.A.4: Estimation Result of Regression Model-1

$$MG_t = \alpha_1 + \beta_1 MG_{t-1} + \beta_2 ID_t + \beta_3 ER_t + \beta_4 I_t + \beta_5 XM_t + \beta_6 D_t + \mu_1$$

Variable/constant	Estimated coefficient	't' statistic
CONSTANT	1.3263	0.2091
MG_{t-1}	0.72407	4.603*
I_t	-0.12951	-4.653*
ER_t	0.21171	2.053**
ID_t	0.30668	0.3872
XM_t	0.03020	0.2832
D_t	-4.4122	-2.769
R^2	0.9576	
$F_{6,21}$	78.963	

Note: *: Significant at 1%, **: Significant at 5%, ***: Significant at 10%

Table-4.A.5: Estimation Result of Regression Model-3

$$PCG_t = \alpha_2 + \beta_1 PCG_{t-1} + \beta_2 ID_t + \beta_3 ER_t + \beta_4 I_t + \beta_5 XM_t + \beta_6 D_t + \mu_1$$

Variable/constant	Estimated coefficient	't' statistic
CONSTANT	-4.2055	-0.6968
PCG_{t-1}	0.67433	4.431*
I_t	-0.030132	-1.453
ER_t	0.21022	1.191***
ID_t	0.29684	0.3439
XM_t	0.13767	1.367
D_t	-3.9283	-2.669**
R^2	0.9690	
$F_{6,21}$	109.262	

Note: *: Significant at 1%, **: Significant at 5%, ***: Significant at 10%

Table-4.A.6: Estimation Result of Regression Model-4

$$TDG_t = \alpha_3 + \beta_1 TDG_{t-1} + \beta_2 ID_t + \beta_3 ER_t + \beta_4 I_t + \beta_5 XM_t + \beta_6 D_t + \mu_1$$

Variable/constant	Estimated coefficient	't' statistic
CONSTANT	0.80745	0.1554
BDG_{t-1}	0.70516	5.439*
I_t	-0.10128	-5.131*
ER_t	0.23019	2.748**
ID_t	0.33505	0.5060
XM_t	-0.028687	-0.3352
D_t	-4.2981	-3.390*
R^2	0.9669	
$F_{6,21}$	102.381	

Note: *: Significant at 1%, **: Significant at 5%, ***: Significant at 10%

Table-4.A.7: Determination of optimum lag-length of residual in Breusch-Godfrey (BG) Autocorrelation Test

Model	Schwarz Criterion (SC) values at			
	One lag	Two lags	Three lags	Four lags
1a	3.81	<u>3.57</u>	3.95	4.53
1b	<u>4.53</u>	4.76	5.25	5.58
2a	<u>3.64</u>	3.97	3.92	4.40
2b	<u>3.99</u>	4.50	4.54	5.05
3a	2.51	<u>2.39</u>	2.55	2.43
3b	<u>3.43</u>	3.72	4.05	4.01

Note: Lags corresponding to Boldface underlined values are optimum as those are the minimum SC values.

Appendix-4.B

TESTS FOR DIFFERENCE BETWEEN MEANS OF THE MEASURES OF EFFECTIVENESS OF FINANCIAL INTERMEDIATION IN PRE AND POST REFORM PERIOD:

Ratio of Reserve Money to Total Deposit

Entire sample period (1974-2002) is divided into two sub-sample period 1974-1989 and 1990-2002. 1974-1989 is defined as pre-reform period and 1990-2002 is defined as post reform period. Data on the relevant variable are presented in Table-4.B.1 below:

Table-4.B.1: Ratio of Reserve Money to Total Deposit

Pre-reform Period	Ratio of Reserve Money to Total Deposit	Post-reform period	Ratio of Reserve Money to Total Deposit
1974	0.093716	1990	0.116671
1975	0.094698	1991	0.107621
1976	0.092034	1992	0.081196
1977	0.076612	1993	0.141239
1978	0.066353	1994	0.156517
1979	0.071598	1995	0.105462
1980	0.097707	1996	0.085556
1981	0.08205	1997	0.095094
1982	0.069078	1998	0.098898
1983	0.054184	1999	0.104913
1984	0.059448	2000	0.090344
1985	0.069604	2001	0.088005
1986	0.065075	2002	0.11385
1987	0.078855		
1988	0.13446		
1989	0.125552		

Source: Calculated from various issues of Economic Trend, Statistic Department, Bangladesh Bank.

Data required to perform the test are presented in Table-4.B.2 below.

Table-4.B.2: Data on Ratio of reserve money to total deposit

Period	Mean Ratio	Estimated standard deviation	Number of observations
1974-1989	0.083189 (=x ₁)	0.02244 (=s ₁)	16 (=n ₁)
1990-2002	0.106567 (=x ₂)	0.021872 (s ₂)	13 (=n ₂)

Following hypotheses will be tested:

1. **H₀:** $\mu_1 = \mu_2 \leftarrow$ Null Hypothesis: There is no difference between the means of ratio of reserve money to total deposit in pre and post reform period.
2. **H₁:** $\mu_1 < \mu_2 \leftarrow$ Alternative Hypothesis: Mean ratio of reserve money to total deposit in pre-reform period is lower than post reform period.

As the population standard deviation is not known, standard error of the difference between two sample means can be calculated using following formula:

$$\hat{\sigma}_{\bar{x}_1 - \bar{x}_2} = \sqrt{(\hat{\sigma}_1^2/n_1 + \hat{\sigma}_2^2/n_2)} \quad \text{-----} \quad \text{-----} \quad (4.B.1)$$

In case of large sample sizes (i.e. greater than 30), $\hat{\sigma}_1^2$ and $\hat{\sigma}_2^2$ could be estimated by s_1^2 and s_2^2 respectively. But as the samples sizes in present case is small (16 and 13) this procedure is not appropriate. Instead $\hat{\sigma}_{\bar{x}_1 - \bar{x}_2}$ is calculated as under:

$$\hat{\sigma}_{\bar{x}_1 - \bar{x}_2} = s_p \sqrt{(1/n_1 + 1/n_2)} \quad \text{----} \quad \text{-----} \quad \text{-----} \quad \text{-----} \quad (4.B.2)$$

where, s_p is called pooled estimate of population standard deviation σ .

S_p is calculated as under:

$$s_p^2 = \frac{[(n_1-1)s_1^2 + (n_2-1)s_2^2]}{(n_1+n_2-2)}$$

$$\begin{aligned}
&= \frac{[(16-1)(0.02244)^2 + (13-1)(0.021872)^2]}{(16 + 13 - 2)} \quad (\text{From Table-4.B.2}) \\
&= 0.0004899.
\end{aligned}$$

Therefore, $s_p = \sqrt{(0.0004899)} = 0.0221336$

Putting this value of s_p in equation (4.B.2), standard error of the difference between two sample means is obtained as under:

$$\begin{aligned}
\hat{\sigma}_{\bar{x}_1 - \bar{x}_2} &= s_p \sqrt{(1/n_1 + 1/n_2)} \\
&= 0.0221336 \sqrt{(1/16 + 1/13)} \\
&= 0.0084523
\end{aligned}$$

Next 't' statistic is calculated as under:

$$\begin{aligned}
t &= \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)H_0}{\hat{\sigma}_{\bar{x}_1 - \bar{x}_2}} \\
t &= \frac{(0.0832 - 0.1065) - 0}{0.0084523} \\
&= -2.75
\end{aligned}$$

Critical t value at 1 % significant level with 27 degrees of freedom ($n_1 + n_2 - 2 = 16 + 13 - 2 = 27$) for one tailed test is -2.473. As the calculated t value falls outside the acceptance region, that is, outside ± 2.473 , the null hypothesis is rejected and the conclusion is that effectiveness of financial intermediation was greater in the pre-reform period as compared to post-reform period.

Ratio of Reserve Money to Quasi-Money

Entire sample period (1974-2002) is divided into two sub-sample period 1974-1989 and 1990-2002. 1974-1989 is defined as pre-reform period and 1990-2002 is defined as post reform period. Data on the relevant variable are presented in Table-4.B.3 below:

Table-4.B.3: Ratio of Reserve Money to Quasi-Money

Pre-reform Period	Ratio of Reserve Money to Quasi Money	Post-Reform Period	Ratio of Reserve Money to Quasi Money
1974	0.171474	1990	0.139966
1975	0.199392	1991	0.129338
1976	0.190791	1992	0.097959
1977	0.138201	1993	0.17004
1978	0.118443	1994	0.192187
1979	0.124403	1995	0.129691
1980	0.164761	1996	0.105608
1981	0.122947	1997	0.115406
1982	0.099976	1998	0.118033
1983	0.079013	1999	0.124538
1984	0.083955	2000	0.106321
1985	0.097312	2001	0.10276
1986	0.091199	2002	0.131619
1987	0.106509		
1988	0.165621		
1989	0.151784		

Source: Calculated from various issues of Economic Trend, Statistic Department, Bangladesh Bank.

Data required to perform the test are presented in Table-4

Table-4.B.4: Data on Ratio of reserve money to quasi-money

Period	Mean Ratio	Estimated standard deviation	Number of observations
1974-1989	0.131611 ($=\bar{x}_1$)	0.038445 ($=s_1$)	16 ($=n_1$)
1990-2002	0.127959 ($=\bar{x}_2$)	0.027125 ($=s_2$)	13 ($=n_2$)

Following hypotheses will be tested:

1. $H_0: \mu_1 = \mu_2 \leftarrow$ Null Hypothesis: There is no difference between the means of ratio of reserve money to quasi-money in pre and post reform period.

2. $H_1: \mu_1 > \mu_2 \leftarrow$ Alternative Hypothesis: Mean ratio of reserve money to quasi-money in pre-reform period is lower than post reform period.

As the population standard deviation is not known, standard error of the difference between two sample means can be calculated using following formula:

$$\hat{\sigma}_{\bar{x}_1 - \bar{x}_2} = \sqrt{(\hat{\sigma}_1^2/n_1 + \hat{\sigma}_2^2/n_2)} \quad \text{-----} \quad \text{-----} \quad (4.B.3)$$

In case of large sample sizes (i.e. greater than 30), $\hat{\sigma}_1^2$ and $\hat{\sigma}_2^2$ could be estimated by s_1^2 and s_2^2 respectively. But as the samples sizes in present case is small (16 and 13) this procedure is not appropriate. Instead $\hat{\sigma}_{\bar{x}_1 - \bar{x}_2}$ is calculated as under:

$$\hat{\sigma}_{\bar{x}_1 - \bar{x}_2} = s_p \sqrt{(1/n_1 + 1/n_2)} \quad \text{----} \quad \text{-----} \quad \text{-----} \quad \text{-----} \quad (4.B.4)$$

where, s_p is called pooled estimate of population standard deviation σ .

S_p is calculated as under:

$$\begin{aligned} s_p^2 &= \frac{[(n_1-1)s_1^2 + (n_2-1)s_2^2]}{(n_1+n_2-2)} \\ &= \frac{[(16-1)(0.038445)^2 + (13-1)(0.027125)^2]}{(16+13-2)} \quad (\text{From Table-4.B.4}) \\ &= 0.0011244. \end{aligned}$$

Therefore, $s_p = \sqrt{(0.0011244)} = 0.033532$

Putting this value of s_p in equation (4.B.4), standard error of the difference between two sample means is obtained as under:

$$\hat{\sigma}_{\bar{x}_1 - \bar{x}_2} = s_p \sqrt{(1/n_1 + 1/n_2)}$$

$$= 0.033532 \sqrt{(1/16 + 1/13)}$$

$$= 0.0110365$$

Next 't' statistic is calculated as under:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)H_0}{\hat{\sigma}_{\bar{x}_1 - \bar{x}_2}}$$

$$t = \frac{(0.131 - 0.127) - 0}{0.0110365}$$

$$= 0.3624$$

Critical t value at 1% significant level with 27 degrees of freedom ($n_1 + n_2 - 2 = 16 + 13 - 2 = 27$) for one tailed test is 2.473. As the calculated t value falls within the acceptance region, that is, within ± 2.473 , the null hypothesis cannot be rejected and the conclusion is that effectiveness of financial intermediation did not record any change during the post-reform period.