

***BBTA Journal***

**Thoughts  
on  
Banking and Finance**

**Volume 1 Issue 1  
July-December 2012**



**Bangladesh Bank Training Academy**

Mirpur-2, Dhaka-1216

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**BBTA Journal**

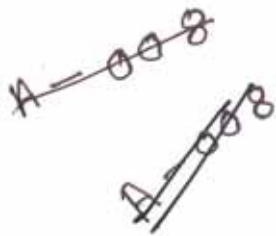
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(A Journal of Bangladesh Bank Training Academy)



A-05

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Executive Editor :

Md. Abdul Awwal Sarker

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## Message from Governor



I am indeed very much delighted to know that Bangladesh Bank Training Academy (BBTA) is going to publish a journal named "Thoughts on Banking and Finance" from December 2012. This initiative definitely adds value to BBTA and also to Bangladesh Bank. The opinions, thought and research outcome published in the journal may help the readers to understand the dynamics of our financial sector. It may create a channel to think about the on-going changes directed to achieve the economic wellbeing of country and may touch upon the unexplored areas of thoughts. I hope quality articles will be published in the journal and the standard will be maintained. I'm sure that this initiative definitely will contribute to the development of knowledge-base of Bangladesh Bank employees at large. As I always concerned for the poor, farmers, and SMEs, I suggest that the journal committee should emphasize on publication of articles especially developed on poverty alleviation, inclusive financing and development of agriculture and SME sector issues. Development of the financial sector, increase of export, and remittance should also get importance.

The main activities of BBTA and its faculty members are to earn knowledge and disseminate those through training to the Bangladesh Bank employees and to the employees of banks and non-bank financial institutions as well. The officers of Bangladesh Bank and faculty members of BBTA may take the opportunity to explore their brilliance and contribute to the journal regularly. Thoughts on Banking and Finance may be a platform for publishing divergent thoughts of the brilliant officers of Bangladesh Bank to guide and augment the future programs of Bangladesh Bank in different areas of financial sector. We know that the world is changing fast and the banking sector is changing faster. To cope with the changing dynamism of the world financial architecture and to meet the demand of the time, it is necessary for the scholars to disseminate their thoughts and knowledge through this journal so that Bangladesh Bank and various government and non-government authorities may get proper insights for taking decisions.

I feel proud to say that Bangladesh Bank is becoming a 'center of excellence' gradually and this publication of the journal "Thoughts on Banking and Finance" will play a pivotal role in the area of knowledge and information. I would like to thank the team who worked hard behind publishing the journal. I wish all-out success of the initiative and hope that the publication will earn domestic as well as international reputation.

  
Dr. Atiur Rahman  
Governor

## Message from Deputy Governor



I am delighted to know that Bangladesh Bank Training Academy (BBTA) has created a milestone in its journey by taking a creative decision to publish a journal named 'Thoughts on Banking and Finance'. I hope that the journal would disseminate the latest research, innovative ideas and thoughts and help to augment the development process of the country.

However, as a developmental central bank Bangladesh Bank has already allocated enough financial resources for research and publication. I believe this Journal of BBTA would be like a mirror which would reflect the current dynamics of our financial system. The articles published in this journal should cover all areas of economics, banking and finance. I hope the journal will enrich our knowledge about the changing banking and financial architecture of recent time.

I want to congratulate all the officials of BBTA who are associated with the publication of this journal. I hope to see regular publication of this journal and invite central bankers, commercial bankers and professionals for continuous submission of their articles to this journal.

Finally, I thank BBTA Journal team for taking untiring efforts for publishing the journal and hope to see its gradual development and wider acceptance to the galaxy of intellectuals for its standard.

A stylized handwritten signature in dark ink, consisting of several loops and a long horizontal stroke at the end.

(S. K. Sur Chowdhury)  
Deputy Governor



## Message from Executive Director



It is a memorable event in the history of Bangladesh Bank that Bangladesh Bank Training Academy (BBTA) is going to publish its 1st issue of half yearly journal "Thoughts on Banking and Finance". First issue has been garlanded with six rich articles prepared by the prominent economists, professionals from banking sector as well as from non-banking arena. I hope that the journey of "Thoughts on Banking and Finance" as a flagship of BBTA would flourish like a lodge in the world of publications. In this connection, I would like to express my heartfelt gratitude and thanks to all members of the Journal Committee whose relentless effort and diligence has made the journey a success and ended the dream to become true. Last of all my greetings could not be complete if I would not mention the encouraging role of our honorable Green Governor Dr. Atiur Rahman and honorable Deputy Governor Mr. Shitangshu Kumar Sur Chowdhury for their all-out support and decision to bring this journal. Their cordial assistance, guidance and encouragement made the journey of publishing the journal a success.

I hope the journal will continue its journey towards development of new thoughts and innovative ideas for creating a vibrant financial sector in the country.

  
(Md. Ataur Rahman)  
Executive Director

## Editor's Message




On behalf of the Bangladesh Bank Training Academy, on the eve of its inaugural publication, I would like to extend my congratulations on the publication of the first-ever journal of the Academy: **Thoughts on Banking and Finance**. Bangladesh Bank, as the central bank of the country, has been experiencing a paradigm shift under the dynamic and torch-bearing leadership of the Governor, Greenest Governor of Bangladesh Bank, Dr. Atiur Rahman.

Recent primary focuses of Bangladesh Bank are centered upon the issues of the development of SMEs, green banking, financial inclusion, corporate social responsibility, and financial education and literacy, among others. These issues have been given utmost importance, and a series of policies have been put in place. However, the developmental role of Bangladesh Bank should be critically examined, and a publication forum is needed to highlight these issues, as examined by bankers, intelligentsia and academics. It is very important that different stakeholders unite and collaborate on the issues which confront society. One of the key objectives of this research should be its usability and application. We hope this BBTa journal will create a space for proper understanding and dissemination of recent ideas, experiences and developments. I am sure that our new journal will significantly contribute in communicating research in the fields of money, banking and finance that will allow policy makers to share information and learn from each other. In this era of globalization, our new open-access online journal will strengthen ties between professional researchers and the central banking community.

The focus of this journal is twofold: (a) research that can be used and (b) research that focuses on applications. The papers should contain conceptual and theoretical underpinnings and be application-based with empirical contributions. Case studies are particularly welcome. The robustness of research is a key element. Therefore, the journal welcomes papers with themes underpinning the overall developmental issues of the country in areas such as macroeconomics, central banking, money and banking, international trade, sustainable development, environmental economics, sustainable SME entrepreneurship, etc. While the research featured in the journal should have qualitative implications, a good mix of qualitative and quantitative approaches is also desirable. Research that focuses only on a quantitative approach is not appropriate. The first issue has been very carefully assembled and covers a wide range of articles in the domain of growth-inflation trade-off, sovereign bonds, financial stability, etc.

I would like to thank our honorable Governor, the editorial advisory committee and board, journal management committee members, authors, reviewers, and the department of communications and publications, all of which have helped in making this journal a possibility.

  
Md. Abdul Awwal Sarker  
Founding Editor

BBTa Journal "Thoughts on Banking and Finance"

# **A Sovereign Bond Issue for Bangladesh?**

Determinants, Risks and Strategies

**Hamid Rashid<sup>1</sup>**

## **Abstract**

In recent years, a number of low and middle income countries issued Eurobonds to ease their financing constraints. Low returns on investments in advanced industrialized economies and excess global liquidity encouraged global investment banks to create new markets for high-yield sovereign bonds from low and middle income countries. While sovereign bonds enable the governments of these countries to raise large sums of foreign capital at relative ease, terms and maturity structures of these debt instruments seldom compare favorably with concessional loans these countries receive from multilateral and bilateral development partners. The paper – reviewing 31 sovereign bond issues from 17 low and middle income countries during 2006-2013 – identifies the key macro and microeconomic determinants of the borrowing costs of sovereign bonds, explains the risks of entering the international capital market and recommends a set of policy options and strategies for the Government of Bangladesh, as it considers to issue a sovereign bond in 2013.

**JEL Classification:** F34, G15, G24, E43, E62

**Keywords:** Sovereign bond, long and short-run determinants, Fiscal deficit, Public debt

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<sup>1</sup> Dr. Hamid Rashid is a Senior Advisor for Macroeconomic Policy in the United Nations Department for Economic and Social Affairs (UN-DESA) in New York. The views and opinions expressed here are those of the author and do not necessarily reflect those of the United Nations Secretariat. The designations and terminology employed may not conform to United Nations practice and do not imply the expression of any opinion whatsoever on the part of the Organization.

Please also see, “Sub-Saharan Africa’s Sub-prime Borrowers” by Joseph Stiglitz and Hamid Rashid, published in the Project Syndicate on 25 June 2013



## I. Introduction

In October 2007, Republic of Ghana became the first Sub-Saharan country<sup>2</sup> in 30 years to issue a US\$750 million 10-year Eurobond. The order book of the debut Sub Saharan issue was four times over-subscribed. The bond was sold at par with a coupon rate of 8.5%. Gabon and Republic of Congo – both oil exporters – shortly followed Ghana's footstep. In December 2007, Gabon raised \$1.0 billion, issuing a 10-year sovereign bond with a coupon rate of 8.2%, while Republic of Congo tapped \$477 million from a 22-year bond that offered a step-up coupon rate of 2.5%. Senegal became the first least developed country (LDC) to join the league of sovereign bond issuers in December 2009, followed by several fellow LDCs - Angola (August 2012), Zambia (September 2012) and Tanzania (February 2013). Cote d'Ivoire, Nigeria and Namibia joined the sovereign bond borrowing spree during 2010-11. These 10 African economies raised \$8.1 billion from their maiden sovereign bond issues, with an average maturity of 11.2 years and the coupon rates averaged 6.2%. In terms of magnitude, these first time sovereign issues represented 2.5% of GDP and over 65 % of outstanding concessional debt that these countries owed to the International Development Association (IDA) of the World Bank. In case of Angola, Cote d'Ivoire, Republic of Congo and Zambia, the one-time proceeds from these bonds were larger than their outstanding loans from IDA (Chart I).



Chart I: Sovereign bond issues from Sub Saharan Africa

Asian economies have been more cautious in entering the sovereign bond market. Vietnam was the first Asian low-income economy to issue a \$200 million sovereign bond in 1998. The maiden Vietnamese floating-rate amortizing bond, with a maturity of 18 years, was repayable in 23 equal semi-annual installments. Pakistan joined the sovereign bond market in 2006, with a 10-year \$500 million issue that offered 7.125%. Sri Lanka had its debut sovereign bond issue in October 2007, followed by four successive issues between 2008 and 2012, which raised \$4.5 billion cumulatively. The coupon rate of the Sri Lankan bond fell from 8.25% on the first issue to 5.875% on the fifth issue. Mongolia raised a total of \$1.5 billion in 2012 with two simultaneous issues that offered coupon rates of 4.125% and 5.125% respectively.

<sup>2</sup> Excluding South Africa



The stated objectives of these sovereign bond issues differ among countries. Namibia raised the money to finance deficits, while Senegal earmarked the proceeds to build a toll road and improve the country's energy infrastructure. Republic of Congo, on the other hand, issued the bond to retire its existing loans from syndicated creditors. The Senegalese bond was also issued to retire a Brady bond that is due in 2014. Sri Lanka's first sovereign bond issue announced, "The net proceeds of the bond issue will be utilized by the Government of Sri Lanka to supplement available concessional funds to develop infrastructure projects that have been previously approved by the Government and included in the current 2007 Budget, including in areas such as electricity generation, water supply, roads, port facilities and railway lines<sup>3</sup>." It also stated, "The success of Sri Lanka's inaugural international sovereign bond issue will also help open the door for Sri Lankan corporates to tap the international markets in the future." In celebrating the maiden sovereign bond issue, Zambia's finance minister Alexander Chikwanda announced, "The money raised from the bond will be spent on growth promoting projects and the social sectors. About \$186 million will be allocated to governments equity into the Kafue Gorge lower Hydro power project scheme and some of the money will also be injected into Zambia Railways and the diversification of the agriculture sector."

Notwithstanding these varied objectives, it is in fact the persistent and growing financing gaps that are encouraging many developing country governments to explore alternative sources of finance. Following the collapse of the last episode of borrowing sprees during 1970s and 1980s, a majority of low and lower middle income countries began to rely on concessional debt from IFIs to finance their development projects during the past three decades. The concessional debt flows to lower middle income countries have declined in recent years. The share of concessional debt as percentage of their total debt flows fell from 42% in 2004 to 24.9% in 2011 for lower middle income countries, compelling countries like Bolivia, Cote d'Ivoire, Ghana, Republic of Congo, Mongolia, Senegal and Sri Lanka to issue sovereign bonds to secure long-term finance from alternative sources. Concessional loans are also becoming increasingly scarce for low income countries. Concessional loans, though generally low-cost, however typically involve a set of conditionalities, long gestation period and high transaction costs, including stringent appraisal, review missions, monitoring and evaluation that impose inordinate burden on national capacities of the recipient countries. Furthermore, they have often been too small to finance large infrastructure projects, encouraging low and middle income countries to raise large amount of foreign capital with sovereign bonds.

On the supply side, a steady increase in global liquidity between 2003 and 2007 and persistently low returns on investments in advanced economies prompted large investment banks to find new sources of profit in Africa and Asia. As American, European and other 'safe haven' sovereign bonds' yields fell to 2% or less, many fixed income investors started to look for new markets to boost their cash flows. Relatively higher yield Eurobonds issued by low and middle income countries offered an attractive alternative to many of these investors. More than two-thirds of the new bond issues reviewed in this paper were purchased by institutional investors in the US and Europe. For example, 99% of Ghana's sovereign bond issues were picked up by investors in the US (42%), UK (28%) and Europe (29%).

<sup>3</sup> Central Bank of Sri Lanka press release, 18 October 2007

Fund managers accounted for 65% of the maiden Ghanaian issue. Similarly, the US and European investors bought 73% of Sri Lanka's most recent sovereign bond with fund managers buying nearly 90% of the issue.

It is also the case that fundamental changes in the underwriting business – with independent rating agencies assuming signaling and quality-control roles – reinforced the supply-side factors to entice new issuers to the international capital market. Legal provisions such as Regulation-S that allows US based institutional investors to buy and hold offshore sovereign bonds, without subjecting themselves to stringent US regulations and disclosure requirements, strengthened the demand for Eurobonds issued by African and Asian economies that are considered below investment-grade. All 31 bonds studied in this paper are Regulation S type bonds and are listed in exchanges outside the United States. Finally, provisions such as the “collective action clauses” (CAC) and *pari passu* further contributed to increasing the demand for Eurobonds sold by untested new issuers. CAC and *pari passu* emboldened many small fund managers to buy sovereign bonds of countries that are considered high risk by credit agencies.

One important consequence of a sovereign bond issue by a low or lower middle income economy is that it may render the country ineligible for concessional debt. To remain eligible for IDA funds, countries must first meet the following two criteria: a. Relative poverty defined as GNI per capita must be below an established threshold and updated annually (in fiscal year 2012: \$1,175); b. Lack creditworthiness to borrow on market terms and therefore have a need for concessional resources to finance the country's development program<sup>4</sup>. Once a country gains access to the international capital market, it is assumed that it will no longer need concessional debt and be in transition to graduate from IDA. Such a consequence of sovereign bond issue can significantly increase the cost of funding for a country like Bangladesh, Senegal or Tanzania that relies heavily on concessional IDA loans. On the other hand, the down-side of continued access to concessional debt is that the economy can become used to selecting inefficient projects at very low break-even points, which would not have been considered investment-worthy if borrowing costs were higher. As no country can expect to get concessional loans *ad infinitum*, a carefully planned and executed sovereign bond issue may help the country to prepare for transition into borrowing on commercial terms.

These bond-issuing low and middle income countries are also likely to commit the ‘original sin’ of borrowing in foreign currencies (Eichengreen, 2002). Persistently low-level of domestic savings and lacking the advantage of a reserve-currency country means that these countries are required to borrow from abroad. Long-term foreign currency borrowing comes with significant exchange rate and maturity mismatch risks, which can put pressure on the current account and adversely affect macroeconomic stability of the sovereign issuer. The remedy for original sin is not borrowing in local currency but rather borrowing less (Reinhart and Rogoff 2003). These low and middle income countries may not be outright discouraged from issuing Eurobond, but they must put in place a prudent and forward-looking debt management structure to ensure that they are not required to borrow to service their debt and that they avoid a default at all costs.

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<sup>4</sup> The World Bank's Fund for the Poorest: International Development Association, Washington DC, October 2012. Please also see Article V 1(c) of the IDA Articles of Agreement, which clearly states, “The Association shall not provide financing if in its opinion such financing is available from private sources on terms which are reasonable for the recipient or could be provided by a loan of the type made by the Bank.”



Another potential risk of sovereign bond issue is that it can encourage sub-sovereign authorities and private sector entities to demand similar access to the international capital market. Nigerian and Mongolian commercial banks have already issued international bonds. In Zambia, as much as \$4.5 billion of international bonds are now planned by the power utility, railway operator and road builder. The Lusaka municipal authority is also seeking to issue bond to re-build the city infrastructure. Individual sub-national borrowers are unlikely to take into account the negative externalities of excessive borrowing, even if their debt is not guaranteed by the sovereign.

A sovereign issuer also needs to be mindful of the implications of rising yields on its bonds, which may increase for reasons beyond its control. Market whims can swing the demand for a particular bond and make its price and yield highly volatile. A very high yield on its outstanding bonds may indirectly affect the issuer as it may serve as benchmark for new borrowing and increase the average cost of new credit from financial and capital markets. It may also increase the servicing cost of the bond if the issuer is required to borrow to make coupon payments. While many low and lower-middle income countries may dislike the stringent conditionalities of concessional borrowings from international financial institutions (IFIs), market whims can be far more harmful than loan conditionalities. In pursuing sovereign bonds as an alternative financing option, these countries should not be jumping from the frying pan to the fire.

Finally, there is also the risk of a speculative bubble and burst. Except for Namibia, all these sovereign bond issuers had 'speculative' credit ratings from the rating agencies (Chart II). B or B+ rating is three or four steps below the minimum investment grade (BBB- or Baa3). Cote d'Ivoire and Congo even floated their sovereign bonds without a credit rating, while Tanzania had B rating (highly speculative) at the time of the issue. The rating agencies put these new issues in the "junk bond" category, signaling significant risks of default. A speculative market behavior can justify the fact that Zambia managed to lock-in a rate that was lower than the yield on Spanish bond even though Spain's credit rating was BBB-, four-grades higher than Zambia's credit rating. The 10-year Zambian bond was 24-times over-subscribed despite the fact that the country had a \$6.0 billion debt relief only in 2006. Euphoric interests in these new sovereign bonds perhaps suggest that the international capital market is betting that many of these bonds would default.



Chart II: Credit rating of new sovereign bond issuers

There are already signs of default stress on many of these bonds. In January 2011, Cote d'Ivoire officially defaulted on its Eurobonds, largely because of a political crisis, as it could not pay \$29 million of interest, which was due on 31 December 2010. Cote d'Ivoire became the first country to default on its sovereign debt obligation since Jamaica in January 2010. On the eve of the default, Ivorian bonds were trading at 36.25 cents for each \$1 of face value of the bond. In March 2009 – less than two years after the issue – Congolese bonds were trading for 20 cents for each dollar value, pushing its yield to record high. In June 2012, Gabon delayed the coupon payment on its \$1 billion bond pending a legal dispute and was on the verge of a default. Should the oil and copper prices collapse, Angola, Gabon, Congo, Mongolia and Zambia may encounter difficulties in servicing, if not default on, their sovereign bonds.

The new generation of sovereign issuers may keep in mind the sovereign debt crisis of 1980s and the painful restructuring process that gave birth to the so-called Brady Bonds to repay the syndicated loans that many Latin American and African countries took from banks in Europe and North America. They may learn from the fate of Detroit, the US city stuck in a vicious cycle of borrowing and near bankruptcies. Since 2005, the Wall Street Banks enabled Detroit, with a credit rating of a junk-bond (B/B+), to issue \$3.7 billion worth of bonds to cover the deficits, pension shortfalls and debt payments. Last year, the city added \$129.5 million in debt in part to repay loans it had taken to service other bonds. The Wall Street banks selling the bonds for Detroit collected \$474 million in underwriting fees and bond insurance premiums, while Detroit's financial health and its ability to service its debt continued to deteriorate. The city is now counting days to file bankruptcy, which will give yet another opportunity to these investment banks to re-structure the debt, earn more fees and sell new debts<sup>5</sup>.

The new sovereign bond issuers may also keep in mind the on-going and long-drawn legal battle between Argentina and Elliot Capital Management - the US based hedge fund. Elliot capital acquired nearly \$1 billion of Argentine bonds, for a fraction of their face value, after Argentina defaulted on its sovereign bonds in 2001. While 76% of Argentina's creditors agreed to a restructuring deal in 2005 and accepted a haircut on the face value of the debts, Elliot Capital refused to join other creditors and demanded to be paid in full face value of the bond even though it had bought the bonds with pennies for the dollar. In 2012, Elliot Capital won a legal battle in the US, invoking the *pari passu* principle, and is in the process of securing full payment from Argentina. Elliot Capital was on the news headlines when it seized an Argentine navy ship in Ghana on 2 October 2012 to force payment from Argentina<sup>6</sup>.

Rest of the paper is organized as following: Part II discusses the data and presents a few summary statistics while Part III identifies the macro and microeconomic determinants of the coupon rate of a sovereign bond issue and makes a projection for Bangladesh's potential borrowing costs. Part IV presents a fiscal model, which will enable Bangladesh to take a comprehensive approach to issuing a sovereign bond. Finally, Part IV presents a set of strategies and policy recommendations.

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<sup>5</sup>“Only Wall Street Wins in Detroit Crisis Reaping \$474 Million Fee”, Bloomberg News, 13 March 2013

<sup>6</sup>“Argentine navy ship seized in asset fight”, Financial Times, 3 October 2012



## II. Data

We collected the data on sovereign bond issue from the C-Bond Emerging Market database, which contains detailed information on each issue, the type of debt instrument, placement, face value, coupon rate, maturity, initial issue price, yield at pricing, issuer rating on the issue date, listing and the name of issue manager(s). Supplementary credit-rating information were obtained from Standard & Poor, Moody's and Fitch. We obtained the data on macroeconomic explanatory and control variables – GDP per capita income, GDP growth, inflation, budget balance (% of GDP), external debt stock (% of GDP), current account balance (% of GDP) and oil and mineral rents (% of GDP) – from the World Development Indicators (WDI) database of the World Bank. The five year averages of the macroeconomic variable - preceding the year a country issued a sovereign bond – were calculated for each explanatory variable for each country.

To analyze the impact of a sovereign bond issue on fiscal balance and debt sustainability of Bangladesh, actual revenues and expenditure data 1990-2011 – obtained from the Ministry of Finance – were used to estimate total revenue and tax revenue elasticity of GDP growth. All revenue and expenditure data were converted to US dollars applying the year-end exchange rates. We calculated the average growth rates of primary expenditures, loans and advances interests and principal repayments on domestic and foreign debt during 1990-2011 – in US dollar terms – to make a baseline projection of the fiscal balance of the Government of Bangladesh for 2013-2022 should it issue a 10-year \$ 1.0 billion sovereign bond in 2013. The baseline assumed a linear, constant relationship between GDP, revenue and expenditure growth and are in 2011 constant dollar terms.

The key characteristics of 31 sovereign bond issues are reported in Table I. The largest issue of \$2.3 billion was from Cote d'Ivoire while Senegal's \$200.0 million issue was the smallest. The average coupon rate of these issues was 6.2%, with Senegal paying the highest 8.75% and Congo and Cote d'Ivoire paying the lowest 2.5%. Both Congo and Cote d'Ivoire, however, issued step-up bonds where their coupon rates increased over time. Cote d'Ivoire – a non-resource rich economy - secured an average coupon rate of 4.75% on its 22 year bond, offering a combination of amortization and stepped increase of coupon rates. Only three countries – Angola, Cote d'Ivoire and Congo – issued amortizing bonds.

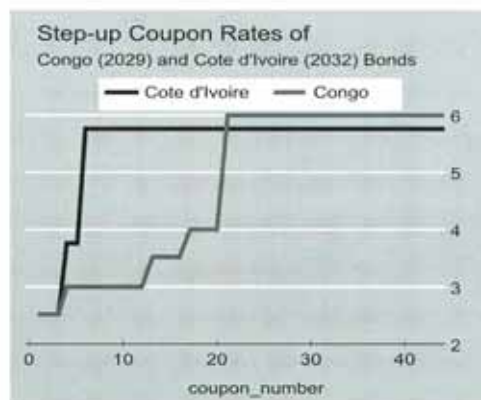


Chart III: Step-up coupon rates of sovereign bonds of Congo and Cote d'Ivoire

It is clear from the data that borrowing costs of sovereign bonds are significantly higher than the cost of concessional debt. The average coupon cost of the first time issuers were nearly 4 times higher than the average interest rates on their existing external debt (Chart IV).

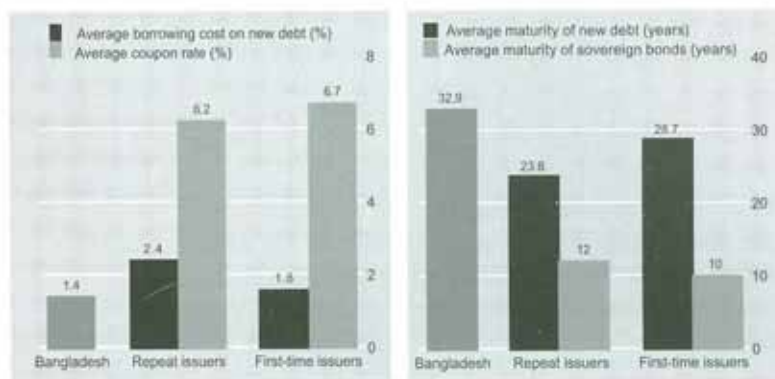


Chart IV: Average borrowing costs and maturity of sovereign bonds and existing debts

The average maturity of sovereign bonds is also significantly shorter than the maturity of the existing foreign debt of these issuing countries (Chart IV). However, it is also evident from the data that a country is able to borrow in more favorable terms if it is endowed with significant amount of oil (Angola, Congo) or mineral resources (Mongolia, Zambia).

Indonesia, Senegal (1st issue) and Sri Lanka (1st issue) offered 5-year bonds while Tanzania is the only country in our sample that issued a variable coupon rate bond. Angola and Tanzania also had private placement of their bonds and undertook no roadshow. Nearly half of the issues were listed on only one exchange for secondary trading. Berlin, Luxembourg and Singapore were the most preferred exchanges for these issues (Chart V). These sovereign bonds had, on average, 2.97 issue managers. Philippines used 8 issue managers to float its 25-year bond in January 2012 while Angola, Congo, Cote d'Ivoire deployed only one issue manager for their sovereign bond. JP Morgan and Citibank each were involved as issue managers in 12 transactions, while HSBC and Barclays managed 11 and 9 issues respectively (Chart V).

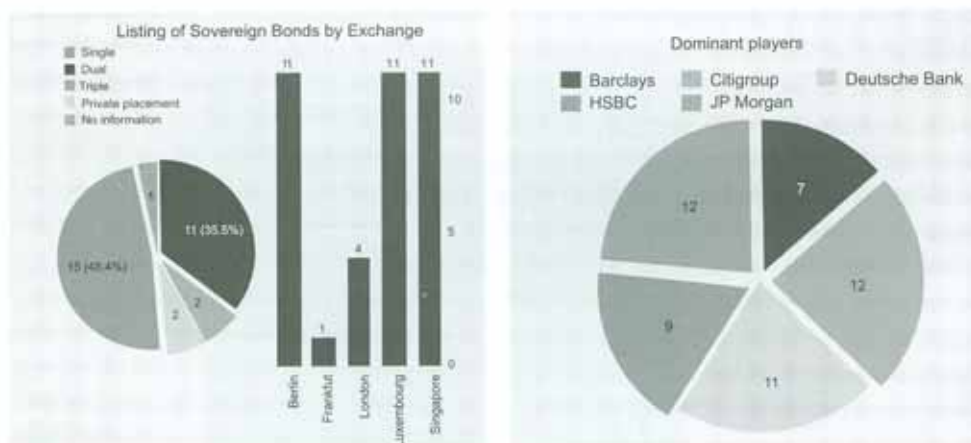


Chart V: Listing of sovereign bonds and dominant market players



### III. Determinants of the Borrowing Cost of Sovereign Bonds

Borrowing cost is perhaps the single most critical factor to influence a country's decision to issue sovereign bonds. The cost of borrowing, reflected in the coupon rate of a bond, takes into account all available information about the sovereign borrower, including its credit worthiness and probability of default. A high coupon rate typically signals higher risks as investors expect to be compensated for buying a high risk bond. The coupon rate includes a risk premium over other risk-free assets (e.g. US treasury bonds of comparable maturity) and serves as a benchmark for calculating the yield of a bond. An upward sloping yield curve typically signals increasing short-term borrowing costs and increases in risk premium. A sovereign issuer must make all efforts to borrow at the lowest possible coupon rate to keep its both current and future borrowing costs low.

Modigliani (1961) and Blinder and Solow (1973) show that in a world where the 'Ricardian equivalence' does not hold, an increase in the fiscal deficit and public debt is expected to increase long term bond-yields. The hypothesis is tested in several recent empirical papers. An IMF working paper by Poghosyan (2012) analyzes the determinants of sovereign bond yields in 22 advanced economies over the period 1980-2010. The paper finds that in the long-run, government bond yields increase by only about 2 basis points in response to a 1 percentage point increase in government debt-to-GDP ratio and by about 45 basis points in response to a 1 percentage point increase in potential growth rate. In the short-run, sovereign bond yields deviate from the level determined by the long-run fundamentals, but about half of the deviation adjusts in one year. Another IMF working paper by Baldacii and Kumar (2010), using a panel of 31 advanced and emerging economies, shows that large fiscal deficits and public debt are strongly and positively correlated to sovereign bond yields. They find that bond yields increase significantly when the overall fiscal balance or the primary fiscal balance deteriorates: an increase in the overall fiscal deficit of 1 percent of GDP pushes up bond yields by 17 basis points, taking into account inflation, initial public debt and GDP growth.

Conway and Orr (2000), studying seven major advanced economies, also find that the impact of public debt on long-term bond yields depends on initial debt levels. Arguably, higher public debt increases concerns that governments will be less able to service their liabilities and therefore increase credit risk. It is further shown that countries with large level of debt encounter the higher risk of inflationary pressures, because of potential monetization of debt, which increased nominal short-term interest rates. These factors affect the long-term borrowing cost of government bonds. Baldacci and Kumar (2010) also find that countries with higher initial fiscal deficits and public debt experience larger increases in bond yields when the fiscal position deteriorates.

On the other hand, Mundell (1963) stresses the effect of international capital mobility on yield, claiming that in an open economy fiscal policy will not affect yield except indirectly through its impact on the risk premium. Eichengreen and Mody (2000) and McGuire and Schrijvers (2003) show that global risk aversion and changes in market sentiment are significant factors that influence yields of sovereign bonds. Jaramillo and Weber (2012) find that the extent to which fiscal variables affects domestic bond yields in emerging economies depend on the level of global risk aversion. They find that when global risk aversion is high, creditors' concern with default risk takes center stage and expectations regarding fiscal deficits and government

debt play a significant role in determining domestic bond yields. They find that every additional percentage point in the expected debt-to-GDP ratio raises domestic bond yields by 6 basis points; and every percentage point expected worsening in the overall fiscal balance-to-GDP ratio raises yields by 30 basis points. Kumar and Okimoto (2009), on the other hand, argues that bond prices are increasingly susceptible to global investor's preferences because of excess liquidity in the global system and country specific risk factors often play a more limited role. This means that factors such as global risk appetite, global savings, and investment have become more important in pricing of sovereign bonds and as a consequence, cross-country correlation of long-term government bond yields has increased over the last two decades. Gonzales-Rozada and Levy-Yeyati (2008) also find that in addition to global risk aversion, global liquidity plays a central role.

In addition, there are few empirical papers that explore the correlation between issue-characteristics and bond pricing and issue costs. An OECD research paper (Sebastián Nieto-Parra, 2012) finds a positive and statistically significant relationship between the amount or maturity of the bond and underwriting fee, indicating that as the maturity and the amount issued increase, underwriters demand a higher compensation for the additional effort to float bonds. The paper shows that, in addition to standard macroeconomic variables microeconomic variables, determined by interactions between governments and investment banks, are significant in the issuance costs in the sovereign market.

**Nieto-Parra (2012) finds:** a. positive and significant correlation between the number of a country's issues that were underwritten by the same bank and the fee paid by the sovereign issuer, which suggests that as competition decreases, the underwriting fee increases; b. negative and statistically significant association between the number of lead managers and fee; c. negative and statistically significant relationship between the regulation S and underwriting fee, implying that the underwriting fee is smaller for issues sold outside the United States and free of the registration requirements of the United States' securities laws; d. a negative and significant relationship between underwriting fees and the inclusion of collective action clauses in the bond agreement, suggesting that CAC empowers small investors by protecting their interests in the event of a sovereign default.

Finally, Nieto-Parra (2012) reports a negative and statistically significant relationship between issues placed by the top investment bank and fees, suggesting that "the most prestigious underwriters have bargaining power in getting members of the underwriting syndicate accept lower fees. The paper finds that Close to 50 (80) percent of the market share is made by the 5 (10) most important investment banks. He also shows, "on average, 80 percent of issues have a different underwriter with respect to that of the previous issue, showing governments' strategy to rotate the small number of actors in the market." A switch between underwriters has also a positive and statistically significant impact on spreads. These results are mixed indicating that both, a high rate of "switching" between underwriters and a high dependence with unique underwriter, increase sovereign bond spreads. For a given country, results suggest that lack of competition as well as high rotation among lead managers do not incentivize underwriters to provide a quality service in placing sovereign bonds.

In this paper, we identify the key determinants of the coupon rate of sovereign bonds, taking into account the both macro and issue level determinants. The paper represents a unique



attempt to estimate the coupon rate, which is the ex ante cost of the borrowing. The literature is rather focused on identifying the determinants of bond yields, which is the ex post pricing of a bond. One cannot under-estimate the importance of coupon rate as it serves as the anchor to calculate yield and ultimately determines the demand for a bond. The paper also adds value as it estimates a mixed model, which takes into account both the macro and micro-level determinants of bond price. The current literature either takes into account the macro-level determinants (e.g. Poghosyan (2012) or Baldacii and Kumar (2010)) or micro and issue level determinants of yields and issue costs (Nieto-Parra (2012)), but not both.

We first construct a macroeconomic model to identify the determinants of the coupon rate, using a cross section of 31 sovereign bond issues from 17 low and middle income countries. The initial model includes log of GDP per capita income, GDP growth rate, inflation and fiscal balance (% of GDP) following the standard practice in empirical literature. The model is estimated in OLS. Given that the right-hand side variables – five year averages prior to the issue - are exogenous to the model, we believe the model gives us efficient and robust estimates although we cannot eliminate the small sample bias. We estimate robust standard errors to correct for heteroskedasticity. The initial unconstrained model (column 1 of Table II) shows a positive and significant correlation between the coupon rate and GDP growth. A one percent point increase in growth is associated with 15 basis point increase in the coupon rate. Our coefficient for GDP growth is significantly lower than the one estimated Poghosyan (2012), which reports 45 basis points increase in yield in response to a 1 percentage increase in growth. The baseline model also shows that a percentage point increase in fiscal balance is associated with 22 basis point decline in the coupon rate. The high adjusted R-squared of the model (.93) suggests a good fit.

Column 2 through 4 (Table II) estimates the model with additional macroeconomic variables. Each successive inclusion of a new explanatory/control variable increases the adjusted fit of the model. The full macroeconomic model (column 4) suggests that 1% increase in GDP growth is associated with 1.55% increase in the ex-ante coupon rate. The estimate is perhaps biased upward because of the small sample size and because the model does not control for specific characteristics of each issue (issue volume, maturity, credit rating, number of book-runners/lead managers etc). The predicted coupon rate of the full model is 6.05%, if the per capita GDP, GDP growth rate and external debt to GDP ratio of Bangladesh are applied. The predicted value is perhaps on the low side as it over-estimates the positive impact of the explanatory variables. It is, however, important to keep in mind that sound macroeconomic performance is necessary but not sufficient conditions for securing a favorable coupon rate on the first issue. Although Bangladesh has a sound macroeconomic basis, including high growth rate and low level of external debt (Chart VI), , it may still face a steep borrowing cost in issuing a sovereign bond – possibly higher than 6.05% - should it decide to enter the international capital market.

Table III presents the results of models that employ the issue characteristics to determine the coupon rate. The baseline model (column 1) includes: natural log of the issue size, average credit rating and tenure of each issue. Successively, we add two dummy variables: New Issue (column 2), which the take value of 1 if it is the first time sovereign bond issue for the country and Amortization (column 3), which takes the value of 1 if the bond is an amortizing type.



Chart VI: GDP Growth rates and external debt levels of Bangladesh and other new sovereign bond issuers

Finally, we add the number of book-runners in the model (column 4). The full issue characteristic-based model results suggest that 1 unit increase in the size of the issue is associated with 56 basis point increase in the coupon rate, significant at 1% level. This means that if Bangladesh increases the issue size by \$100 million, the coupon rate is likely to increase by 9 basis points. We also find that a unit change in credit rating is significantly and negatively correlated to coupon rate (Chart VII). If, for example, Bangladesh's sovereign rating increases from B+ to BB-, we should expect the coupon rate to fall by 62 basis points.

The model also shows a significant and negative correlation between the coupon rate and the number of book-runners/lead managers deployed to issue the bond, consistent with the findings of Nieto-Parra (2012). It is also important to note that coefficients of tenure and new issue are insignificant. This suggests that there is no premium for de Nuevo entry into the sovereign bond market and also the cost of borrowing is not influenced by the tenure of a bond, as far as this sample is concerned. These findings are important to develop an optimal strategy for a new sovereign bond issue. In the absence of macroeconomic controls, we believe these estimates are also biased. The model predicts a coupon rate of 6.6% should Bangladesh issue a \$1 billion bond with its current credit rating of B+.



Chart VII: Negative correlation between credit-rating and coupon rate



Finally, we estimate a mixed model incorporating the statistically significant variables of the macroeconomic (Table II) and issue-characteristic based models (Table III). In the final model (Table IV), the coefficients of the issue size, GDP growth rate, average credit rating and the number of book runners are statistically significant. The overall adjusted fit of the model is high (Adjusted R-squared is .97). We find that one unit increase in the issue size is associated with 61 basis point increase in the coupon rate, while a one unit increase in growth rate and credit rating is correlated with 37 and 65 basis point declines in the coupon rate, respectively. The coefficient for the number of book-runners is significant and -.47. and It is interesting that coefficients of both the issue size and credit rating remain same in the issue-characteristic based and mixed models, while the coefficient of growth rate not only diminishes in magnitude, but also changes sign from positive to negative between the macro and mixed models. One plausible explanation for the change in the coefficient sign is that holding credit-rating constant, which captures significant amount of information about the country's economic health, a country should expect to pay a lower interest to borrow from abroad if its growth rate should increase. The mixed model predicts a coupon rate of 6.2% for Bangladesh should it decide to issue a \$1 billion sovereign bond in 2013 with three book-runners.

#### IV. Fiscal Management and Debt Sustainability

How a government finances its expenditures, including capital expenditures, matters. Bond financing may complement, not substitute, other forms of financing, including financing through taxation. In a world where the Ricardian equivalence does not hold, sound fiscal management becomes an imperative for sustainability of external debt and avoiding a default. In this section, we project fiscal balance of the Government of Bangladesh in the event it decides to issue a sovereign bond. For simplicity, we assume that Bangladesh will issue a 10-year \$1 billion sovereign bond in 2013 with a coupon rate of 6%. The fiscal framework is predicated on the assumption that the economy would grow 6.5% a year during the forecast period. We estimate an investment multiplier for Bangladesh, using the data on the growth rates of public gross fixed capital formation. The estimated GDP multiplier of public sector investment in Bangladesh is 0.20, consistent with estimates obtained in the empirical literature<sup>7</sup>.

We assume that the entire proceed would be invested in developing physical infrastructures in the country, which, taking into account the multiplier effect of investment, will add \$200 million to the GDP each year during the forecast period. The investment multiplier implies that the proceeds of the bond issue should be invested in a project that would have an Economic Internal Rate of Return (IRR) of at least 13.7%.<sup>8</sup>

In developing the fiscal balance model, we also estimate the tax elasticity of GDP growth, which averaged .3 during 1990-2011 (Chart VIII). In the baseline model, we assume that the tax elasticity of growth will remain unchanged. The growth rate of primary expenditures averaged 10% during 1990-2011 and the same growth rate is assumed for the forecast period of the baseline model. We also assume that the growth rates of domestic interest and principal payment will average 10%, following the past 10-year trends. It is also assumed that the past trends of growth rates of interest and principal repayment on foreign debt and loans and advances will continue during the forecast period.

<sup>7</sup> See, for example, Bruckner et al (2010)

<sup>8</sup> Raihan et al (2010) estimates an economic internal rate of return (EIRR) of 19 percent for the Padma bridge project of Bangladesh

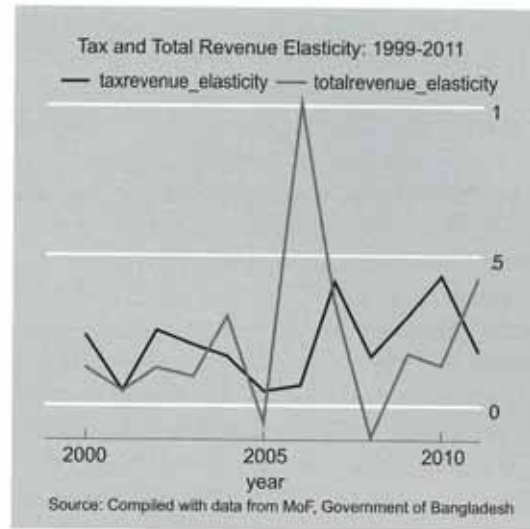


Chart VIII: Tax and Revenue Elasticity of GDP Growth

Based on these linear assumptions, we project that the fiscal deficit of Bangladesh will grow from -6% of GDP in 2014 to -22.4% of GDP in 2022 (Table V and Chart IX). Although the fiscal deficit is not highly sensitive to foreign interest and principal repayments, Bangladesh will encounter the possibility of default as early as in 2019, when fiscal balance will reach -16.2% of GDP. Servicing of the sovereign bond, however, hardly poses any pressure on the fiscal balance. When the principal repayment of the bond will become due, total payments on sovereign bond (\$1,060 million) will account for only about 2% of the \$47.6 billion fiscal deficits in 2022. Total external debt service is projected to rise to \$2.6 billion in 2022 (Chart IX).

We re-estimate the model, assuming an average GDP growth rate of 7% and revenue elasticity of .5. In the re-calibrated model, the fiscal balance drops to -17.2% of GDP. This shows that even if GDP growth and revenue elasticity increase significantly during the forecast period, they are not likely to have a significant positive impact on the fiscal balance. We run an alternative scenario where GDP growth rates and revenue elasticity remain at 7% and .5 respectively but Government's primary expenditure growth rate declines from 10% to 5%. With a drop in primary expenditure growth, fiscal balance improves significantly from -17.2% to -9.5% of GDP. Finally, we re-estimate the model (scenario 3) under the assumption that domestic debt service growth will average 7%, instead of 10% assumed in the baseline model. Under the additional assumption, fiscal balance improves to -5.7% of GDP.

These projections are based on a set of highly static and stringent assumptions. They do not take into account the possibility of global shocks – oil or food price shocks – and exchange rate risks. They also do not take into account the dynamic interactions between growth, government revenue, consumption and investment. They also ignore the effects of inflation expectations and how they are likely to affect aggregate demand in the economy. It is



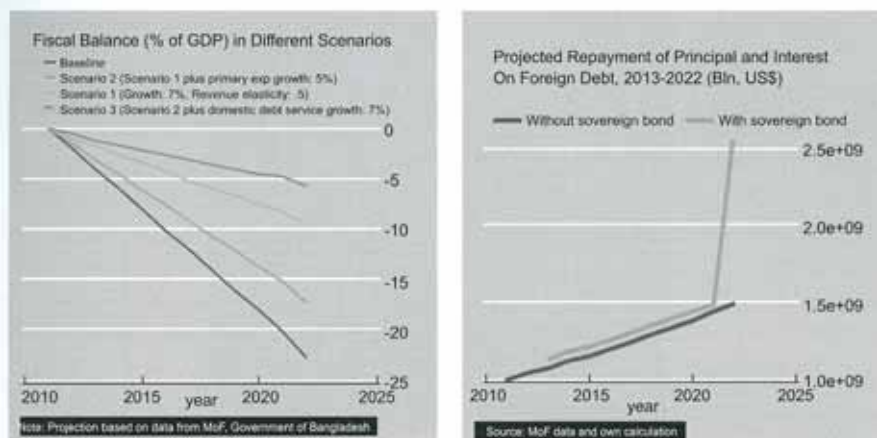


Chart IX: Fiscal balance under different scenarios and projected external debt service

nevertheless clear from the analysis that the key determinant of fiscal balance in Bangladesh is the growth rate of primary expenditures. Issuance of a sovereign bond – in the magnitude of \$1.0 billion – is likely to have little adverse effect and will not directly affect the fiscal balance of the Government. Should Bangladesh issue a sovereign bond and should it seek to avoid a default, it would nevertheless need to put in place a mechanism to stabilize the primary expenditure growth relative to the growth of tax and non-tax revenues. Also, the Government of Bangladesh will need to reduce the growth of domestic debt – between 5% and 7% - to improve the overall fiscal balance and debt sustainability.

## V. Policy recommendations and strategies

Issuing a sovereign bond is not necessarily the best option to finance infrastructure investment projects. Domestic savings are usually the best financing option for infrastructure investment, given that they are typically stable, low-cost and do not entail foreign exchange risks. When the domestic investment-savings gap is large – as is the case in Bangladesh – the second best alternative is usually long-term concessional credit from IFIs, which is also relatively stable and low-cost. Alternatively, a country can also rely on FDI – another stable source of external finance – to invest in long-term projects. When FDI is inadequate or not forthcoming to support long-term infrastructure projects – as is the case in Bangladesh and other low income countries – the Government may resort to issuing a foreign currency denominated sovereign bond to raise funds in the international capital market. But issuing a sovereign bond entails considerable risks – the most critical among them is the possibility that it can make a low-income country prematurely ineligible for IDA and other concessional loans from its development partners. If a low-income country like Bangladesh loses access to IDA credit facilities, without a long transition period from low-cost credit to commercial-term borrowing, it may be forced to cut back its social sector investments. Such a consequence may reverse the current trajectory of development in health, education and other social sectors of the economy. Historically, Bangladesh enjoyed access to concessional credit, from IDA and other sources, which allowed the Government to finance social sector investments. Bangladesh's borrowing cost averaged 1.4% with an average maturity of 32.9 years (Chart IV and Chart X).

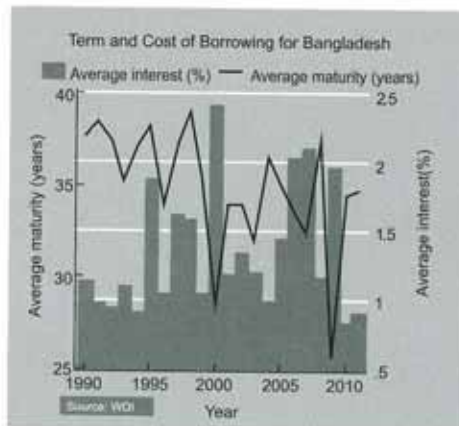


Chart X: Terms of Bangladesh's external debt during 1990-2011

Government of Bangladesh may engage in discussions with IDA before issuing its debut sovereign bond. It is critical that Bangladesh retains its access to current level of concessional IDA funding for at least another 15 years, i.e. from IDA17 through IDA21 replenishment periods. After reaching a peak of \$820 million in 2008, IDA flows have steadily declined to the lowest level since 2002. Net IDA inflows became negative \$16.1 in 2009 for the first time in Bangladesh's history (Chart XI). The Government may make utmost efforts to reverse the downward trend in IDA flows and seek some assurance from the World Bank that issuing the sovereign bond will not adversely affect Bangladesh's IDA eligibility in the medium term. The Government may also negotiate a long-term graduation plan from IDA, which will enable Bangladesh to gradually reduce its reliance on concessional debt. Bangladesh may also engage with other bilateral and multilateral development partners before the issuance to ensure steady-flow of concessional debt and ODA to fund its social and economic development activities.

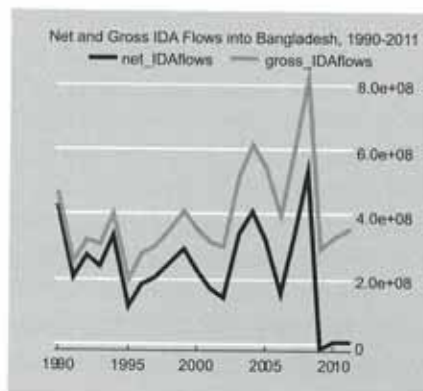


Chart XI: Net and gross IDA inflows during 1990-2011

Should Bangladesh decide to issue a sovereign bond as a last resource to finance its pipeline infrastructure projects, the Government may make an explicit announcement that it will not allow its private sector to issue bonds in the international capital market for a specified period of time. An ex ante announcement to that effect will neutralize the pressure from the private

sector entities, who may try to follow Government's suit and seek access to the international capital market. A private issue of international bonds will open the Pandora's Box and will negatively impact Bangladesh's debt sustainability. Government of Bangladesh may also plan and announce subsequent sovereign issues – preferably three to five years in advance – to avoid surprises and prevent knee-jerk reactions among the existing holders of the Bangladesh sovereign bonds. It may also announce a long-term and legally binding ceiling on international borrowing with sovereign bonds to give a clear signal that Bangladesh will not primarily rely on sovereign bonds to meet its financing needs. The ceiling may be set at a reasonably low-level to prevent the temptation of excessive borrowing and fall into the vicious cycle of indebtedness and default.

There is a need for clear strategies for management of its sovereign bond should Bangladesh decide to raise funds in the international capital market. A coordinated structure overseeing all debt issues – domestic, Eurobond and concessional loans – needs to be in place to ensure effective debt management. There needs to be particular effort to reduce debt financing of government expenditure, which hovers around 45% of total outlays (Chart XII).

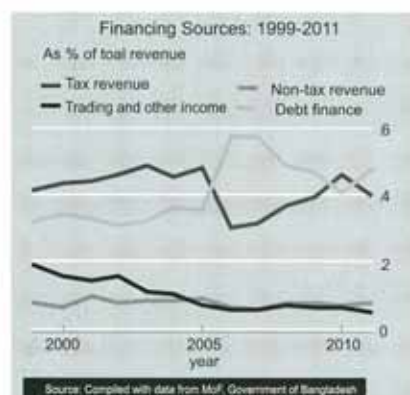


Chart XII: Financing sources of Government of Bangladesh's fiscal expenditures

To minimize exchange rate risks and also to reduce the pressure on exchange rate when coupon payments become due, Government may create a 'Debt Servicing Fund'. Central bank may periodically sterilize some foreign exchange inflows and set them aside in the debt servicing fund to make coupon and principal repayment. This will enable the Government to avoid any pressure on its international reserves. The Fund may also undertake treasury functions and buy back Bangladesh sovereign bonds in the secondary market in the event its bond prices would fall very low. This will enable Bangladesh to reduce the overall direct and indirect costs of its sovereign debt.

The key objective of the debt management strategy would be to ensure that Bangladesh is not required to borrow short or long-term to service its coupon and principal repayment. Short-term borrowing is likely to be very costly, especially if the bond price plunges for factors beyond Bangladesh's control and the yield goes up. Short-term foreign currency borrowing will likely be benchmarked to the yield of the Bangladesh sovereign bond.

Fundamentally, debt sustainability will depend on effective fiscal management by the Government. Tax and revenue elasticity of GDP growth is still very low in Bangladesh, which



means incurring additional debt and making good investment of the debt proceeds do not necessarily translate in additional tax revenue for the Government. To succeed on its maiden issue and to issue additional sovereign bonds, Bangladesh will need to significantly improve the revenue elasticity of GDP Growth. The Government will also need to rein in growth in primary expenditure – limit it to 5% annual growth or to any other reasonable threshold – until the revenue elasticity increases sufficiently. Government may set a target for primary fiscal balance and reduce debt financing of recurrent government expenditures to maintain its overall debt at manageable level. The Government may also make concerted efforts to further develop the domestic bond market and generate demand for longer-term bonds among corporate and institutional investors. It may consider issuing inflation-indexed long-term government bonds to bolster the domestic bond market.

At the issue level, Bangladesh may limit the first sovereign issue to \$1 billion. Given that there is no apparent liquidity premium for longer-term maturities, Bangladesh may seek the longest possible maturity for its maiden bond. The negotiation can begin, seeking to issue a 25-year bond and eventually accept a 20-year maturity. Under no circumstances, Bangladesh should go for a variable coupon rate bond as it will make the servicing of the bond highly variable and volatile. It may go for a step-up coupon rate, with an initial grace period of 3 years. The step coupon rate can start at 2.5% and increase to a maximum of 6.0% in 10 years, keeping the overall coupon rate within the 5.75% range. Bangladesh may have a strong preference for an amortizing bond, which will avoid a balloon payment at maturity. Such a bond is likely to minimize the risk of default and enable Bangladesh to borrow at a lower rate. An amortizing bond will also contribute to strengthening fiscal discipline and ensuring that resources are collected and set aside to repay principal and interest in each period.

The Regulation-S type bond issued by Bangladesh may be listed at least in two exchanges – Singapore in Asia and London or Berlin in Europe. There should be at least three book-runners with specific geographic specialization and client orientation. There should be particular emphasis on book-runners to secure orders from Pension Funds. Pension Funds typically hold on to sovereign bonds longer and look for longer term returns. Hedge Funds should be the least preferred clientele for the Bangladesh sovereign bond. The collective action clause of the sovereign bond should target a lower bound for super-majority. There can be different thresholds for super-majority for different set of contingencies. The *pari passu* provision should be clearly defined in the bond issue to prevent hold-outs in the event a bond restructuring or re-scheduling becomes necessary.

In the final analysis, issuing a sovereign bond is not necessarily the most preferred financing option for a low-income country like Bangladesh, which relies heavily on concessional credit to finance its socio-economic development. It may issue a sovereign bond – on a test-case basis – to raise capital for an infrastructure investment project and in the process, build tolerance for borrowing on commercial terms as the country will not have access to concessional debt ad infinitum. As a rule of thumb, such borrowing will be justifiable if the real yield on the bond is lower than the real return that the Government will earn on investing the proceeds of the bond. There are, however, considerable risks in issuing a sovereign bond as the country may fall prey to investor preferences and market whims for reasons beyond its control. In raising international funds with a sovereign bond issue, Bangladesh must remain careful so that it does not jump from a frying pan to the fire. A sound, forward-looking and comprehensive debt management structure may ensure that Bangladesh is able to reap the benefit of a sovereign bond issue without falling into the vicious cycle of relentless borrowing to service its debt.



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**Table I: Sovereign bond issues during 2006-2013**

Country	Issuance Time	Issue volum (USD)	Tenor (years)	Coupon rate	Issue Managers
Angola	Aug-12	1,000,000,000	7	7	VTB - Private placement
Bolivia	Oct-12	500,000,000	10	4.875	Bank of America Merrill Lynch, Goldman Sachs
Congo	Dec-07	477,790,000	22	2.5	HSBC
Cote D'Ivoire	Apr-10	2,332,149,000	22	2.5	JP Morgan
Gabon	Dec-07	1,000,000,000	10	8.2	JPMorgan/ Citi
Ghana	Oct-07	750,000,000	10	8.5	Citi / UBS
Indonesia	Feb-09	1,000,000,000	5	10.375	BARCLAYS/ UBS
Indonesia	Nov-11	1,000,000,000	7	4	HSBC, Citigroup, Standard Chartered Bank
Indonesia	Jan-12	2,250,000,000	30	5.25	HSBC, JP Morgan, Standard Chartered Bank
Indonesia	Nov-12	1,000,000,000	10	3.3	Deutsche Bank, HSBC, Standard Chartered Bank
Mongolia	Nov-12	500,000,000	6	4.125	Bank of America Merrill Lynch, Deutsche Bank, HSBC, JP Morgan
Mongolia	Nov-12	1,000,000,000	10	5.125	Bank of America Merrill Lynch, Deutsche Bank, HSBC, JP Morgan
Namibia	Mar-11	500,000,000	10	5.5	Barclays Capital, Standard Bank
Nigeria	Jan-11	500,000,000	10	6.75	Citi, Deutsche Bank
Pakistan	Mar-06	500,000,000	10	7.125	Citi, Deutsche Bank, JP Morgan
Pakistan	Mar-06	300,000,000	30	7.875	Citi, Deutsche Bank, JP Morgan
Pakistan	Jun-07	750,000,000	10	6.875	Citi, Deutsche Bank Securities, HSBC
Philippines	Jul-09	1,400,000,000	11	6.5	Citi, Credit Suisse, Deutsche Bank
Philippines	Sep-10	1,000,000,000	11	4.95	Citi, Deutsche Bank, Credit Suisse, Goldman Sachs, HSBC, JP Morgan
Philippines	Mar-11	1,500,000,000	15	5.5	Citigroup, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan, UBS
Philippines	Jan-12	1,500,000,000	25	5	Deutsche Bank, SCB, Citi, Credit Suisse, Goldman Sachs, HSBC, JP Morgan, UBS
Senegal	Dec-09	200,000,000	5	8.75	Citigroup, Standard Bank
Senegal	May-11	500,000,000	10	8.75	Standard Chartered, Standard Bank
Sri Lanka	Oct-07	500,000,000	5	8.25	Barclays Capital, HSBC, JP Morgan
Sri Lanka	Oct-09	500,000,000	6	7.4	HSBC, JP Morgan, Royal Bank of Scotland
Sri Lanka	Sep-10	1,000,000,000	10	6.25	Bank of America Merrill Lynch, HSBC, RBS
Sri Lanka	Jul-11	1,000,000,000	10	6.25	Bank of America Merrill Lynch, Barclays Capital, HSBC, RBS
Sri Lanka	Jul-12	1,000,000,000	10	5.875	Bank of America Merrill Lynch, Barclays Capital, Citigroup, HSBC
Tanzania	Feb-13	600,000,000	7	Libor 6 month +6	Standard Bank - private placement
Vietnam	Jan-10	1,000,000,000	10	6.75	Barclays Capital, Citigroup, Deutsche Bank
Zambia	Sep-12	750,000,000	10	5.375	Barclays Capital, Deutsche Bank



**Table II: Macroeconomic Model**  
Dependent variable: Coupon rate of sovereign bond

VARIABLES	(1) Model	(2) Model	(3) Model	(4) Model
Natural log of GDP per capita	0.46* (0.235)	0.23 (0.351)	-0.21 (0.350)	-0.57** (0.291)
GDP growth rate (%)	0.15* (0.074)	0.40* (0.196)	1.15** (0.521)	1.55*** (0.491)
Inflation (%)	0.14 (0.160)	0.07 (0.182)	0.10 (0.159)	0.16 (0.149)
Budget balance (% of GDP)	-0.22* (0.122)	-0.29* (0.148)	-0.03 (0.165)	-0.06 (0.209)
External debt (% of GDP)		0.01* (0.009)	0.02* (0.011)	0.07** (0.024)
FDI (% of GDP)			-0.24** (0.090)	0.04 (0.172)
Mineral rent (% of GDP)				-0.10 (0.125)
Oil rent (% of GDP)				-0.17** (0.062)
Current account balance (% of GDP)				-0.38** (0.150)
Observations	25	24	24	24
R-squared	0.93	0.93	0.95	0.97
Adj. R-squared	0.91	0.91	0.93	0.94

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

Table V: Projection of Fiscal Balance – 2013-2022

<i>In million US\$ (in constant 2011 dollars)</i>	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
GDP	112,000	118,720	125,843	133,394	141,397	149,881	158,874	168,407	178,511	189,222	200,575	212,609
Total revenue	31,974	32,550	33,136	33,732	34,339	34,957	35,587	36,227	36,879	37,543	38,219	38,907
Total primary expenditure	15,892	17,481	19,230	21,153	23,268	25,595	28,154	30,969	34,066	37,473	41,220	45,342
Total domestic interest expenditure	2,030	2,233	2,457	2,702	2,973	3,270	3,597	3,957	4,352	4,787	5,266	5,793
Total foreign interest expense	209	213	217	221	226	230	235	240	245	249	254	260
Total domestic debt repayment	10,254	11,279	12,407	13,648	15,013	16,514	18,166	19,982	21,980	24,178	26,596	29,256
Total Loans and advances	2,739	2,876	3,020	3,171	3,330	3,496	3,671	3,855	4,047	4,250	4,462	4,685
Total foreign debt repayment	794	826	859	893	929	966	1,005	1,045	1,087	1,130	1,175	1,222
Sovereign bond debt service	-	-	60	60	60	60	60	60	60	60	60	1,060
Fiscal balance	55	(2,360)	(5,054)	(8,057)	(11,399)	(15,114)	(19,241)	(23,820)	(28,898)	(34,525)	(40,756)	(47,652)
Fiscal balance (% of GDP)	0.05	(1.99)	(4.02)	(6.04)	(8.06)	(10.08)	(12.11)	(14.14)	(16.19)	(18.25)	(20.32)	(22.41)

Assumptions for the baseline:

GDP Growth	6%
Revenue elasticity of growth	0.3
Revenue growth rate	2%
Primary expenditure growth rate	10%
Growth rate of domestic interest payment	10%
Growth rate of foreign interest payment	2%
Growth rate of domestic debt repayment	10%
Growth rate of loans and advances	5%
Growth rate of foreign debt repayment	4%



## Estimating growth-inflation trade off threshold in Bangladesh

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Dr. Akhtaruzzaman <sup>2</sup>

### Abstract

The objective of this study is to explore the inflation-economic growth linkage, if any, in Bangladesh. With this view, various tables and charts, correlation matrices, pair-wise Granger Causality tests and a quadratic regression equation estimated by OLS based on time series annual data covering the sample period from 1976 to 2012 are used. The results of all the data including regression analysis convincingly demonstrate that the relationship between inflation and growth is non-linear with an existence of a threshold level of inflation within the range of 7-8 percent. This implies that targeting too low an inflation level (relative to the threshold) would be hurtful for growth in terms of potential cost of forgone output and, at the same time, too high level of inflation would also impede economic growth.

**JEL Classification:** C22 and E31

**Keywords:** Inflation, Growth, Threshold level of Inflation, Bangladesh Economy

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## **I. Introduction**

Understanding the relationship between inflation and output growth is very crucial in setting the targets of policy goals, inflation in particular and formulating the policy framework. Several cross-country and single country studies on the issue indicate that the relationship between inflation and output growth is not linear and there exist a threshold level of inflation, up to which inflation appears to be helpful for economic growth and beyond which it appears to impede growth. This simply means that likewise the cost of high inflation, keeping too low inflation is also costly in terms of output loss. The objective of this study is to explore the inflation-economic growth linkage, if any, in Bangladesh, particularly identifying a reasonable threshold level, which is robust and not highly sensitive to changes in underlying assumptions. This would be very useful as guide for policy makers as the cost of wrong choice of threshold inflation level could be substantial in terms of forgone output and employment opportunities. Study identifying the threshold level of inflation in Bangladesh is scarce; therefore, the current study makes an attempt to examine the relationship between inflation and output growth to identify a realistic level of threshold level of inflation in Bangladesh. The plan of the study is as follows: after the introduction in section-I, a review of the related literature is provided in section-II. While section-III analyzes the relationship between growth and inflation, section-IV outlines the model specification, methodology and the empirical estimation. Finally, the conclusions and recommendations are given in section-V.

## **II. Review of literature on threshold effect of inflation on growth:**

The debate whether inflation has inimical or helpful or no effects on growth were examined empirically in many studies. Some earlier empirical works, such as Fischer, (1993, 1996) and Bruno and Easterly (1995) generally accepted the views that there exists a negative relationship between inflation and economic growth at least at double-digit level of inflation supporting the idea of Phillip's curve. However, as Barro (1995) and Sarel (1996) do not find any clear negative relationship below 8 percent inflation, some uncertainties regarding this relationship remain at low level of inflation. Fischer (1993) examined the possibility of non-linearity in the relationship between inflation and economic growth in a panel of ninety-three countries. Using both cross-section and panel data for a sample of both developing and industrialized countries, his findings suggest a non-linear relationship between inflation and growth. Barro (1995) using data for 100 countries covering 1960-1990 assessed the impact of inflation on economic performances. The regression results indicate that the growth rate of real per capita reduced by 0.2-0.3 percentage points per year for every 10 percentage points increase in inflation. Another study by Sarel (1996) tested a structural

break in the relationship between inflation and growth. Sarel (1996) used a panel data (1970-1990) of eighty-seven countries. The author found evidence of a significant structural break at an annual inflation rate of 8 percent beyond which the relationship between inflation and growth is negative, which is statistically significant and extremely strong. Below that rate, however, inflation does not have any significant negative effect on growth rather comes with marginally positive effect. Khan and Senhadji (2001) used an unbalanced panel data covering the period 1960-98 for 140 countries to estimate the threshold levels of inflation for industrial and developing countries. Using a non-linear least squares (NLLS) estimation method, they found that the threshold levels of inflation for industrial and developing countries are in between 1-3 percent and 11-12 percent respectively. For inflation rates above these threshold levels, there is a strong negative relationship between inflation and growth for the respective group of countries. In case of India, the outcomes of the studies on threshold levels of inflation provide differing views. For example, Chakarvarty Committee (1985) considered the acceptable rise in prices at 4 percent while Rangarajan (1998) judged it at 6-7 percent, which is supported by few other studies like Vasudevan et al. (1998) found the threshold level to be around 6 percent. In contrast, Singh and Kalirajan (2003) using annual data for the period of 1971-1998 provided argument against any threshold level for India. Using an annual data set for the period 1973-2000, Mubarik (2005) estimated the threshold level of inflation for Pakistan. He found an inflation rate beyond 9 percent is detrimental for the economic growth suggesting that an inflation rate below 9 percent is favorable for the economic growth of Pakistan. However, the study by Hussain (2005) based on the annual data covering 1973-2005 found no threshold level of inflation for Pakistan. Lee and Wong (2005) estimated the threshold levels of inflation using quarterly data during 1965-2002 for Taiwan and 1970-2001 for Japan. Their estimation of the threshold models suggests that an inflation rate beyond 7.25 percent is detrimental for the economic growth of Taiwan. For Japan on the contrary, they found two threshold levels, which are 2.52 percent and 9.66 percent. To summarize the findings of the above studies it can be safely noted that there is relationship between inflation and economic growth, which is often non-linear in nature. Under a certain level of inflation, the relationship is positive and beyond that level of inflation, the relationship is negative. Simple implication of this kind of relationship between inflation and economic growth is that modest increase in the rate of inflation would not be harmful for the long-run real economic growth for the economies with initially low rates of inflation. But for economies with initially high rates of inflation, further increase in the inflation rate would have adverse effects on real economic growth.

### **III: An analysis of the growth-inflation relationship in Bangladesh**

In view of visualizing the relationship between inflation and GDP growth in Bangladesh, several statistical tables and charts containing CPI inflation, real GDP during the period from 1981 to 2012 are used.



**Chart-1: Inflation and Real GDP Growth**



Source: Economic Trends, Bangladesh Bank

Chart-1 shows the relationship between the CPI inflation and real GDP growth for the period 1977-78 to 2009-10. It is evident from the chart that during the late 80s to late 90s, when the rates of inflation were higher, the corresponding average GDP growth was relatively lower. During 1990s and 2000s, however, inflation and growth maintained some sort of neutral relationship. Although from FY04 onward matching with the period of flexible exchange rate regime, the real GDP growth was relatively higher corresponding to relatively lower rates of inflation. It can also be noted from the chart that the relationship between inflation and growth is not linear that might go through some structural breaks requiring further investigation.

*Table-2: Evidence from historical data: inflation-growth*

Sample size	inflation (percent)	Avg. GDP growth (percent)
6	up to 2.99	4.25
1	3.00-3.99	5.39
2	4.00-4.99	4.94
3	5.00-5.99	5.13
2	6.00-6.99	5.85
4	7.00-7.99	5.94
5	8.00-8.99	4.48
5	9.00-9.99	4.98
2	10.00-10.99	3.80
1	11.00-11.99	2.90
2	12.00-12.99	6.65
1	16.00-16.99	0.80
1	18.00-18.99	1.3

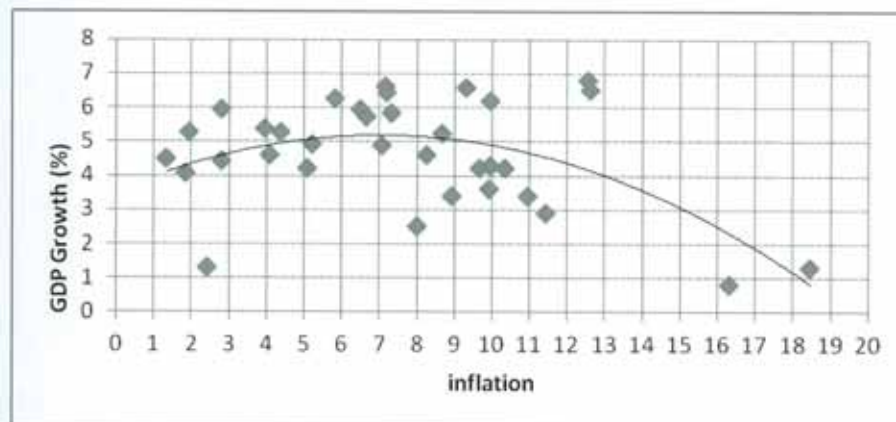
Source: Author's own calculation

Table-2 contains the data on inflation and real GDP growth in Bangladesh for the last 35 years (1975-76 to 2011-12) in a way that various levels of GDP growth are recorded against a low-to-high sequence of inflation levels. The recorded data show that when the rates of inflation are below 3 percent the corresponding average GDP growth is 4.25 percent for six different years. It is also seen from the table that when inflation rates are between 3 to 3.99 percent, the real GDP growth is 5.39 percent. While inflation rates are in between 7 to 7.99 percent, the corresponding average real GDP growth rate is one of the highest at 5.94 percent



for 4 different years. Beyond the 7.99 percent inflation, the average real GDP growth started to moderate. Thus the above bi-variate relationship between inflation and GDP growth indicates some sort of non-linearity with a structural break or inflexion point when the relationship between inflation and GDP growth switched.

**Chart 2: Average actual GDP growth against various level of inflation:  
Scatter diagram of real GDP with polynomial (degree=2) of inflation**



The above scatter diagram (Chart-2) shows various levels of inflation and its corresponding real GDP growth. From the above chart of real GDP and polynomial (degree=2) of inflation it is seen that the relationship between inflation and real GDP starts changing while inflation level is between 7-8 percent.

#### **IV: Model specification, methodology and empirical results**

##### **A. Data Analysis**

Before estimating the model, it is necessary to examine the stationarity properties of the series. Inflation and GDP growth are found to be stationary at the level using both the Augmented Dickey-Fuller (1979) and Phillips-Perron (1998) tests. In order to see whether inflexion point exists in the inflation growth relationship two correlation matrices are estimated. A correlation-matrix with the inflation level less than 7.31 percent shows a positive correlation, while another correlation-matrix with more than 7.31 percent inflation shows a negative correlation between inflation and GDP growth. Therefore, from the two correlation matrices, we can assume that the relationship between inflation and growth is non linear with the existence of at least one break point. The relationship is positive at some level and after that level the relationship become negative. Historical data guided us to choose 7.31 percent level of inflation as one of the break point (Chart-2).

***Correlation matrix for inflation less than 7.31 percent***

	Inflation	GDP growth
Inflation	1	-
GDP Growth	0.54	1

***Correlation matrix for inflation higher than 7.31 percent***

	Inflation	GDP growth
Inflation	1	-
GDP Growth	-0.49	1

***Pair-wise granger causality tests***

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
GRY does not Granger Cause INF	33	0.62	0.54
INF does not Granger Cause GRY		3.56	0.04

As the correlation matrices stated above do not let us decide the direction of the relationship, Granger (1969) approach is used. It would allow us to see how much of the current GDP could be explained by past values of inflation and then to see whether adding lagged values of inflation could improve the explanatory power of inflation. Based on minimum Akaike Information Criteria (AIC) both the variables up to second lags are used in Granger Causality test and it is found that the causality runs from inflation to growth, which is statistically significant at 5 percent level.

**B. Model specification**

The issue of non-linear relationship between variables in the areas of the social and behavioral sciences are not uncommon. Numerous theories as well as econometric approaches are there to handle such nonlinear relations among variables. As noted by Wang, Houshyar, and Prinstein (2006), the most-often investigated nonlinear effects are interaction and quadratic effects (the inverted U effect). A quadratic effect implies that predictor variables interact with themselves. Based on the analyzed non-linear relationship between inflation and growth, a quadratic equation of inflation and growth has been estimated by OLS to determine the threshold level of inflation using annual data during 1976-2012 for Bangladesh. Although, it is reasonable to argue that growth-inflation regression needs to include other plausible determinants of growth but considering argument of Ghosh et al. (1998)<sup>2</sup> and objective of the paper no other variable is included in model. Therefore, this study estimates bivariate model to gauge the relationship between inflation and growth.

<sup>2</sup> Ghosh et al. (1998) argued that inflation growth findings might not be robust once "conditioning" variables are included in the regression analysis. Besides, conditioning variables may themselves be functions of the inflation rate. Inclusion of these variables in a growth regression may reduce apparent effect of inflation.

$$\text{Equation: } \text{Gry} = C + \beta_1 \text{Inf} + \beta_2 \text{D(Inf)} * (\text{Inf}) + u$$

Where, Gry=Real GDP growth, Inf=lower Inflation inf\*inf=higher inflation

Estimated results: Ordinary Least Square Method(OLS)		
Dependent variable: real GDP growth		
Explanatory variables	Coefficient	Prob.
C	3.268858	0.00***
INFLATION	0.539016	0.00***
INFLATION*INFLATION	-0.036450	0.02**
R-squared	0.31	
DW	1.75	

\*\*\* implies significant at 1 percent level while \*\* implies significant at 5 percent level

The above quadratic equation has been used to estimate the threshold level of inflation. The estimated results obtained from OLS using only inflation and its square to right hand side gives us a threshold level of inflation for Bangladesh. As per simple rule of optimization (setting first differentiation=zero and solving the equation), we get the threshold level of inflation at about 7.394. This equation also satisfies the second order condition (SOC) of growth maximization with respect to inflation implying  $(d^2\text{gry}/d^2\text{inf}) < 0$ , the inverted U curve.

$$(d^2\text{gry}/d^2\text{inf}) 0.539016 - 2(0.03645)\text{INF} = 0$$

$$\text{or, INF} = 0.539016 / 0.0729 = 7.394 \text{ percent}$$

The estimated quadratic equation for the sample period from 1976 to 2012 give a threshold level of inflation at 7.39 percent and up to this level of inflation, the impact of inflation on GDP growth remains positive in Bangladesh. After that level, any rise in inflation would hurt GDP growth. Various diagnostic tests are applied to the above estimated model to see whether it passes all the required diagnostic tests. First, the Jarque-Bera statistic for testing normality. If the residuals are normally distributed, the histogram will be bell-shaped and the Jarque-Bera statistic should not be significant. It has been found that the histogram is bell-shaped and Jarque-Bera statistic is insignificant (probability=0.6819 and Jarque-Bera test statistics=0.7655) implying that the residuals are normally distributed.

Second, the white noise Residual Test. The correlogram of Q-statistics shows that all the residuals are insignificant and white noise implying that there is no serial correlation or information left in the residuals. The LM test for higher order serial correlation test confirms no serial correlation as well. Besides, the stability test shows that the residual are within the band, implying no structural break in the estimated residual.



## V. Conclusion

The objective of this study is to explore the nature of relationship between inflation-economic growth in identifying two things: first, is the relationship non-linear and second, if so at what level of inflation the relationship breaks? The outcomes of all the data analysis including regression convincingly exhibit that the relationship between inflation and growth is non-linear with an existence of a break point. Historical data as depicted in several tables and charts show that average economic growth reaches its peak when inflation rates are in between 7-8 percent in Bangladesh. Correlation matrices also support this range in the sense that the inflation-growth correlation is positive when the rate of inflation is less than 7.31 percent which turns into negative at the rate of inflation higher than 7.31 percent. Besides, Granger Causality test confirms that the causality runs from inflation to growth allowing a regression analysis to see the threshold effect of inflation on economic growth. Accordingly, a quadratic equation by OLS is estimated generating a threshold level of inflation at 7.39 percent in Bangladesh, standing within the range of 7-8 percent.

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# Dynamic Linkages between Macroeconomic Variables and Stock Prices in Bangladesh: An Empirical Analysis

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## Abstract

This paper examines the dynamic causal relationship between capital stock prices and macroeconomic activities in Bangladesh. Though the empirical literature on this issue is voluminous, however for Bangladesh it is quite nascent. Only a handful of studies for Bangladesh [Chowdhury (1995), Mohiuddin et.al. (2006), Rahman and Uddin (2009), Ali (2011), Afzal and Hossain (2011)] has been conducted of which most of them suffer either from omitted variable bias or from the methodological deficiencies. This study is an improvement of the early studies in terms of data used and from methodological point of view. The major objective of this paper is to examine the short run dynamics of the long run relationship between the macrovariables such as the gross domestic product (GDP), money supply (M2), consumer price index (CPI), exchange rate (EXR), interest rate (IR), private sector credit (PSC) on the variability of the stock price (SPI) in Bangladesh. That is to see whether they are cointegrated or not. It also sheds lights on the causal relationship among the considered variables using annual time series data for the period 1985 to 2010. The empirical results show that all the time series data are nonstationary and cointegrated with a single vector. All the explanatory variables have been found to contribute to the long-run equilibrium relationship. The estimation of the error-correction model further confirms the existence of long run stable equilibrium among the variables in the model. It is confirmed that any disequilibrium is corrected by fast adjustment. The Granger causality test also indicates that the lagged change in GDP, M2 and PSC has significant predictive ability for the movements in the stock prices. However, the bidirectional causality has not been established. The implication of the result is that monetary policy has strong stimulus in stabilizing and smooth functioning of the stock market in Bangladesh.

**Keywords:** Stock Market, Macroeconomic Activities, Cointegration, Granger Causality, Error Correction Models.

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## 1.0 Introduction

The central objective of macroeconomics is to achieve higher level of output. The role of savings and so the accumulation of capital to this end has gained attention in the literature over a long period of time, dating back to the Adam Smith's the *Wealth of Nations*. Over the course of time different school of thought and economists like Frank Ramsey (1928), Allyn Young (1928), Frank Knight (1944), Joseph Schumpeter (1934) and Harrod (1939) & Domar (1946) analyzed growth process of the capitalist economies in various lines, identifying different determinants of economic growth. The general consensus is that accumulation of capital plays critical role in the economic growth process. The role of private sector in such accumulation is very important in developing countries like Bangladesh. The stock market plays a *sine qua non* in mopping up the necessary idle money of the savers to bring it to the directly productive activities. Stock exchanges enable firms to acquire capital quickly, due to the ease with which securities are traded. Stock exchange activity, thus, plays an important role in helping to determine the effects of macroeconomic activities. Therefore, the establishment of the lead to lag relationship between macro variables and stock prices is highly important. The significant lagged effects of macroeconomic variables on stock prices indicate informational inefficiency of the stock market, which led to earn supernormal capital gain by an individual through the exploitation of previous information on various macroeconomic fundamentals. Such situations disfigure the market capacity to efficiently allocate scarce resources. However, studies show a reverse effect from stock market movement to anticipate future economic conditions. Therefore examining the dynamic linkages between the stock prices and macroeconomic variables is crucial in formulating stabilization policies (Ibrahim, 1999).

Bangladesh is a small economy, where there is an acute shortage of capital to the government as well as the private sector needed for the industrial development. However, there is a huge amount of unorganized capital / savings in the hands of private individuals which needs channeling to the directly productive activities. Though in the emerging stage, the stock market in Bangladesh can play decisive role in bringing the idle money to make a strong industrial base of the economy. The examination of the causal relationship between the stock prices and the macroeconomic variables is thus imperative. The major objective of the paper is to shed light on the nature of causal relationship that exists between the stock market and macroeconomic variables, i.e. is it unilateral or bilateral.

The paper will be articulated as follows. After introducing the issues in section 1, section 2 briefly survey the existing literature on this issue. Section 3 presents the methodology of the study. Section 4 points out the data and the analytical framework for testing stationarity, cointegration, error correction models and causality among the variables of the study. Section 5 analyzes the results found following the analytical framework. Finally, section 6 summarizes the paper with concluding remarks.

## 2.0 Survey of the Literature

The causal nexus between macroeconomic variables and stock prices becomes an active area of research in the developed countries. Very early studies by Palmer (1970) and Sprinkel (1971) have indicated that money supply leads to stock prices, which was further supported by the latter studies by Malliaris and Urrutia (1991) for the United States. Thornton (1993) found that stock returns lead to real income. Chang and Pinegar (1989) and Chen et.al. (1986) concluded that there is a close relationship between stock market and the domestic economic activity. Using Indian data Panda and Kamaiah (2001) found that expected inflation and real activity do affect stock returns.

A handful of important studies for developing economies include Mookerjee and Yu (1997) and Maysami and Koh (2000) for Singapore, Kwon et al. (1997) and Kwon and Shin (1999) for South Korea, and Habibullah and Baharumshah (1996) and Ibrahim (1999) for Malaysia. Using bi-variate co-integration and causality tests, Mookerjee and Yu (1997) note significant interactions between M2 money supply and foreign exchange reserves and stock prices for the case of Singapore. However, Maysami and Koh (2000) document significant contribution of interest rate and exchange rate in the long-run relationship between Singapore's stock prices and various macroeconomic variables. Evaluating the Korean equity market, Kwon et al. (1997) provide evidence for the exchange rate, dividend yield, oil price and money supply as being significant macroeconomic factors.

Stabilizing the price level that is containing moderate inflation is also one of the key macroeconomic goals. A few earlier studies address the linkage among the stock market and inflation. Fama (1990) suggests that macroeconomic variables have predictive power for the stock exchange performance, although they do not consent to the anticipating authority of stock performance for the economy.

Aggarwal (1981), Soenen and Hennigar (1988) examined the relationship between exchange rates and stock prices. Literature showed that any change in the exchange rates would affect corporate foreign business and profitability. This will, as a result, affect firm's equity prices. The type of change in equity prices would base on the global distinctiveness of the firm. Aggarwal (1981) noted strong positive relationship between the US dollar and US equity prices, while Soenen and Hennigan (1988) found a considerable negative relationship. Index of industrial production indicates a measure of total economic activity in the economy and influences equity prices by effecting on future earnings (Fama, 1990).

Mukherjee and Naka (1995) explored the relationship between industrial production and stock prices in Japan and found positive relationship between industrial production and stock exchange prices. Bhattacharya and Mukherjee (2002) examined the causal relationship between stock prices and macro-economic factors in India. This study applied methodology of Toda and Yamamoto for the period of 1992-1993 to 2000-2001, and found that change in industrial production affects the stock prices. Nishat and Shaheen (2004) found industrial production having largest positive relationship with stock prices in Pakistan.

Chakravarty (2005) has also examined positive relationship between industrial production and stock prices using Granger causality test and observed unidirectionality from industrial production to stock prices in India. Balance of trade has also been taken by many researchers to analyze its effects on stock exchange prices; however it is observed that it has no significant



effects on stock exchange prices, for instance Bhattacharya (2002) found negative relationship between trade balance and stock exchange prices in India.

Most of the empirical literature on stock prices and macroeconomic variables has used the modern time series techniques of cointegration and error correction modeling. For instance, Maysami and Sims (2002, 2001a, 2001b) employed the Error-Correction Modelling technique to examine the relationship between macroeconomic variables and stock returns in Hong Kong and Singapore (Maysami and Sim, 2002b), Malaysia and Thailand (Maysami and Sim 2001a), and Japan and Korea (Maysami and Sim 2001b). Using Hendry's (1986) approach which allows making inferences to the short-run relationship between macroeconomic variables as well as the long-run adjustment to equilibrium, they analyzed the influence of interest rate, inflation, money supply, exchange rate and real economic activity, along with a dummy variable to capture the impact of the 1997 Asian financial crisis. The result confirmed the influence of macroeconomic variables on the stock market indices in each of the six countries under study, though the type and magnitude of the associations differed depending on the country's financial structure. Islam (2003) replicated the above studies to examine the short-run dynamic adjustment and the long-run equilibrium relationships between four macroeconomic variables (interest rate, inflation rate, exchange rate, and the industrial productivity) and the Kuala Lumpur Stock Exchange (KLSE) Composite Index and reached the same conclusion.

Ibrahim (1999) also investigated the dynamic interactions between the KLSE Composite Index, and seven macroeconomic variables (industrial production index, money supply M1 and M2, consumer price index, foreign Relationship between macroeconomic Variables and Stock Market Indices reserves, credit aggregates and exchange rate). Observing that macroeconomic variables led the Malaysian stock indices, he concluded that Malaysian stock market was informationally inefficient.

Chong and Goh (2003) examine the dynamic linkages among stock prices, economic activities, real interest rates and real money balances in Malaysia and found that the considered variables are linked in the long run both in the pre- and post capital control sub periods. Mukherjee and Naka (1995) applied Johansen's (1998) VECM to analyze the relationship between the Japanese Stock Market and exchange rate, inflation, money supply, real economic activity, long-term government bond rate, and call money rate. They concluded that a cointegrating relation indeed existed and that stock prices contributed to this relation. Maysami and Koh (2000) examined such relationships in Singapore. They found that inflation, money supply growth, changes in short- and long-term interest rate and variations in exchange rate formed a cointegrating relation with changes in Singapore's stock market levels.

Islam and Watanapalachaikul (2003) showed a strong, significant long-run relationship between stock prices and macroeconomic factors (interest rate, bonds price, foreign exchange rate, price-earnings ratio, market capitalization, and consumer price index) during 1992-2001 in Thailand. Hassan (2003) employed Johansen's (1988, 1991, 1992b) and Johansen and Juselius' (1990) multivariate cointegration techniques to test for the existence of long-term relationships between share prices in the Persian Gulf region. Using a vector-error-correction model, he also investigated the short-term dynamics of prices by testing for the existence and direction of intertemporal Granger-causality.



Vuyyuri (2005) investigated the cointegrating relationship and the causality between the financial and the real sectors of the Indian economy using monthly observations from 1992 through December 2002. The financial variables used were interest rates, inflation rate, exchange rate, stock return, and real sector was proxied by industrial productivity. Johansen (1988) multivariate cointegration test supported the long-run equilibrium relationship between the financial sector and the real sector, and the Granger test showed unidirectional Granger causality between the financial sector and real sector of the economy. Maghyereh (2002) investigated the long-run relationship between the Jordanian stock prices and selected macroeconomic variables, again by using Johansen's (1988) cointegration analysis and monthly time series data for the period from January 1987 to December 2000. The study showed that macroeconomic variables were related in stock prices in the Jordanian capital market.

Gunasekarage, Pisedtasalasai and Power (2004) examined the influence of macroeconomic variables on stock market equity values in Sri Lanka, using the Colombo All Share price index to represent the stock market and (1) the money supply, (2) the treasury bill rate (as a measure of interest rates), (3) the consumer price index (as a measure of inflation), and (4) the exchange rate as macroeconomic variables. With monthly data for the 17-year period from January 1985 to December 2001 and employing the usual battery of tests, which included unit roots, cointegration, and VECM, they examined both long-run and short-run relationships between the stock market index and the economic variables. The VECM analysis provided support for the argument that the lagged values of macroeconomic variables such as the consumer price index, the money supply and the Treasury bill rate have a significant influence on the stock market.

Though the relationship between stock prices and macroeconomic variables are well documented in the developing and developed countries, for emerging markets such as Bangladesh it is quite nascent. A study by Mohiuddin et. al. (2006) suffers from methodological deficiency. It examines the linkages between macrovariables and stock prices in the multivariate framework without addressing the time series issues. Rahman and Uddin (2009) examined the dynamic relationship between exchange rates and stock price index in three South Asian markets namely, Dhaka Stock Exchange index, Bombay stock exchange index and Karachi stock exchange index. The study found that there is no cointegrating relationship between stock prices and exchange rates. Ali (2011a) long-run equilibrium relationship as well as causal relationships between the DSE all share price index (DSI) and the four microeconomic variables (i.e. market dividend yield, market price-earnings multiples, monthly average market capitalization and monthly average trading volume) using monthly data from the period January 2000 to December 2010. Significant findings include long-run equilibrium relationship among the variables under study. However, the study did not consider the short run dynamics among the variables and so did not apply error correction model. A very recent study by Afzal and Hossain (2011) examined the relationship between macroeconomic variables and stock prices in Bangladesh under bivariate and multivariate causality framework. The study found a long run causal relationship among the considered variables. However, the study suffers from omitted variable bias. It omitted two key macroeconomic variables of gross domestic product (GDP) and private sector credit, which

are strongly correlated to the stock prices. The present study tried to overcome all the shortcomings of the earlier studies on Bangladesh and is an improvement in terms of data used and the methodology applied.

### **3.0 Methodology**

With a view to accomplish the stipulated objectives of the study various tools of the time series econometrics have been applied. To examine the dynamic linkages among the variables in the model the paper has taken into account of various modeling issues that arise in causality framework. The usual first step in any standard time series analysis is to conduct the unit root test to examine the stochastic properties of the data. The study examines the stationary properties of the data on the variables by applying the Augmented Dicky Fuller (ADF) test. Though some of the studies also used the Phillips-Parron test, the present study relied on the ADF test only since our data point is small and over the considered time frame the Bangladesh has not experienced any significant structural changes. Once it is found that the considered time series are integrated of order one i.e.  $I(1)$  then it is necessary to check whether there exist any long run relationship among them. Johansen and Juselius test has been applied to examine the cointegration i.e. the long run relationships among the variables. Some of the earlier studies (Afzal and Hossain, 2011) for Bangladesh used the Engel and Granger two step procedure to examine the cointegration among the variables. However, due to the robustness of such study in case of small data points the present study relied on the Johansen and Juselius cointegration test. Then the Error Correction models and Granger causality test has been applied to test the short run dynamics of long run relationships between macro variables and stock prices. The findings of the above tests help to examine the nature and direction of long run equilibrium relation and the extent of causality among the stock prices and the macroeconomic variables in Bangladesh.

### **4.0 The Analytical Framework**

#### **4.1 Data**

This study is based on the annual data<sup>2</sup> for the period 1985 to 2010 taken from the Economic Trends published by the Bangladesh Bank, and various reports published by Security and Exchange Commission. To measure the stock price; the study uses the annual average values of the stock price index (SPI) of Dhaka Stock Exchange. Broad money (M2) is considered as monetary stock. Though some early studies (Afzal and Hossain, 2011) uses both narrow money (M1) and broad money (M2) we relied on the study of Ibrahim (1999), which shows that M2 is a preferable intermediate target to stabilize the economy and M2 is found to be cointegrated with other macrovariables and is thus superior as a long run policy variable. Friedman and Schwartz (1963) explained the relationship between money supply and stock returns by simply hypothesizing that the growth rate of money supply would affect the aggregate economy and hence the expected stock returns. Nominal GDP is used as a measure of aggregate economic activity. The results of studies by Fama and Schwert (1977), Chen, Roll and Ross (1986), Nelson (1976) and Jaffe and Mandelker (1976) pointed to a negative relation between consumer price index and stock prices. Therefore, the study

<sup>2</sup> Some of the early studies for Bangladesh for instance Afzal and Hossain (2011) used quarterly data. However, for Bangladesh quarterly data is not available for all the variables. The early studies did not provide explanation how the quarterly data has been generated. Therefore, the present study relied on annual data.



uses the consumer price index (CPI) as a measure of the aggregate price level, (Base: 1995-96 =100). Data on CPI have been obtained from various issues of Statistical Yearbook of Bangladesh. The domestic credit aggregates are claims on the private sector (PSC). The weighted average of annual interest rate on lending by banks has been considered as the interest rate (IR). Lastly, the study employs the annual average of Tk/\$US exchange rate as a measure of the foreign exchange rate (EXC). Econometric estimations have been done by using econometric software package Eviews 7.0.

#### 4.2 Granger Causality Test

To test the causal relationship between stock prices and macroeconomic variables the study relied on the Granger Causality test, due to its wide applicability to examine the direction of causality among variables. Although regression analysis deals with the dependence of one variable on other variables, it does not necessarily imply causation. Alternatively, the existence of a relationship between variables does not prove causality or the direction of influence. But in regression involving time series data we need to examine the direction of causality. Otherwise the simple regression results become spurious. The direction of causality can be explained by the Granger Causality test. The basic idea of the Granger Causality is that a variable X causes another variable if Y can be explained better by the present and lagged values of X than by the past values of Y alone assuming that both X and Y are stationary variables. This test assumes that the information relevant to the prediction of the respective variables is contained solely in the time series data on these variables (Gujrati, 2003). For illustrative purpose using a two variable system, the test is based on the following regression:

$$Y_t = \beta_0 + \sum_{i=1}^m \beta_i Y_{t-i} + \sum_{j=1}^n \alpha_j X_{t-j} + u_t \quad (1)$$

$$X_t = \gamma_0 + \sum_{i=1}^m \gamma_i X_{t-i} + \sum_{j=1}^n \delta_j Y_{t-j} + v_t \quad (2)$$

where  $u$  and  $v$  are mutually uncorrelated white noise series and  $t$  denotes time period. Causality may be determined by estimating equations (1) and (2) and testing the null hypothesis that  $\alpha_j = \delta_j = 0$  for all  $j$ 's against the alternative hypothesis that  $\alpha_j \neq 0$  and  $\delta_j \neq 0$  for at least some  $j$ 's. If the coefficients  $\alpha_j$ 's are statistically significant but  $\delta_j$ 's are not, then  $Y$  is said to have been caused by  $X$ . The reverse causality holds if  $\delta_j$ 's are statistically significant while  $\alpha_j$ 's are not. If both  $\alpha_j$  and  $\beta_j$  are significant, then causality runs both way. In addition, the framework can be generalized to include more variables in the system. In this study we have extended the Granger Causality test for the six considered variables.

The implementation of Granger causality test needs to estimate the unrestricted and restricted version of equations. To test whether  $X$  causes  $Y$  the unrestricted regression involves the estimation of equation (1) using OLS. From this regression we obtain the unrestricted residual sum of squares ( $RSS_{ur}$ ). Then, another version of (1) that restricts the coefficient of all lagged  $X$ 's to zero is to be performed and obtained the restricted residual sum of squares ( $RSS_r$ ). The causality test can be performed by the usual  $F$  test<sup>3</sup>.

The  $F$  test is based on the following statistic:

$$F = [(RSS_r - RSS_{ur})/m] / [RSS_{ur} / (n - k)]$$

Which follows  $F$  distribution with  $m$  and  $(n - k)$  df. Here  $m$  is equal to the number of lagged  $X$  terms included in the equation (1) and  $k$  is the number of parameters estimated in the unrestricted equation.  $X$  is said to Granger cause  $Y$  if the computed  $F$  statistics is significant at the conventional level. The same procedure can be applied to test causality from  $Y$  to  $X$ .



The Granger causality test assumes that the disturbance term of the regression is serially uncorrelated. However, the non-stationarity of the variables may destroy this assumption (Serietis, 1988), which makes the OLS estimation biased and inconsistent and thus decrease the credibility of the regression result. Intuitively, a time series is said to be stationary if its mean and variance do not systematically vary over time. In contrast, time series is non-stationary if its mean and variance is variable with time. Granger causality test may not be valid if non-stationarity in the data is not handled properly. The study thus examined whether the considered time series is stationary or not.

The number of lagged terms to be included in the causality test is an important practical question since the direction of causality may depend critically on the number of lagged term included. If we use too few lags we will omit potentially valuable information contained in the more distant lagged values, the causality result is thus distorted. On the other hand, if we use too many lags we will be estimating more coefficient than necessary, which in turn introduces additional estimation error into forecasts and may cause an absence of causality between them. The study used Schwartz information criteria to make such choice.

The stationarity properties of the series are not taken into consideration in the standard Granger causality test which may report one-way or two-way causality or no causality. However, if the variables are cointegrated, the modified Granger causality test rules out the possibility of no causality when the variables share a common trend. The estimation of the Granger causality test involves three steps. Step I includes the identification of the order of integration of the variables under consideration. If the variables under consideration are integrated of the same order they are considered to be cointegrated. However, statistically we have to test whether the variables are cointegrated or not. If the variables are cointegrated, the residuals obtained from the cointegrating regressions are used as error-correction terms in estimating the modified Granger causality equations. The process of cointegration and error correction has explained below.

#### 4.3 Cointegration Test and Error Correction Models<sup>4</sup>

Most of the economic time series have the tendency to move together, which has statistical implication of the existence of a long-run relationship between economic variables (Thomas, 1993). Thus we need to test for the possible cointegration of the variables as a guide for model specification. Presence of cointegration between two variables led to the causality in the Granger sense as least in one direction (Miller, 1999). There are two channels of causality between cointegrated variables –the standard Granger test and the error correction specification<sup>5</sup>.

<sup>4</sup> This section draws partially on Hossain, M.A. (2009).

<sup>5</sup> If  $Y_t$  and  $X_t$  are cointegrated, then Granger representation theorem (Engle and Granger, 1987) says that the relationship between the two variables can be expressed as the error correction mechanism as follows:

$$\Delta Y_t = \lambda_1 Z_{t-1} + \sum_{i=1}^k \delta_i \Delta X_{t-i} + \sum_{j=1}^k \pi_j \Delta Y_{t-j} + u_{1t} \dots\dots\dots(3)$$

$$\Delta X_t = \lambda_2 Z_{t-1} + \sum_{i=1}^k \tau_i \Delta X_{t-i} + \sum_{j=1}^k \zeta_j \Delta Y_{t-j} + u_{2t} \dots\dots\dots(4)$$

where,  $Z_t = Y_t - YX_t$ , and  $u_{1t}$  and  $u_{2t}$  are white noise error terms. In these two equations, the series  $Y_t$  and  $X_t$  are cointegrated when at least one of the coefficients  $\lambda_1$  or  $\lambda_2$  is not zero. This error correction model allows us to study the short run dynamics of the long run relationship between  $Y_t$  and  $X_t$ . If  $\lambda_1 \neq 0$  and  $\lambda_2 = 0$ , then  $X_t$  will lead  $Y_t$  in the long run. The opposite will occur if  $\lambda_2 \neq 0$  and  $\lambda_1 = 0$ . If both  $\lambda_1 \neq 0$  and  $\lambda_2 \neq 0$ , then feedback relationship exists between  $Y_t$  and  $X_t$ , which will adjust in the long run. In addition short run dynamics between  $Y_t$  and  $X_t$  are characterized by the coefficients  $\delta_i$ 's  $\zeta_j$ 's. If  $\delta_i$ 's are not all zero, movements in the  $X_t$  will lead to  $Y_t$  in the short run. If  $\zeta_j$ 's are not all zero, movement in the  $Y_t$  will cause  $X_t$  in the short run. If  $\gamma$  can be obtained so that  $Z_t$  can be constructed, the remaining parameters in equations (3) and (4) can easily be estimated.

## 5.0 Analysis of the Results

Testing for causality and cointegration and to estimate the error correction models among the considered variables, we need to proceed with the following three steps.

### 5.1 Testing for the Order of Integration

The first step consists of determining the order of integration of the variables under consideration. This is done by using the Augmented Dickey- Fuller (ADF) test (Dickey and Fuller, 1981). This test is based on the following regression equation with a constant and a trend of the form:

$$\Delta Y_t = a_1 + a_2 t + b Y_{t-1} + \sum_{i=1}^m \rho_i \Delta Y_{t-i} + u_t \dots\dots\dots(5)$$

where,  $\Delta Y_t = Y_t - Y_{t-1}$  and  $Y$  is the variable under consideration,  $m$  is the number of lags in the dependent variable, is chosen by Schwarz criterion and  $u_t$  is the stochastic error term. The null hypothesis of a unit root implies that the coefficient of  $Y_{t-1}$  is zero. If the null hypothesis is rejected, then the series is stationary and no differencing in the series is necessary to induce stationarity. The ADF is widely used due to the stability of its critical values as well as its power over different sampling experiment. In this study the test is applied to both the original series (in logarithmic form) and to the first differences. Further, both the models with and without trend are tried. The lag parameters are determined by Schwarz's criterion. The results are reported in table -2.

Table 2: ADF Unit Root Tests

Variables	Log Levels		First Difference	
	No Trend	With Trend	No Trend	With Trend
SPI	-1.24	-2.75	-5.52*	-5.42*
GDP	-0.28	-2.04	-4.76*	-4.73*
M2	-2.03	-0.93	-2.64***	-3.25***
CPI	-1.14	-3.23	-4.58*	-4.32*
IR	-2.02	-3.24	-3.49**	-3.41***
EXR	-2.42	-3.22	-8.11*	-7.92*
PSC	-1.7	-1.74	-2.93***	-4.59***

Notes: i) \*, \*\* and \*\*\* indicates significance at 1%, 5% and 10% respectively.  
ii) Author's own formulation by using econometric software Eviews 7.0.

The results indicate that at the levels all the considered variables are nonstationary. Therefore to achieve stationarity the variables must be first-differenced. The ADF statistics are significant only for the first-differenced series. This shows that, all the series are integrated of the same order i.e.,  $I(1)$ . Since all of the series are integrated of the same order, the series may be tested for the existence of a long-run relationship between them. Thus, cointegration analysis can be applied to the selected variables in the present analysis as all the series are found to be stationary in first differences.

### 5.2 Testing for Cointegration (Multivariate Cointegration Test)

If the considered time series variables found to be integrated of order one i.e.  $I(1)$ , it is possible that they have a tendency to move together in the long run. That is they are cointegrated and have a stable long run relationship. The usual second step thus involves searching for



cointegration between variables. This can be understood from the graphical representation of the two series and to see whether they have any common stochastic trend and can be tested either by Engle-Granger two step cointegration procedures or by Johansen-Juselius cointegration technique. We relied on Johansen-Juselius<sup>6</sup> cointegration technique because of limited data points.

The result is presented in table-3 and 4.

**Table 3: Unrestricted Cointegration Rank Test (Trace)**

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.979582	281.5163	125.6154	0.0000
At most 1 *	0.968797	188.1236	95.75366	0.0000
At most 2 *	0.878102	104.9096	69.81889	0.0000
At most 3 *	0.753221	54.39996	47.85613	0.0107
At most 4	0.443693	20.81765	29.79707	0.3691
At most 5	0.239075	6.743210	15.49471	0.6077
At most 6	0.007717	0.185919	3.841466	0.6663

Notes:

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Source: Author's own formulation using econometric software

EvIEWS 7.0.

<sup>6</sup> In this technique two test statistics are used to identify the number of cointegrating vectors, namely the trace statistic and the maximum eigenvalue test statistic. The Trace test statistic for the null hypothesis that there are atmost r distinct cointegrating vectors is

$$\lambda_{\text{max}} = T \sum_{i=r+1}^n \ln(1 - \lambda_i) \dots\dots\dots(6)$$

where,  $\lambda_i$ 's are the N-r smallest squared canonical correlations between  $X_t$ -k and  $\bar{A}X_t$  (where  $X_t$  = (considered variables)/ and where all variables in  $X_t$  are assumed I(1)), corrected for the effects of the lagged differences of the  $X_t$  process. The maximum eigenvalue statistic for testing the null hypothesis of at most r cointegrating vectors against the alternative hypothesis of r + 1 cointegrating vectors is given by

$$\lambda_{\text{max}} = -T \ln(1 - \lambda_{r+1})$$

Johansen (1988) shows that equations (6) and (7) have non-standard distributions under the null hypothesis and provide approximate critical values for the statistic, generated by Monte Carlo methods.

\* denotes rejection of the hypothesis at the 0.05 level

\*\* MacKinnon-Haug-Michelis (1999) p-values

Source: Author's own formulation using econometric software EvIEWS 7.0.



**Table 4: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)**

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.979582	93.39266	46.23142	0.0000
At most 1 *	0.968797	83.21402	40.07757	0.0000
At most 2 *	0.878102	50.50961	33.87687	0.0002
At most 3 *	0.753221	33.58231	27.58434	0.0075
At most 4	0.443693	14.07444	21.13162	0.3590
At most 5	0.239075	6.557291	14.26460	0.5428
At most 6	0.007717	0.185919	3.841466	0.6663

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level

Table-3 and 4, reports the maximum eigen-value and trace tests of Johansen and Juselius (1991). These are complementary versions of the same test to determine the cointegration rank,  $r$ . Both the test suggests that the considered variables are cointegrated. This result indicates the existence of a stable long run relationship among stock price index and the considered macroeconomic variables in Bangladesh. That is changes macroeconomic variables in Bangladesh economy will have some important long run implications on the changes in the stock price index.

### 5.3 Estimation of the Error Correction Models

The cointegration among the considered variables implies the presence of long run equilibrium relationship. However, in the short run there may be disequilibrium. Therefore, we can treat the error term in the cointegrating relation as the equilibrium error which is used to tie the short run behavior of the variables. The error-correction mechanism first used by Sargan and later popularized by Engle and Granger corrects for disequilibrium. Therefore, the error-correction models (ECM) are applied to explore the direction of causality. Any ECM has an interesting temporal causal interpretation in the Granger sense. That is when two series are seen to be cointegrated the absence of causal relationship between them is ruled out in the error correction framework, while such a possibility exists in the Granger test. Thus, the study also employs Granger causality to examine the direction of causality. The results are reported in table- 5.

Table 5: Causality based on Granger Causality (F statistic) and Vector Error Correction Model (t statistic)

Dependent Variable	Significance level of F statistics							t statistics
	$\Delta$ LSPI	$\Delta$ LGDP	$\Delta$ LM2	$\Delta$ LCPI	$\Delta$ LIR	$\Delta$ LEXR	$\Delta$ LPSC	ECMt-1
$\Delta$ LSPI		0.223	0.29	2.093**	1.13	2.48**	0.316	-2.83*
$\Delta$ LGDP	2.789**		0.87	2.689**	4.92*	3.11*	0.19	-0.0240
$\Delta$ LM2	6.12*	0.82		5.412*	3.41*	4.08*	0.36	-1.04
$\Delta$ LCPI	1.7	0.8	0.676		3.272*	2.192	3.55	-0.64
$\Delta$ LIR	1.06	0.076	0.36	0.118		0.92	2.27	-0.68
$\Delta$ LEXR	1.46	3.22*	1.19	0.15	1.1		0.003	-0.170
$\Delta$ LPSC	2.824**	5.35	0.459	6.308*	5.63*	2.586		-2.94*

Notes: i) \*, \*\* and \*\*\* indicates significance at 1%, 5% and 10% respectively.

Source: Author's own formulation using econometric software Eviews 7.0.

The table reflects the direction of causality among the considered variables in the empirical framework. It is revealed from the table that there is a unidirectional causality from the consumer price index (CPI) and exchange rate (EXR) to the stock price index (SPI) and also from the stock price index to the gross domestic product (GDP), money supply (M2) and private sector credit (PSC). The respective coefficients are statistically significant at different levels indicated in the table. The implication of the result is that the lagged change in GDP, M2 and PSC has significant predictive ability for the movements in the stock prices. This result is justified both from the F statistic based on Granger causality and from the error correction models. The predictive ability of stock prices for GDP and PSC is consistent with the hypothesis that stock prices contain the market participants' expectations for future economic activities. This result is in line with Ibrahim (1999) Secondly, from column 1 of the table it is also revealed we see that the stock price movements anticipate variations in CPI and EXR, (the statistically significant respective coefficients are 2.789 and 2.824) but have no predictive ability to the changes of the other macroeconomic variables. Therefore the monetary policy has significant stimulus in the effective functioning of the stock market.

## 6.0 Summary and Conclusions

This study examines the causal linkages between the Bangladesh stock price index and the fundamental economic forces, which include nominal GDP, nominal broad money supply, nominal interest rate, exchange rate, consumer price index and private sector credit. In doing so, we first examine the time series properties of the data using both the widely used ADF unit root tests. The unit root test results show that all the data series are of I(1) processes. Hence, we utilize the Johansen-Juselius multivariate cointegration test to examine the long run equilibrium relationship among the variables in the model. Existence of a single cointegrating vector was detected and all the identified variables belong to the cointegrating space. The normalized cointegrating vector shows that the Bangladesh stock prices index is elastic with respect to lagged change in GDP, M2 and PSC. However, it is inelastic with respect to the other considered variables and they are not highly significant. The estimation of



error-correction model further confirms the existence of long run stable equilibrium among the variables in the model. It is confirmed that any disequilibrium is corrected by fast adjustment. The Granger causality test also indicates that the lagged change in GDP, M2 and PSC has significant predictive ability for the movements in the stock prices. However, the bidirectional causality has not been established as is evident from column 1 in table 5.

To sum up, it is of interest to note that potential macroeconomic variables could provide impetus to the emerging stock market in Bangladesh. By knowing the linkages between stock prices and macroeconomic variables, investors can obtain more information on changes in these variables to predict the movement in stock returns. Since the unidirectional causality runs GDP, M2 and PSC to stock price index the monetary policy should be designed in such a way that can contribute to stabilize and smooth functioning of the stock market.

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## **Measurement of Technical, Allocative, and Cost Efficiency of Islamic Banks in Bangladesh Using Data Envelopment Analysis**

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### **Abstract:**

The present paper is an attempt to measure the technical, allocative, and cost efficiency of Islamic banks operating in Bangladesh. The research is conducted by using of nonparametric technique DEA (Data Envelopment Analysis) as a mostly used tool for analysis of efficiency in banking. Two outputs and three inputs have been used for the purpose of the analysis according to the input-oriented approach. The authors have selected seven Islamic Banks listed in the Dhaka Stock Exchange for conducting the study and the secondary data for the same was related to the year 2006 to 2011. Through the study, EXIM Bank Limited was found to be most efficient Islamic bank with an average efficiency score of 0.9992 on the basis of the efficiencies to which they were put to test. ICB Islamic bank Limited was found to have the highest lack of efficiency among all the Islamic banks in Bangladesh.

**Keywords:** Overall Technical Efficiency, Pure Technical Efficiency, Scale Efficiency, Allocative Efficiency, Cost Efficiency, DEA, Islamic Banks, Bangladesh.

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## 1.0 Introduction

A good banking system not only acts as the heart of the economy, pumping the needed, finance to each and every organ of it, but also responsible for the overall development and health of it. It accepts the deposits from depositors and investors and channelizes the same to the needy individuals/businesses/ firms, etc. in the form of loans and advances. In this way the money is used for production, distribution and other allied activities which are responsible for generating surpluses for the economy and hence economic development take place. The banking system has a full control over the money circulation in a country. The better banking system is a source of better economy capable of fulfilling the needs of its people (Kuldip S. Chhikara and Deepak Bhatia, 2012).

Islam is the largest religion of Bangladesh, the Muslim population is approximately 148.6 million, which is the fourth largest Muslim population (after Indonesia, Pakistan, and India), constituting 90.4% of the total population as of 2010. Bangladesh established its first Islamic bank in 1983. At present there are seven full fledged Islamic Banks and nine conventional banks with banking branches are working on the basis of Islamic Shariah. The seven Islamic banks operating in Bangladesh include: Islami Bank Bangladesh Limited, Social Islami Bank Limited, Al-Arafah Islami Bank Limited, EXIM Bank Limited, First Security Islami Bank Limited, Shahjalal Islami Bank Limited, and ICB Islamic Bank Limited. Like any other conventional commercial banks, the Islamic banks produce loans and investments by mobilizing deposits. But the basic difference lies in their mode of operation i.e. their mode of operation is based on Shariah.

Due to Islamic banking expansion, an intensive competition among the Islamic banks has arisen by providing innovative Islamic products, and efficient management in resource allocation and saving money. It is a well-known fact that, an effective and efficient banking system is important for long-term growth and crucial for economic development (Gaddam, Al Khathlan, and Malik, 2009). Thus each bank tries to be unique than the others to achieve higher market share.

Now, it is pertinent to the study to measure the efficiency of Islamic banks operating in Bangladesh and to adjudge the positive or negative contribution made by them towards the economic development. For this purpose the Data Envelopment Analysis (DEA) is used to measure the efficiency of the selected Islamic banks.

In this paper the efficiency have been evaluated using data for the period 2006 to 2011. The remainder of the paper is organized as follows. Section 2 reviews the literature on performance efficiency studies in banking. Section 3 data and methodology used in the study. Section 4 discusses the empirical findings and section five concludes.

## 2.0 Literature Review

In a rapidly changing financial market worldwide, bank regulators, managers, and investors are concerned about how efficiently banks transform their expensive inputs into various financial products and services (Isik & Hassan, 2002).

There are a large number of studies in the literature concerning the banking sector using DEA. Most of the studies concentrate on the technical efficiency of the banks. Efficiency measurement indicates whether the banks have used a minimum number of inputs in order to produce a certain number of outputs or whether they can produce maximum output using a certain number of inputs (Fethi & Pasiouras, 2010).

Berger and Mester (1997) attempted to measure the efficiencies of the banks in the USA between 1990 and 1995 by using econometric efficiency frontier models. According to the findings of the study, while the average cost efficiencies of the American banks were at the level of 86%, their average profit efficiency scores were 47%. According to these results, the American banks were able to manage their cost efficiency well but they suffered from serious shortcomings regarding profit efficiency.

Yudistira (2004) examined the efficiency of the Islamic banking system with 18 Islamic banks over 3 years by using DEA and found that banks could be scored between zero and one, "with a completely efficient bank having an efficiency score of one. In DEA the most efficient bank (with a score of one) does not necessarily generate the maximum level of output from the given inputs"

Samad (2004) measured the performance of the Islamic banking sector in contrast to that of the Western system in Bahrain and showed that there were no significant differences between the Islamic & the Western banking system in Bahrain with regard to profitability and deposit risk.

According to the results of his study, the Islamic banks had shown higher equity ratios than Western banks. The finding suggested that Islamic banks in the study exercised more caution when making loans than their Western counterparts did.

Johnes, Izzeldin, and Pappas (2009) measured the efficiency of Islamic versus Western banks through the Cooperation Council of the Arab States within the Gulf of GCC area and found that leaders of Islamic banks were less cost efficient but more revenue and profit efficient than Western banks.

Kamaruddin et al., (2008) investigated profit and cost efficiency of Islamic banks and Islamic windows at commercial (non-Islamic) banks by using DEA showed that the Islamic banks achieved technical efficiency through using technology such as ATMs, Internet banking, smart cards, and wireless banking. For cost efficiency, the Islamic banks used about 30% of their resources to produce outputs. Islamic windows and foreign Islamic banks operated more efficiently on the cost side than the profit side.

In a recent study, Samad (2009) measured inefficiencies in Bangladesh banking industry using stochastic frontier production function. Samad (2009) showed that the technical efficiency in Bangladesh banking industry lies between 12.7% and 94.7% and that the industry average efficiency is around 69.5%. Samad (2009) used a cross sectional data for the year 2000 involving 44 commercial banks.

Wadud and Yasmeen (2004) measured technical efficiency of Bangladeshi banks using DEA techniques. Using data for nine commercial banks in 2001, they estimated the industry



average technical efficiency, pure technical efficiency and scale efficiency as 73%, 90.6% and 81.7%, respectively. They found that while a majority of the private banks in Bangladesh are purely technically efficient, they tend to operate with high scale efficiency. Very recently, Wahida Yasmeeen (2011) examines technical efficiency and productivity growth of various banks in Bangladesh by using DEA. The results show significant variation in technical efficiency and PTE across various banks. Efficiency differences were also observed among public, private and specialized banks.

This paper adopts a more complete approach compared to the previous studies. Firstly this paper analyses efficiency of the Islamic banks operating in Bangladesh using data in a longitudinal context from 2006 to 2012. Secondly, the paper provides the dynamics of pure technical efficiency, overall technical efficiency, scale efficiency, allocative efficiency, and economic efficiency of the Islamic banks. Thirdly, the study includes the Islamic banks operating in Bangladesh.

### **3.0 Objective of the study**

1. To measure the overall technical efficiency, pure technical efficiency, scale efficiency, allocative efficiency, and cost efficiency of the Islamic banks in Bangladesh.
2. To assess the ranking of the selected banks under study.
3. To give viable suggestions to improve the efficiency of the banks.

### **4.0 Data and Methodology**

#### **4.1 Data**

As the study is about measuring the technical, allocative and cost efficiency of Islamic banks, the population included all the Islamic banks operating in Bangladesh. At present there are seven Islamic banks in Bangladesh and all the banks have been selected for the purpose of the study. The study is based on secondary data; for the purpose of the analysis the data were extracted from the published annual reports of the selected banks. The data on the selected input and output variables for the year 2006 to 2011 has been taken into consideration for measuring the efficiency of Islamic banks in Bangladesh.

For analyzing the efficiency of the banks, the DEA (Data Envelopment Analysis) method has been used. DEA is a mathematical linear programming approach based on the technical efficiency concept, it can be used to measure and analyze TE of different entities: productive and non productive, public and private, profit and nonprofit seeking firms. It is a non-parametric approach that calculates efficiency level by doing linear program for each unit in the sample.

The DEA measures the efficiency of the decision-making unit by the comparison with best producer in the sample to derive compared efficiency. DEA submits subjective measure of operational efficiency to the number of homogeneous entities compared with each other, with a number of sample's units which form together a performance frontier curve that envelops all observations. That's why, this approach is called Data Envelopment Analysis. Consequently, decision-making units (DMUs) which lie on the curve are efficient in distributing their inputs

and producing their outputs, while DMUs which do not lie on the curve are considered to have lack of efficiency.

#### 4.2 Modeling Efficiency

The results on technical efficiency, scale efficiency, cost efficiency and allocative efficiency (according to Coelli, 1996) have been presented in this research.

The technical efficiency gives information about management and their ability to organize activities in their bank and also to find the best way to transform inputs into outputs. Full technically efficient bank makes the maximum amount of outputs from given level of resources.

If the technical efficiency analysis is made assuming the Constant Return to Scale (CRS), this kind of efficiency is considered as "Overall Technical Efficiency" (OTE). In the case of CRS we are starting with assumption of optimal level of its capacities. On the other hand, if the bank is below or above the optimum level, then we are starting with the assumption of Variable Return to Scale (VRS) (Banker et al., 1984). According to this, in DEA analysis OTE will be decomposed into Pure Technical Efficiency (PTE) and the Scale efficiency (SE). Scale Efficiency (SE) = Overall Technical Efficiency (OTE)/Pure Technical Efficiency (PTE). The PTE gives information not only about efficiency configuration of inputs/outputs, but also quality of setting of capacities of the operations that bank realizes. The SE provides information about managerial ability in deciding about optimal amount of resources use, or activities that will result with efficient banking operations. If the analysis is conducted on VRS assumption, there will be two possible results: Decreasing Return to Scale (DRS), or Increasing Return to Scale (IRS). If the bank is in the "IRS", it means that the bank has some unused capacities and that management can increase bank efficiency by increasing the activity level and vice versa for the "DRS". For measuring Cost Efficiency (CE), information about input prices is needed. Therefore, a bank is cost efficient if it has minimum costs of inputs for a given level of output. Finally, the Allocative Efficiency (AE) measures how bank allocates its resources to realize the level and mix of outputs that maximize revenue (Leibenstein, 1966).

This study uses the input-oriented intermediation approach with different return to scale which Coelli (1996) presented as a mathematical problem, computing the ratio of all outputs over all inputs such as  $u'y_i/v'x_i(1)$

Where,  $y_i$  and  $x_i$  are output and input respectively, while the symbol 'u' is the  $M \times 1$  vector of output weights and 'v' is the  $K \times 1$  vector of input weights. According to (Coelli, 1996), mathematical formulation of the model for the constant return to scale is:

$$\begin{aligned}
& \max_{u,v} (u'y_i / v'x_i) \\
& \text{st } u'y_j / v'x_j \leq 1, \quad j = 1, 2, \dots, N \\
& \quad u, v \geq 0.
\end{aligned}$$

One problem with this particular ratio formulation is that it has an infinite number of solutions, so it is necessary to impose a constraint  $v'x_i = 1$ , and then the model gets the following form (Coelli T.A., 1996):

$$\begin{aligned}
& \max_{\mu, v} \mu (u'y_i), \\
& \text{st } v'x_i = 1 \\
& \quad \mu'y_j - v'x_j \leq 0, \quad j = 1, 2, \dots, N \\
& \quad \mu, v \geq 0.
\end{aligned}$$

By using the duality in linear programming, it is possible to derive the final formulation of the model (Coelli, 1996):

$$\begin{aligned}
& \min_{\theta, \lambda} \theta, \\
& \text{st } -y_i + Y\lambda \geq 0, \\
& \quad \theta x_i - Y\lambda \geq 0, \\
& \quad \lambda \geq 0
\end{aligned}$$

Where ' $\theta$ ' is a scalar of the efficiency scores that satisfies the condition  $\theta = 1$ . If it is equal to 1, it indicates full technical efficiency. The ' $\bar{e}$ ' is an  $N \times 1$  vector of constants. But for the variable return to scale it is necessary to introduce the convexity constraint  $N1'\bar{e} = 1$  as follows (Coelli, 1996):

$$\begin{aligned}
& \min_{\theta, \lambda} \theta, \\
& \text{st } -y_i + Y\lambda \geq 0, \\
& \quad \theta x_i - X\lambda \geq 0, \\
& \quad N1'\lambda = 1 \\
& \quad \lambda \geq 0
\end{aligned}$$

where,  $N1$  is an  $N \times 1$  vector of ones. For allocative and cost efficiency it is necessary to conduct the cost DEA (Coelli, T. A., 1996):

$$\begin{aligned}
& \min_{\lambda, x_i} w_i' x_i^*, \\
& \text{st } -y_i + Y\lambda \geq 0, \\
& \quad x_i^* - X\lambda \geq 0, \\
& \quad N1'\lambda = 1 \\
& \quad \lambda \geq 0
\end{aligned}$$



Where, ' $w_i$ ' is a vector of input prices for the  $i$ -th DMU and  $x_i^*$  is the cost minimizing vector of input quantities. Accordingly, the cost efficiency or economic efficiency is calculated as:

$$CE = w_i' x_i^* / w_i' x_i$$

The Allocative Efficiency is calculated residually by  $AE = CE/TE$

## 5.0 Specification of Input and Output Variables

The evaluation of bank efficiency creates several problems which arise as a result of the nature and function of financial intermediaries, especially as banks are multi-product firms that do not produce or market physical products. One of the major problems in the study of bank efficiency is the specification of bank inputs and outputs.

Generally, there are two ways of measuring bank outputs; the production approach and the intermediation approach. Under the production approach, banks produce accounts of various sizes by processing deposits and loans, and incurring capital and labor costs. Thus, outputs are measured by the number of deposits and loan accounts or the number of transactions performed on each type of service provided, and costs are the operating costs needed to produce these products. This approach is rarely used because of lack of data.

Under the intermediation approach, banks are treated as financial intermediaries that combine deposits, labor and capital to produce loans and investments. The values of loans and investments are treated as output measures; labor, deposits and capital are inputs; and operating costs and financial expenses comprise total cost. Here it is possible to conduct two types of analysis: input-oriented and output-oriented analysis. In the first one, it is examined how much it is possible to reduce the amount of input used without reduction in the level of output. The second one examines the possibility of increasing of the level of output using the given level of inputs.

Thus, the choice of input and output variables constitute a major difficulty, which must be addressed carefully. This study uses the input-oriented intermediation approach. Accordingly, three inputs and two outputs are used consisting of the following:

**Table-1:** The selected variables for the DEA analysis of efficiency of Islamic Banks in Bangladesh

Character of Variable	Variable Name	Definition
Output	Investment Other Earning Assets	Total short-term and long-term investment Sum of investment securities, inter-banks fund sold, and other loan to special sectors
Input	Total Funds Fixed Assets Personnel Expenses	Total deposit plus total borrowed funds The sum of physical capital and premises Total expenditure on employees
Input price	Price of Funds Price of Fixed Assets Price of Personnel Expenses	Interest expenses on deposit and non-deposit funds plus other operating expenses divided by total funds Depreciation expenses divided by fixed assets Personnel expenses divided by total funds.

## 6. 0 Results and Findings

The estimated efficiencies are reported in the table 2. The table reports the efficiency scores of all the Islamic Banks for the period 2006-2011. For each year and each bank, OTE (Overall Technical Efficiency), PTE (Pure Technical Efficiency), SE (Scale Efficiency), AE (Allocative Efficiency), and CE (Cost Efficiency) scores are reported in the table. The table indicates that there has been a considerable change in the efficiency patterns over 2006-2011.

From the analytical table 2 it is exposed that, in the year 2006, there were three fully efficient banks in all aspects which comprises of Al-Arafah Islami Bank, First Security Islami Bank Limited, and EXIM Bank Limited. Another bank which was fully technically efficient but exhibited cost and allocative inefficiency was Shahjalal Islami Bank Limited. ICB Islamic Bank Limited was the most inefficient bank in the year 2006.

As indicated in the table 2, in the period 2007, only two banks (Islami Bank Bangladesh Ltd. and EXIM Bank Limited) were found to be fully efficient. Social Islami Bank, Al-Arafah Islami Bank & ICB Islamic Bank Limited were inefficient with OTE and SE. The mean score of both OTE and SE for all the banks was found to be 0.938. It is clear from the analysis that Social Islami Bank & ICB Islamic Bank Limited were suffering from serious inefficiencies as they were far away from the average performance of all banks taken together. All the banks were efficient according to PTE in this year. The mean score of AE and CE of all the banks were 0.960 and 0.902 respectively. Five banks (Social Islami Bank Limited, Al-Arafah Islami Bank Limited, First Security Islami Bank Limited, Shahjalal Islami Bank Limited & ICB Islamic Bank Limited) out of seven were found to be inefficient with AE and CE fronts in 2007.

Table 2: Technical, Allocative and Cost Efficiency of Islamic Banks in Bangladesh for the period 2006-2011

Banks Name	2006						2007					
	OTE	PTE	SE	AE	CE	Returns	OTE	PTE	SE	AE	CE	Returns
Islami Bank Bangladesh Limited	0.869	1	0.869	0.991	0.861	drs	1	1	1	1	1	
Social Islami Bank Limited	0.888	0.983	0.904	0.978	0.869	irs	0.79	1	0.79	0.993	0.784	irs
Al-Arafah Islami Bank Limited	1	1	1	1	1		0.985	1	0.985	0.993	0.978	irs
EXIM Bank Limited	1	1	1	1	1		1	1	1	1	1	
First Security Islami Bank Limited	1	1	1	1	1		1	1	1	0.975	0.975	
Shahjalal Islami Bank Limited	1	1	1	0.818	0.818		1	1	1	0.892	0.892	
ICB Islamic Bank Limited	0.823	0.832	0.989	0.811	0.668	irs	0.79	1	0.79	0.869	0.687	irs
<b>Mean score:</b>	<b>0.94</b>	<b>0.974</b>	<b>0.966</b>	<b>0.943</b>	<b>0.888</b>		<b>0.938</b>	<b>1</b>	<b>0.938</b>	<b>0.96</b>	<b>0.902</b>	

Banks Name	2008						2009					
	OTE	PTE	SE	AE	CE	Returns	OTE	PTE	SE	AE	CE	Returns
Islami Bank Bangladesh Limited	0.949	1	0.949	0.99	0.939	drs	0.957	1	0.957	0.988	0.946	drs
Social Islami Bank Limited	0.795	0.842	0.944	0.994	0.79	irs	1	1	1	1	1	
Al-Arafah Islami Bank Limited	0.997	1	0.997	0.993	0.989	drs	1	1	1	1	1	
EXIM Bank Limited	1	1	1	0.988	0.988	-	1	1	1	1	1	
First Security Islami Bank Limited	1	1	1	1	1	-	1	1	1	0.99	0.99	
Shahjalal Islami Bank Limited	0.904	1	0.904	0.985	0.891	drs	1	1	1	0.875	0.875	
ICB Islamic Bank Limited	1	1	1	1	1	-	0.89	1	0.89	0.943	0.839	irs
<b>Mean Sore:</b>	<b>0.949</b>	<b>0.977</b>	<b>0.97</b>	<b>0.993</b>	<b>0.942</b>		<b>0.978</b>	<b>1</b>	<b>0.978</b>	<b>0.971</b>	<b>0.95</b>	

Banks Name	2010						2011					
	OTE	PTE	SE	AE	CE	Returns	OTE	PTE	SE	AE	CE	Returns
Islami Bank Bangladesh Limited	0.916	1	0.916	0.986	0.904	drs	0.984	1	0.984	0.987	0.972	drs
Social Islami Bank Limited	0.951	1	0.951	0.992	0.944	irs	1	1	1	1	1	
Al-Arafah Islami Bank Limited	1	1	1	1	1		1	1	1	1	1	
EXIM Bank Limited	1	1	1	1	1		1	1	1	1	1	
First Security Islami Bank Limited	1	1	1	0.941	0.941		1	1	1	0.932	0.932	
Shahjalal Islami Bank Limited	0.954	0.954	1	0.977	0.932		0.991	0.993	0.998	0.987	0.979	drs
ICB Islamic Bank Limited	0.78	1	0.78	0.902	0.703	irs	0.885	1	0.885	0.904	0.8	irs
<b>Mean Score:</b>	<b>0.943</b>	<b>0.993</b>	<b>0.95</b>	<b>0.971</b>	<b>0.918</b>		<b>0.98</b>	<b>0.999</b>	<b>0.981</b>	<b>0.973</b>	<b>0.955</b>	

Source: Author's Calculation

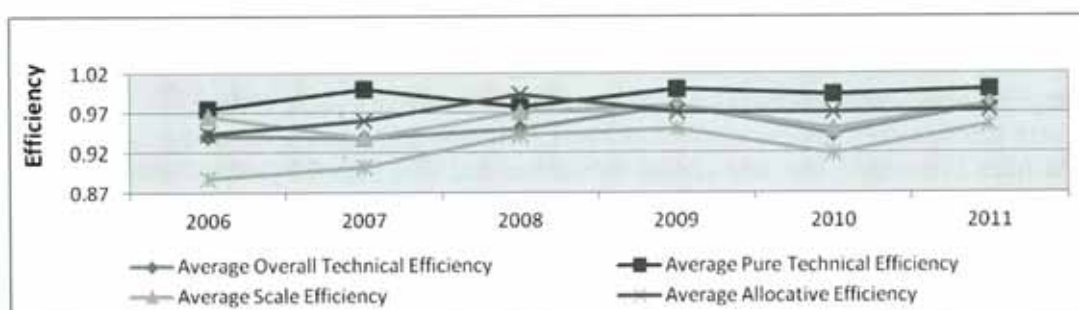
Note: PTE = Pure Technical Efficiency, OTE= Overall Technical Efficiency, SE= Scale Efficiency, AE= Allocative Efficiency, DRS= Decreasing Return to Scale, IRS= Increasing Return to Scale.



In the year 2008, interestingly ICB Islamic Bank Limited recorded a significant improvement in efficiency and became the most efficient bank in this year along with First Security Islami Bank Limited. But Exim Bank Limited, which was fully efficient in all aspects in 2006 and 2007, became inefficient with AE and CE in this year. The mean scores of OTE, PTE, SE, AE, and CE for all the banks were 0.949, 0.977, 0.970, 0.993, and 0.942 respectively. Social Islami Bank was the most inefficient as it was far away from the average performance of all the banks.

During the year 2009, three banks comprising of Exim Bank Limited, Al-Arafah Islami Bank, Social Islami Bank were fully efficient in all aspects of efficiency. In this year, Social Islami Bank Limited exhibited a highly significant improvement in efficiency than the previous years. Another two banks which were full technically efficient but inefficient in AE and CE were First Security Islami Bank Limited and Shahjalal Islami Bank Limited. The average scores of OTE, PTE, SE, AE, and CE for all the banks taken together were 0.978, 1.00, 0.978, 0.971, and 0.950 respectively. Al-Arafah Islami Bank and Exim Bank Limited were fully efficient in both the year 2010 and 2011. Again ICB Islamic Bank Limited was the most inefficient bank during these years. Average efficiency of all the Islamic Banks for the period 2006-2011 is projected in the following figure:

**Figure-1: Year-wise Average Efficiency of all the Islamic Banks**



Source: Author's calculation

Table 3 exposed the ranking of the Islamic banks on the basis of average efficiency scores for the period 2006 to 2011.

**Table 3: Ranking of the Islamic Banks on the Basis of Average Efficiency**

Name of the Bank	OTE	PTE	SE	AE	CE	Average	Ranking
Islami Bank Bangladesh Ltd.	0.945833	1	0.945833	0.990333	0.937	0.9638	4
Social Islami Bank Ltd.	0.904	0.970833	0.9315	0.992833	0.897833	0.9394	6
Al-Arafah Islami Bank Ltd.	0.997	1	0.997	0.997667	0.9945	0.997233	2
EXIM Bank Limited	1	1	1	0.998	0.998	0.9992	1
First Security Islami Bank Ltd.	1	1	1	0.973	0.973	0.9892	3
Shahjalal Islami Bank Ltd.	0.974833	0.991167	0.983667	0.922333	0.897833	0.953967	5
ICB Islamic Bank Limited	0.861333	0.972	0.889	0.904833	0.782833	0.882	7
Average (Approximately)	95%	99%	96%	97%	93%		

Source: Author's calculation

As shown in the table 3, most of the banks recorded high levels of pure technical efficiency or scale efficiency or both, resulting in higher overall technical efficiency, but lower cost efficiency. The overall technical efficiency averaged around 95% for the banks under study. This suggests that the bank might increase one or more of their current outputs by around 5% without reduction in their other outputs or without a need for more inputs. The allocative efficiency scores averaged around 97% which reflects that most of the banks have almost succeeded to combine inputs and outputs in their optimal proportions in the light of their prevailing prices. The cost efficiency estimated for the banks under study averaged around 93% under constant return to scale over 2006-2011. This cost estimate suggests that the same level of output could be produced with approximately 93% of their current inputs if banks under study were operating on the most efficient frontier. Among all the Islamic banks, EXIM Bank Limited was the most consistently efficient bank over all the years and Al-Arafah Islami Bank secured the second position. First Security Islami bank, Islami Bank Bangladesh limited, Shahjalal Islami Bank, and Social Islami Bank secured the 3rd, 4th, 5th and 6th position respectively. On the other hand, ICB Islamic Bank was the most inefficient bank over all the years excluding the year 2008; especially huge gap is in the OTE, AE and CE which mean that this bank has some problems in managing of their business, setting of their products, allocating of their resources and managing of their costs.

## **7.0 Conclusion**

Several conclusions can be drawn from the study. Firstly, the Islamic commercial banks in Bangladesh exhibited high efficiency over all the years. Six banks out of seven exhibited average efficiency above 90%. This is because the banks strive to keep themselves at par with the best practice ones for the obvious reasons. It is also important to note that the Islamic banks have to compete not only among themselves but also with the conventional banks by providing innovative Islamic products, and efficient management in resource allocation and saving money. In the recent years there have been a significant development in banking operation and technologies and most of the Islamic banks have adopted the technologies with efficient management and scale of operations.

Further, our results suggest that Social Islami Bank and ICB Islamic Bank Limited exhibited increasing returns to scale (IRS) in almost all the fiscal years under study, which indicates that these banks are smaller than the most productive scale size. Furthermore, Islami Bank Bangladesh Limited consistently exhibited decreasing returns to scale (DRS), suggesting that the bank exceeded its most productive scale size.

Finally, as a caveat, the results of this research should be interpreted with great caution since previous research differs substantially across different estimation procedures. Further study should use other estimation approaches and look at the revenue and profit efficiency, allowing results to be compared.



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# **An Assessment of Financial Stability in the Banking Sector: An Empirical Analysis**

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## **Abstract**

The objective of the paper is to evaluate the financial stability in the banking sector of Bangladesh on the basis of Macro-Financial Indicator (MFI) and Macroeconomic variables (MEV) of the IMF. The time period 1997 to 2012 has been taken in analyzing MFI while in analyzing MEV, the time period 1990-2012 has been considered. The analysis of trend in MFI indicates that banking sector in Bangladesh demonstrated a moderate level of stability in the recent years despite of dismal performance of State Own Commercial Banks (SCBs) and Development Financial Institutions (DFIs). The Private Commercial Banks (PCBs) and Foreign Commercial Banks (FCBs) stand on sound footing in resilience in terms of MFI's performance. The paper finds that correlation coefficient between Nonperforming Loan (NPL) and Gross Domestic Product (GDP) is -0.67 for the sample period 1991-2012 implying that increase of GDP pushes down NPL that ensures financial stability in banking system in Bangladesh. The correlation coefficient between real lending rate and GDP is -0.52 and the correlation of real lending rate with NPL are 0.63 which implies that prevailing high lending rate is distressing for the banking system. An estimated correlation coefficient between Current Account Balance (CAB) and NPL is -0.72 which implies a good position or surplus in CAB leading to decrease NPL in the banking system which helped financial stability in the recent time.

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## **I.0 Introduction**

Financial stability is the most important ingredient for macroeconomic management towards sustainable economic growth. In the face of global financial crisis, financial stability issues have been receiving priority attention among policy makers around the world. Following the global financial crisis, financial stability has emerged as an important objective of central banks along with traditional objectives (the long period of macro-economic stability in terms of growth and inflation) across countries— developed, developing and emerging market economies.<sup>2</sup> Global financial crises of the recent past and sovereign debt crises of a number of European countries and of the US provoked policy makers to appraisal financial stability because central banks have to be the forefront in combating, neutralizing the crisis and restoring financial stability and economic growth whenever a financial crisis occurs which threatening a possible financial meltdown.

The term ‘financial stability’ is usually interpreted conceptually as a persistent state of robust functioning of various financial system components i.e., markets, institutions, market infrastructure and bestowing the system to face any endogenous or exogenous financial shock with minimal disruptive impact. There is no unanimous agreement on a working definition of this concept. Some define financial stability in terms of what it is not, i.e., the absence of financial instability. Others take a macro-prudential view and specify financial stability in terms of limitation of risks of significant real output losses in the presence of episodes of system- wide financial distress. Financial stability is a situation in which the financial system is capable of satisfactorily performing its three key functions simultaneously. First, the financial system is efficiently and smoothly facilitating the inter-temporal allocation of resources from savers to investors and the allocation of economic resources in general. Second, forward-looking financial risks are assessed and priced reasonably accurately and are relatively well- managed. Third, the financial system is in such a condition that it can comfortably, if not smoothly, absorb financial and real economic surprises and shocks. If any one or more of these key functions are not being satisfactorily performed. It is likely that the financial system is moving in the direction of becoming less stable, and at some point might exhibit instability (RBI, 2008-09).

Globally, financial stability / instability have assumed significance because of the tendency of financial turbulence to spill across borders. This is amply illustrated by the ongoing crisis which has brought the issue of financial stability to the forefront. What started as a sub-prime crisis in the US housing mortgage sector has turned successively into a global banking crisis, global financial crisis and now a global economic crisis? Apart from the current one, in recent years, crises in Mexico (1994), Asia (1997), Turkey (1999) and Argentina (2001) entailed significant costs to the countries concerned and also exerted serious corollary damage on neighboring countries, which induced Governments and multilateral institutions to be more proactive in preventing and resolving financial crises. The World Bank and the International Monetary Fund (IMF) introduced the Financial Sector Assessment Program (FSAP) in 1999, aimed at assessing regularly the strengths and weaknesses of financial systems in their member countries.

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<sup>2</sup> See RBI Report on Trend and Progress of Banking in India, 2008-09.



To detect financial instability and to take appropriate measures / policies, several international forums are active such as the Financial Stability Forum, Basele Committee on Banking Supervision, Financial Stability Institute, Committee on Global Financial System, Committee on Payment and Settlement Systems, International Association of Insurance Supervisors, International Accounting Standards Board, International Organization of Securities Commissions and the International Association of Deposit Insurers. There is also the Counterparty Risk Management Policy Group, a private sector organization devoted to fostering financial stability. At country level, many central banks and regulatory authorities have also taken financial stability more seriously, establishing Financial Stability Departments and introducing the regular publication of Financial Stability Reports, focused on assessing potential risks to financial stability. Bangladesh Bank has started publishing Financial Stability Report (FSR) since 2010 and Financial Stability Department created in 2012.

The recent experience of global financial crisis shows that financial stability and macroeconomic performance are intimately linked. A vast of literature indicates that without a healthy stable macroeconomic situation, achieving a sound and robust financial system is quite impossible. Conversely, if a country has a weak financial system-particularly a weak banking system-it becomes much more difficult for the authorities to pursue sound monetary, financial and even fiscal policies. Therefore, any central bank should be included fostering a sound financial system as core function of their functions.

In order to maintain financial stability in Bangladesh especially in the banking sector, many prudential measures have been taken. The relevant issues associated with the financial stability are being addressed by the Bangladesh Bank as part of its supervisory practices and implementation of Basel frameworks. The main measures are: (1) introducing Risk Based Capital Adequacy (RBCA) framework for banks from 2010 as a regulatory compliance, (2) maintaining CAR at greater than or equal to 10 percent of Risk Weighted Assets (RWA) from July 2011, (3) issuing a revised guideline on 'Risk Based Capital Adequacy in line with Basel-II', (4) issuing several prudent guidelines on risk management for the banks which include risk based capital adequacy, stress testing and six core risk management, and (5) ensuring good corporate governance in banks for overcoming liquidity and solvency problems caused by poor governance. Besides, in order to understand and appreciate the risks the banking industry is exposed to, ensure the soundness and sustainability of the banking industry and make the banks more shock resilient, guidelines on stress testing was issued in April 2010. Since banking is the main component of the overall financial system in Bangladesh, the health of the economy is closely related to the soundness of its banking system. A sound banking sector cannot develop without adequate handling of the various risks that banks face in their business. While risk management is the primary responsibility of individual banks, its effective supervision is indispensable to ensure financial stability.

The financial system of Bangladesh is made-up of Banks, Non-Bank Financial Institutions (NBFIs), Insurance Companies, Securities & Exchange Commission and Micro-credit



Organizations. It is an important responsibility of Bangladesh Bank to discharge its responsibilities as regulator of banks and NBFIs in coordination with regulators of other financial institutions with a view to maintaining stability and public confidence in the financial system. In light of global economic turmoil and in considering the rapid-growing and evolving financial sector in Bangladesh, Bangladesh Bank (BB) established the Financial Stability Department (FSD), which started functioning from June 2012 (FSR, 2011). The FSD will examine the stability of the financial system of Bangladesh through macro-prudential analysis. It will assess and quantify financial system risk and vulnerability, analyze their outlook and make appropriate policy recommendation for safeguarding financial stability.

In the face of global financial crisis, ensuring financial stability has emerged a key policy in conducting monetary policy both in developed and developing countries. In pursuing financial stability, BB has adopted many prudential policies for maintaining stability in the banking sector. Thus, an assessment of the aggregate impact of the reforms and the present soundness of the banking system is important to identify the weaknesses of the system and determine future policy directions. In this backdrop, the paper takes an attempt to evaluate the financial stability in the banking sector of Bangladesh. The paper assesses the financial stability on the basis of IMF's Macro-Financial Indicator (MFI) and Macro-Economic Variable (MEV) developed by the International Monetary Fund (IMF, 2000). The time period 1997 to 2012 has been taken in analyzing MFI while in analyzing MEV, the time period 1990-2012 has been considered. The annual data have been collected from Economic Trends of Bangladesh Bank, Annual Report of Bangladesh Bank, Bangladesh Bank Quarterly, Economic Review of Ministry of finance and World Development Indicators, World Bank (2012).

The remainder of the paper is organized as follows: Following the introduction in section I, review of literature portraits in section II, development and performance of banking sector in Bangladesh discuss in Section III, and section IV sketches the analysis of the financial stability of banking sector in Bangladesh. Finally, the section V gives the conclusion.

## **Section II: Review of Literature**

Many studies have been found on financial stability with reference to the global financial crisis. Sinclair (2000) finds the central banks and financial stability by presenting details of 37 central banks' functions and powers as they stood in March 2000. The sample consists of 13 industrial, 16 developing and 8 transition countries. He concludes that safeguarding financial stability is a core function of the modern central bank, no less than market operations and the conduct of monetary policy.

Nier (2009) examines the financial stability frameworks and the role of central banks: lessons from the crisis. The paper suggests that an expanded role of the central banks that goes beyond the tools already typically at their disposal-monetary policy, lender of last resort and payment oversight-could enhance the overall effectiveness of financial regulation, allowing synergies to be exploited with new regulatory tools to mitigate systemic risk.

Yamora et al (2010) find the role of central banks in sustaining economic recovery and in achieving financial stability. They found that a strong and resilient financial system in times of crisis is important to continue the intermediation between borrowers and lenders. But normally, strengthening the soundness of the financial system must be accorded priority with

emphasis given to improving corporate governance, risk management and internal control practices and processes in banks through enhancing banking supervision and surveillance processes.

Cheang (2004) investigates the relationship between financial stability and economic growth of Macao and he finds that although the financial stability in Macao is not a direct contributor to the economic growth, it is undeniable that the Special Administrative Region (SAR's) stable financial system has played a significant role in underpinning the growth of the economy in the good years.

Okereke et al (2009) examines the financial deepening and economic development in Nigeria and he concludes that the financial system has not sustained an effective financial intermediation, especially credit allocation and a high level of monetization of the economy. He also argues that the regulatory framework should be restructured to ensure good risk management, corporate governance and stemming systemic crisis in the system.

Martin (2006) reviews the central bank's role in financial stability based on survey report of 160 Financial Stability Reports (FSRs) published in 47 countries central bank. He noted that FSRs provide useful insights into how central banks analyze financial stability, but there are areas for improvement. These include clarifying the aims of the reports, providing an operational definition of financial sector soundness, clarifying the "core analysis" that is presented in FSRs consistently across time and making available the underlying data. The survey also suggests that the quality of an FSR is positively correlated with the economic development, approximated by GDP per capita, which may be a proxy for factors such as relative amount of resources available for the analysis of financial stability or the availability of market-based information.

Hanning et al (2010) analyses the importance of financial inclusion to enhance the financial stability. They argue that greater financial inclusion presents opportunities to enhance financial stability. Their study suggests that innovations aimed at countering financial exclusion may help strengthen financial system rather than weakening them. Bepari et al (2007) analyses the Macroprudential Indicators (MPI) framework of IMF to evaluate the current soundness and stability of the banking system of Bangladesh. Their analysis shows that the banking system of Bangladesh remains vulnerable to future crisis emanating from three pronged risks: macroeconomic epidemic, microeconomic epidemic and endemic crisis of entrenched government permeation. Though foreign commercial banks (FCB) and some private commercial banks (PCB) stand on sound footing, crisis may start from nationalized portion of commercial banks (NCB), Development Financial Institutions (DFIs) and from a few problems inflicted private banks. In terms of macroeconomic indicators the country's banking system may encounter instability emanating from asset price and lending boom, high inflation and volatility exchange rate, deteriorating terms of trade and continuous adverse trade and current account balance.

Anwar et al (2010) investigates efficacy of bank governance measures in improving asset performance and capital adequacy standard for private commercial banks of Bangladesh during (1999-2008). The study suggests that board size and board meeting powerfully explain NPL of the banks. On the other hand, board size and institutional shareholding have strong predictive power to explain the improvement of capital adequacy ratio.



Uddin (2010) examines the causes of the global financial crisis and its remedies. The study highlights the operation of the existing financial system and its performance in Bangladesh. It also recommends a sustainable financial system for Bangladesh with some key factors, which are required for its well being in particular and the economy at large.

Nimalathasan (2008) analyses the performance of banking sector in Bangladesh by applying CAMELS rating system. His study shows that according to CAMELS rating system, 3 banks was 01 or strong, 31 banks were rated 02 or unsatisfactory, rating of 07 banks were 03 or fair, 5 banks were rated 4 or marginal and 2 banks got 05 or unsatisfactorily rating. One NCB had unsatisfactorily rating and NCBs had marginal rating.

### **Section III: Development and Performance of Banking Sector in Bangladesh**

Banking system of Bangladesh comprises of four categories of scheduled Bank, i.e., state-owned commercial banks (SCBs), state-owned development financial institutions (DFIs), private commercial banks (PCBs), and foreign commercial banks (FCBs). The banking sector is the dominant sector in the financial system of Bangladesh. Banking sector play an import role to fostering economic growth and poverty reduction in the country by mobilizing resources from surplus unit (depositor) and allocating resources (lending) efficiently to deficit unit (borrower). Presently, four SCBs, four DFIs, thirty PCBs, and nine FCBS are operating in Bangladesh through 7961 branches.

After liberation, the banks operating in Bangladesh were nationalized. These banks were merged and grouped into six commercial banks. Of the total six commercial banks, Pubali Bank Limited and Uttara Bank Limited were subsequently transferred to the private sector with effect from January 1985. Rupali Bank was transferred as public limited company from December 1986. Sonali, Janata and Agrani state owned banks were as public limited company from December 2007. Besides, to bring competition and dynamism in banking sector, private banks were allowed to operate in 1980s. In order to finance to agriculture sector, Bangladesh Krishi Bank (BKB) was established in 1973. Another specialized bank emerged as Rajshahi Krishi Unnayan Bank (RAKUB) for financing in agriculture sector in the northern part of Bangladesh. In order to accelerating industrialization and to finance to set up new industry and modernization, expansion , replacement, and balancing existing industry Bangladesh Shilpa Bank (BSB) and Bangladesh Shilpa Rin Shongstha (BSRS) were established in 1972 to BSB and BSRS were merged and renamed as Bangladesh Development Bank Limited (BDBL) in March 2010.

Structure of the banking sector with breakdown by type of banks is shown in Table-1. The share of SCBs in industry asset has been declining over time while the same is increasing for PCBs. At the end of December 2011, the share of PCBs stood at 60 percent from 35 percent at the end of December 2001 while SCBs share declined to 28 percent at the end of December 2011 from 46 percent at the end of 2001.



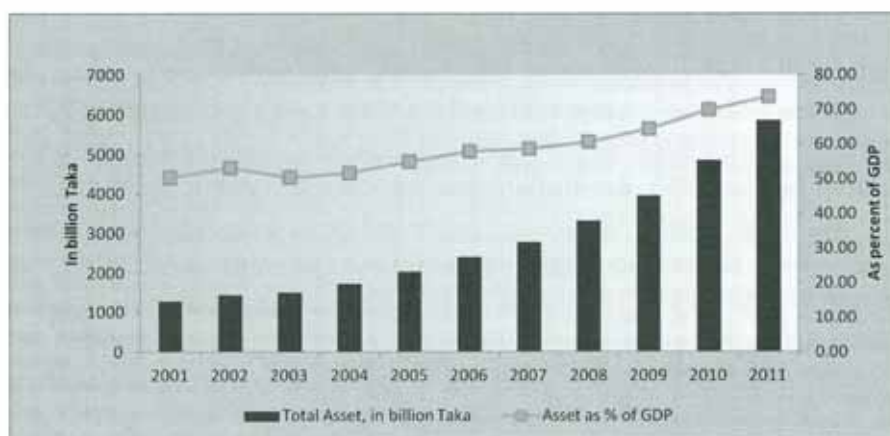
**Table 1 : Industry Asset and Share in Banking System in Bangladesh (in billion Taka)**

Bank Type	2010						2011					
	Number of banks	Number of Branches	Total Assets	Percent of industry assets	Deposits	Percent of Deposits	Number of banks	Number of Branches	Total Assets	Percent of industry assets	Deposits	Percent of Deposits
SCBs	4	3404	1384.3	28.5	1044.9	28.1	4	3437	1629.2	27.8	1235.6	27.4
DFIs	4	1382	295.4	6.1	183.4	4.9	4	1406	328.8	5.6	214.4	4.8
PCBs	30	2810	2854.6	58.8	2266.5	60.9	30	3055	3524.2	60.0	2787.5	61.8
FCBs	9	62	320.8	6.6	227.1	6.1	9	63	385.4	6.6	272.2	6.0
<b>Total</b>	<b>47</b>	<b>7658</b>	<b>4855.1</b>	<b>100.0</b>	<b>3721.9</b>	<b>100.0</b>	<b>47</b>	<b>7961</b>	<b>5867.6</b>	<b>100.0</b>	<b>4509.8</b>	<b>100.0</b>

Source: Bangladesh Bank, Annual Report (Various Issues).

Total asset of banking sector has been growing steadily over time. Total asset grew on an average about 30 percent during 2001-2011. Total asset as percent of GDP increased to 74 percent in 2011 from 50 percent in 2001 (Chart 1).

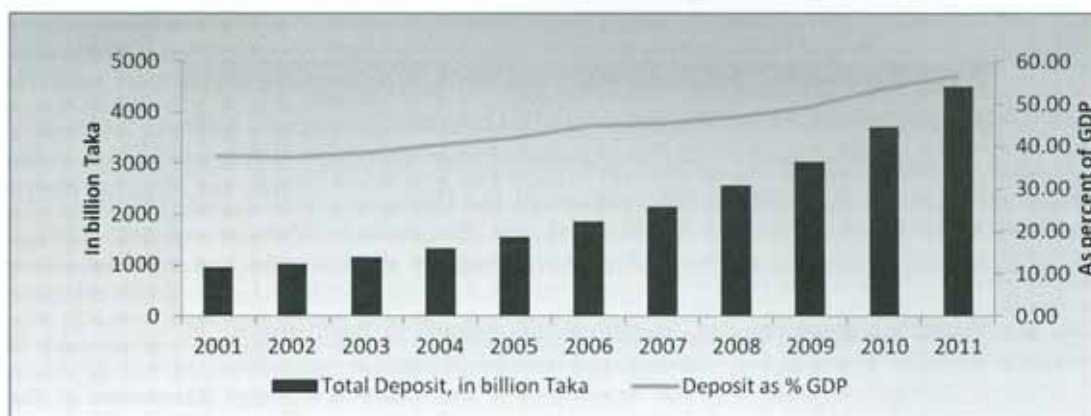
**Chart 1: Trend In Banking Industry Asset During 2001-2011**



Source: Bangladesh Bank, Annual Report (Various Issues).

Total deposit mobilization by the banking industry increased by 31 percent, on an average, to Tk. 4509.7 billion in 2011 from Tk. 1023.53 in 2001. Total deposit as percent of GDP increased to 46.60 percent in 2011 from 37.68 percent in 2001 (Chart 2). The share of deposit in total deposit for SCBs declined to 27 percent in 2011 from 51 percent in 2001 while the share of PCBs increased to 62 percent in 2011 from 36 percent in 2001. The analysis of liabilities of aggregate industry indicates that deposit constitutes more than 75 percent. Deposit in 2011 accounted for 76.9 percent of aggregate liabilities which was about 75 percent in 2001.

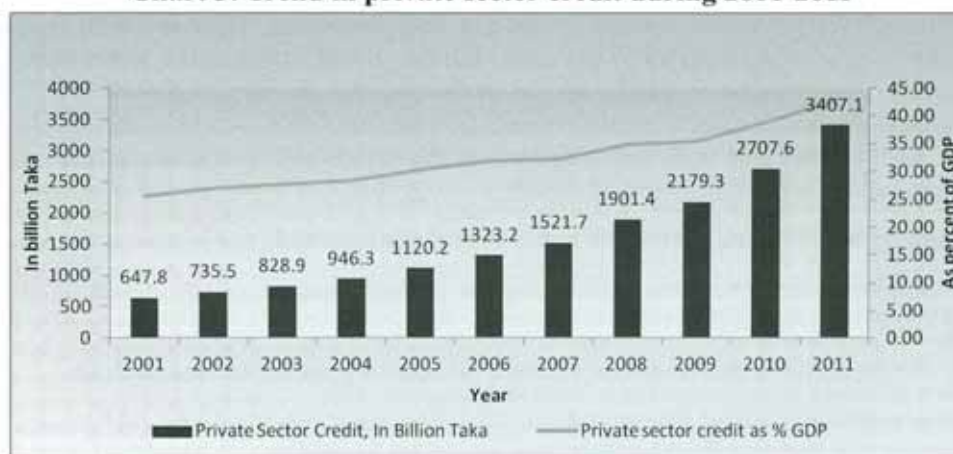
**Chart 2: Trend in deposit mobilization by banking industry during 2001-2011**



Source: Bangladesh Bank, Annual Report (Various Issues).

Total credit disbursement in private sector by the industry increased by 35.50 percent, on average, to Tk. 3007.1 billion in 2011 from Tk. 647.8 billion in 2001. Private sector credit as percent of GDP increased to 42.77 in 2011 from 25.55 percent in 2001 (Chart 3). An analysis of aggregate asset of industry indicates that the share of loan and advances to total asset varies between 58 percent and 65 percent during 2001-2011. Loan and advances constituted about 60 percent in 2001 which increased to 64.6 percent in 2011.

**Chart 3: Trend in private sector credit during 2001-2011**



Source: Bangladesh Bank, Annual Report and Bangladesh Bank Quarterly (BBQ) (Various Issues).

In response to the recent global financial melt-down, BB strengthened its attention to macro-prudential actions as a complement to applying micro-prudential policy tools towards addressing systemic risks<sup>3</sup> (Chowdhury, 2012). BB has initiated the following policy

<sup>3</sup>Systemic risk refers to a disruption to financial services that is caused by an impairment of all or parts of the financial system and has the potential to have serious negative consequences for the real economy. The mandate of maintaining financial stability almost inevitably compels Bangladesh to give special focus on mitigating systemic risk.

measures with a view to maintaining soundness, solvency, efficiency and stability in the financial system:

- BB initiated two Basel III-liquidity standards, namely the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) to the banks as a reporting requirement in 2011. An introductory period is continuing and will last for no more than one year;
- in light of global economic turmoil and considering the rapidly-growing and evolving financial sector in Bangladesh, BB established the financial Stability Department (FSD) with a view to examine the stability of the Bangladesh financial system through macro-prudential analysis, assess and quantify financial system risks and vulnerabilities, design and conduct stress-testing exercises, oversee the means of payments and settlement systems operating in the country, monitor developments in the insurance sector, as well as capital markets participants, recommend macro-prudential regulation and engage in macro-prudential oversight, thereby strengthening the macro-prudential framework of the country; • BB has also initiated a process to adopt a tailor-made Financial Projection Model (FPM), under the technical assistance from the World Bank, to improve its risk assessment framework in individual banks and the banking system as a whole;
- With the existing supervisory tools like CAMELS rating, Stress Testing, Financial Projection Model etc., Bangladesh Bank started determining financial position of the bank's quarterly through quick review report. This report focuses on major risks existing in the bank and provides the possible way out in brief;
- BB created a new department titled "Deposit Insurance Department" for exclusively expediting the issues of implementing an effective deposit insurance system in Bangladesh in accordance with international best practices. A Deposit Insurance Trust Fund (DITF) has been created for providing limited protection (not exceeding Taka 100,000) to a small depositor in case of winding up of any bank. BB has already advised the banks to bring the Deposit Insurance Scheme (DIS) to the notice of the public through displaying key information about it on their display board. In addition, BB is working to introduce this system to the NBFIs as well and proposed to the concerned ministries to make it more risk-based and more expansive in coverage;
- imposing limits on banks' exposures to the capital market; and
- developing an Enterprise Data Warehouse for prompt analysis of the systemic risks and taking correcting/remedial actions.

#### **Section IV: Analysis of the financial stability of banking sector in Bangladesh**

A vast literature on financial system indicates that the development of a sound banking sector is important for the sustainable development of an economy. A range of quantitative indicators can be used to analyze the health and stability of the banking system, including Financial Soundness Indicators (FSIs), market-based indicators of financial conditions, structural indicators and macroeconomic indicators. Macro Prudential Indicators (MPI)-defined broadly as indicators of the health and stability of the financial system-have been encouraged by the G7 countries, the IMF and the World Bank. The MPIs are divided into two broad categories: (1) aggregated micro-prudential indicators of the health of individual financial institutions, also known as Macro-Financial Indicators (MFI)/FSIs, and (2) macroeconomic variables associated with financial system soundness (Annexure 1).



## Capital Adequacy

Capital adequacy focuses on the total position of banks' capital and protection of depositors and other creditors from the potential shocks of losses that a bank might incur. It helps absorbing all possible financial risks<sup>4</sup>. Under Basel-II, banks in Bangladesh are instructed to maintain Minimum Capital Requirement (MCR) at 10.0 percent of the Risk Weighted Assets (RWA) or Taka 4.0 billion as capital, whichever is higher, with effect from July-September quarter in 2011.

**Table 2: Capital to Risk Weighted Assets Ratio by type of Banks (in percent)**

Year/ Bank Type	SCBs	DFIs	PCBs	FCBs	TOTAL
1997	6.6	6	8.3	16.7	
1998	5.2	6.9	9.2	17.1	
1999	5.3	5.8	11	15.8	7.4
2000	4.4	3.2	10.9	18.4	6.7
2001	4.2	3.9	9.9	16.8	6.7
2002	4.1	6.9	9.7	21.4	7.5
2003	4.3	7.7	10.5	22.9	8.4
2004	4.1	9.1	10.3	24.2	8.7
2005	-0.4	-7.5	9.1	26	5.6
2006	1.1	-6.7	9.8	22.7	6.7
2007	7.9	-5.5	10.6	22.7	9.6
2008	6.9	-5.3	11.4	24	10.1
2009	9	0.4	12.1	28.1	11.6
2010	8.9	-7.3	10.1	15.6	9.3
2011	11.7	-4.5	11.5	21.0	11.4
2012(JUNE)	11.2	-4.3	11.4	21.5	11.3

Source: BB, Annual Report and BBQ (various issues).

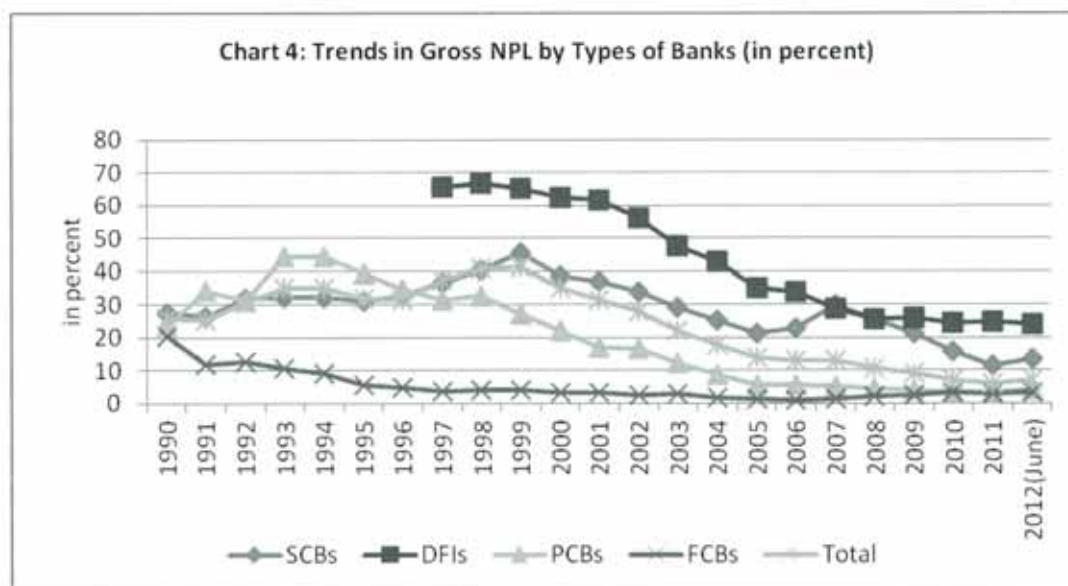
Scheduled banks in Bangladesh are becoming increasingly compliant with the Basel II capital adequacy framework. Data show that CAR for SCBs, DFIs, PCBs and FCBs increased to 11.2 percent, -4.3 percent, 11.4 percent and 21.5 percent respectively at the end of June 2012 from 4.4 percent, 3.2 percent, 10.9 percent, and 18.4 percent respectively at the end December 2000. Total CAR of banking system increased to 11.3 percent at the end June 2012 from 6.7 percent at the end December 2000, reflecting a good health of overall banking system in Bangladesh (Table-2). Although CAR of banking system of Bangladesh has been increasing over time, it is below as compared with that of SARRC countries. It is observed from cross-country scenario that India, Sri Lanka, and Pakistan maintained CAR at 13.5 percent, 14.5 percent, and 14.1 percent respectively in 2011 (Table 2).

<sup>4</sup> The risk are credit risk, market risk, operational risk, residual risk, core risks, credit concentration risk, interest rate risk, liquidity risk, reputation risk, settlement risk, strategic risk, environmental & climate change risk etc.

## Asset quality

The asset composition of all commercial banks shows the concentration of loans and advances (64.6 percent). The high concentration of loans and advances indicates vulnerability of assets to credit risk, especially because of having significant portion of non-performing assets. A huge non-performing loan portfolio has been the major predicament of banks particularly of the SCBs and DFIs. However, investment of banks in bills, bonds, shares etc. also demonstrates somewhat concentration, which is 14.1 percent of total assets.

The most important indicator intended to identify problems with asset quality in the loan portfolio is the ratio of gross non-performing loans (NPLs) to total loans and net NPLs to net total loans. Data on types of banks show that NPL ratio for PCBs and FCBs have been declining since 1990 while the same for SCBs and DFIs shoed a mixed trend during 1997-2012. The gross NPL ratio for all banks declined to 6.20 percent in 2011 from the peak 41.10 percent in 1999. The ratio again increased to 10.03 percent at the end of 2012 due to sharp increase in NPL of SCBs (Chart 4).



Source: Bangladesh Bank, Annual Report and BBQ (various issue)

During the 1970s and 1980s, the SCBs and DFIs experienced a high level of NPLs mainly due to a substantial loan has been disbursement on political considerations other than commercial as well as directed loan. BB took various measures (i.e. loan classification, loan rescheduling, provisioning, and write-off) to recover loan during 1990s-2000s. As results, NPLs position witnessed a significant improvement after 1990s.

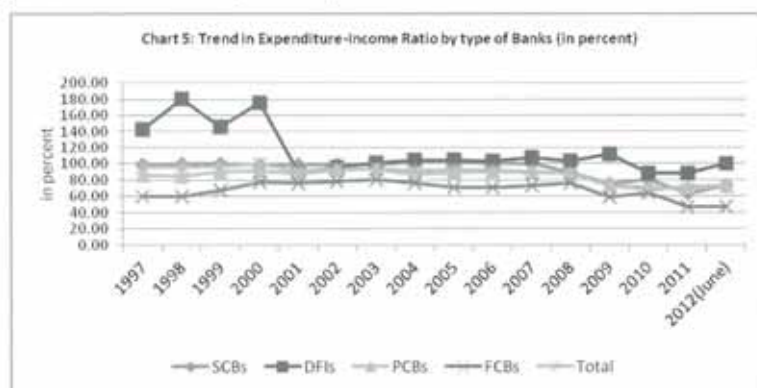
In comparison of cross country NPL data show that Bangladesh crossed a very worst situation in the early 2000s. The improvement in the NPL position implies an improving of assets quality of the banking system. It is observed that among the developed countries, in 2005 USA achieved the lowest NPL to total loan ratio but later on it was on an increasing trend and rose at 5.5 percent in 2010. UK experienced a fluctuation from 2.6 percent in 2002 to 3.5 percent

in 2009. Among the emerging economy, Chain achieved a remarkable progress by reducing its NPL to loans ratio from 26 percent in 2002 to only 1.6 percent in 2009. However, Bangladesh suffered for high NPL to loan ratio 28.1 percent in 2002 but later on succeeded to reduce the ratio at 6.2 percent which is lower than that of Russia in 2011<sup>5</sup>.

### Management Soundness

Sound management is the most important pre-requisite for the strength and growth of any financial institution. The total expenditure to total income, operating expenses to total expenses, earnings and operating expenses per employee and interest rate spread are generally used to portrayed management soundness. Technical competence and leadership of mid and senior level management, compliance with banking laws and regulations, adequacy, compliance of sound internal policies, ability to plan and respond to changing circumstances etc are also taken into consideration to illustrate the quality of management.

In particular high and increasing expenditure to income ratio indicates the operating inefficiency that could be due to flaw in management. Data on expenditure-income (EI) ratio show that the EI for all banks came down to 68.60 in 2011 and 72.8 at end June 2012 from 99.90 in 2000. A mark improvement was pronounced in SCB over PCBs during the recent time. In 2011, the EI ratio of the DFIs was the highest among the bank clusters due to poorer non-interest income and higher operating expenses particularly incurred by BKB and RAKUB. The EI ratio of the PCBs was 71.7, the second highest, which could mainly attributable to high administrative and operating expenses. The EI ratio of SCBs got a fall from 80.7 in 2010 to 62.7 in 2011 mainly due to significant increase (taka 6052.2 crore to Taka 9169.8 crore) in interest income (Chart 5).



Source: BB, Annual Report (various issues)

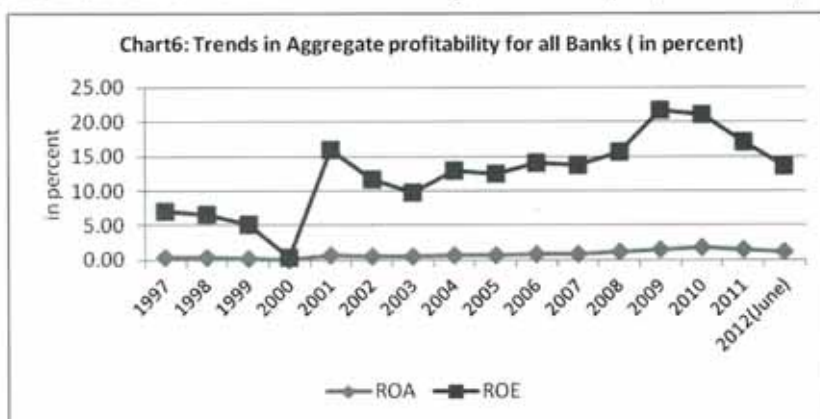
### Earnings and Profitability

Strong earnings and profitability profile of a bank reflect its ability to support present and future sound operation, absorb future contingent shocks and strength resilience capacity. More specifically, this determines the capacity to absorb losses by building an adequate capital base, finance its expansion and pay adequate dividends to its shareholders. Although there are various measures of earnings and profitability, the best and widely used indicator is return on assets (ROA), which is supplemented by return on equity (ROE) and net interest margin (NIM).

<sup>5</sup> See World Development Indicators, WB, 2012.



The trend of ROA and ROE for all banks exhibited mixed trend during 1997-2012 (Chart 6). The ROA increased gradually to 1.80 percent in 2010 from 0.70 percent in 2001. Afterwards, it declined to 0.12 percent in 2012. The ROE reached 21.70 percent in 2009 then it fell to 13.5 percent in June 2012. An analysis of these indicators reveals that the ROA of the SCBs was less than industry average, but it is gradually increasing over time. The DFISs' situation is not better due to operating loss incurred by BKB and RAKUB. The ROA of PCBs and FCBs shows an irregular trend but gains a strong position. On the other hand, the ROE of SCBs was 26.2 percent in 2009, but dropped down to 18.4 percent in 2010 as owners' equity had increased comparatively at higher rate than after tax profit. However, it increased to 19.7 percent in 2011 and it turned to negative 11.87. In case of DFIs, the ROE was still negative in 2012. The ROE of FCBs has been showing gradual decline from 2009 due to increase of equity. The ROE of PCBs was mixed trend during 1997-2012 (BB, Annual Report).



Source: BB, Annual Report (various issues).

Aggregate net interest income (NII) of the industry has increased constantly from Taka 16.6 billion in 2003 to Taka 146.7 billion in 2011. However, the NII of the SCBs was a negative amount of Taka 1.2 billion in 2000 and it turned to positive (Taka 7.7 billion) in 2005. In 2011, the NII of SCBs was Taka 34.3 billion. The DFIs had a positive trend since 2000 and it was Taka 4.9 billion in 2011. Since 2005, SCBs have been able to increase their net interest income (NII) by reducing their cost of fund. The NII of the PCBs has been incredibly high over the period from 2003 through 2011. Overall industry NII shows a consistently upward trend. The trend of NII indicates that the interest spread of PCBs and FCBs is higher than that of SCBs and DFISs (Table 3).

**Table 3: Net Interest Income (NII) by type of Banks (in billion Taka).**

YEAR	SCBs	DFIs	PCBs	FCBs	TOTAL
1997	2.7	-0.1	1.7	2	6.3
1998	2.2	0.5	2.3	2.2	7.1
1999	3.1	-0.1	3	1.8	7.8
2000	-1.2	1	6.1	2.5	8.4
2001	-1.8	2.7	9.2	3.3	13.4
2002	-1.5	1.4	10.2	3.4	13.5
2003	-0.3	1.3	12	3.6	16.6
2004	-1.1	1.8	13.7	4.2	18.3
2005	7.7	1	21	5.6	35.3
2006	9	1.7	25.4	8.2	44.3
2007	7.4	1.4	36.1	9.9	54.8
2008	7.9	1.9	48.5	12.6	70.9
2009	12.1	1.9	56.7	10.7	81.5
2010	19.8	6.2	82.8	13	121.9
2011	34.3	4.9	91.4	16.1	146.7
2012(JUNE)	9.7	3.8	57.9	10.4	81.8

Source: BB, Annual Report (various issues)

## Liquidity

It is also important indicator for financial stability. On the liability side, indicators should cover funding sources, including interbank and central bank credits. Liquidity indicators should also be able to capture large maturity mismatches in the largest financial institutions or the overall financial sector (Evans et al. 2000). Deposits are the main source of funding for the banking sector, with capital, reserve and borrowings constituting a small portion thereof. Banks mainly use funds to provide loans and invest in debt and equity securities.

The credit deposit ratio is a useful indicator of a bank's liquidity adequacy. The ratio of credit to total deposits (excluding interbank deposits) may give indications of the ability of the banking system to mobilize deposits to meet credit demand. A high ratio may indicate stress in the banking system and a low level of liquidity to respond to shocks (Evans et al. 2000). A low ratio indicates the increasing ability of the banking system to mobilize deposit to meet credit demand. During 1990-2011 credit – deposit ratio showed a mixed trend. During 1990-92 the ratio was more than 100 percent. After 1992, it showed a downward trend during 1993-1995 and again it crossed 100 percent during 1996-1999. The ratio stood higher during 2002, 2008 and 2011. The ratio, on average, was 99.37 in 1990s and 98.42 in 2000s (BB, Economic Trends). In February 2011, Bangladesh Bank instructed to banks to maintain their Credit Deposit Ratio (CDR) within a certain level<sup>6</sup> (BB, FSR, 2011). At the end of December 2012, overall CDR for banking system came down to 76.59 (The Prothom Alo, February 26, 2013).

<sup>6</sup> For conventional banks up to 85 percent and Islamic shariah based banks up to 90 percent.

A large increase in central bank credit to banks and other financial institutions-as a proportion of their capital or their liabilities-often reflects severe liquidity (and frequently also solvency) problems in the financial system (Evans et al. 2000). Data show the decreasing trend in central bank credit to DMBs. The ratio came down to 4.29 percent in 2011 from 19.46 percent in 1990.<sup>7</sup>

This indicates an increasing liquidity in the banking system. This proposition is supported by excess liquidity in the banking system. Data show that total liquidity ratio was a range of 23.38 percent and 26.50 percent during 1997-2011 and excess liquidity was a range of 4.46 percent and 9.80 percent during the same period in the banking system<sup>8</sup>.

### **Sensitivity to Market Risk**

In general, sensitivity to market risk assesses the degree to which a bank might be exposed to adverse financial market conditions. Banks are increasingly involved in diversified operations, all of which involve one or more aspects of market risk. A high share of investments in volatile assets may signal a high vulnerability to fluctuations in the price of those assets. In general, the most relevant components of market risk are interest rate and foreign exchange risk, which tend to have significant impacts on financial institutions' assets and liabilities. Moreover, in some countries, banks are allowed to engage in proprietary trading in stock markets, so it is also of interest to track equity risk (Evans et al. 2000). Similarly, commodity risks derived from the volatility of commodity prices can be important in certain countries. In line with Basel-I, BB introduced core risks guideline for banks in 2003 to manage risk in banking sector<sup>9</sup>. In considering distress of global financial crisis, BB further issued risk management guideline in line with Basel-II for banks in February, 2012 to facing various challenges due to increased competition and expansion of diversified business network<sup>10</sup>. According to this guideline, banks are asked to create Risk Management Unit (RMU) to supervise all core risk<sup>11</sup>. It is mentioned that a considerable degree of volatility in the domestic financial markets in Bangladesh during 2011 contributed to the increase in market risk for banks but its impact on their financial performance is likely to be well-contained, given BB's stringent prudential requirements on various market risk exposures (BB, FSR, 2011).

### **Interest rate risk**

The first important source of market risk is interest rate risk, which is primarily driven by banks' investments in securities and adverse movement in security prices, in addition to the direct exposure in government securities. Data of end December 2011 indicates that the share of risk weighted assets (RWA) assigned to interest rate risk is only 1.3 percent of total risk weighted assets in the banking system, whereas the RWA related to overall market risk is only 6 percent. The banks' capital charge for interest rate risk is Tk 6.2 billion at end December 2011. Only 5 banks (11 percent of the industry) contain almost 50 percent of industry interest rate risk and 37 banks (79 percent of the industry) materially contain no or insignificant interest rate risk (BB, FSR, 2011).

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<sup>7</sup> BB, Monthly Economic Trends (various issues)

<sup>8</sup> BB, Annual Report (various issues).

<sup>9</sup> See BRPD Circular No. 17, 2003.

<sup>10</sup> See DOS Circular No-02, 2012.

<sup>11</sup> The core risks are: credit risk, market risk (interest rate risk, exchange rate risk and equity risk), liquidity risk, operational risk and other risks.



### **Exchange Rate Risk**

The second important source of market risk is exchange rate risk, which is primarily driven by banks' investments in foreign exchange dealings and adverse movement in exchange rates, in addition to the direct exposure arising from foreign exchange placements in different exchange markets. Data as of end December 2011 indicates that share of risk weighted assets (RWA) assigned to exchange rate risk is less than 2 percent of total risk weighted assets in the banking system, whereas it is 26.8 percent of the market risk. The banks' capital charge for exchange rate risk is Tk 7.8 billion. However, only 10 banks contain almost 82 percent of industry exchange rate risk and 37 banks (79 percent of the industry) contains the remaining 28 percent of exchange rate risk in the banking system (BB, FSR, 2011).

### **Equity Price Risk**

The third important source of market risk is equity price risk, which is primarily driven by banks investments in equities and adverse movement in equity prices, in addition to the indirect exposure from the quantum of bank loans collateralized by shares. The Dhaka Stock Exchange (DSE) showed mixed trends in CY11, with the General Index reaching a high of 6459.62 in July and low of 5036.50 in October (BB, FSR, 2011). An analysis of share price volatility shows that General share price index, on average, increased by about 29.67 percent per year during 1990s which grew by 23.38 percent during 2000s, and declined by 12.92 percent during 2011-2012. As against the price growth, the volatility measured by standard deviation declined to 17.43 percent during 2011-2012 from 36.43 in 2000s, and 87.13 during 1990s.

Data as of end December 2011 indicate that the share of risk weighted assets (RWA) assigned to equity price risk is a bit higher than 3 percent of total risk weighted assets in the banking system, whereas it is 52.1 percent of the market risk. The banks' capital charge for equity price risk is BDT 15.2 billion at end December 2011. The top ten banks contain more than 50 percent of industry equity price risk and 37 (79 percent of the industry) banks materially contain the remaining 50 percent risk from the movement of equity prices (BB, FSR, 2011).

### **Aggregate CAMELS Rating of the Banking System**

BB had introduced Early Warning System of supervision from March 2005 to address difficulties faced by the banks in any of the areas of CAMELS. Any bank found to have faced difficulty in any area operation, is brought under early warning category and monitored very closely to help improve its performance. Presently 2 banks are monitored under EWS. As of end 2011, CAMELS rating of 2 banks was 1 or "strong"; 33 banks were rated 2 or "satisfactory"; rating of 9 banks was 3 or "fair"; 2 were rated 4 or "marginal" and 1 bank got 5 or "unsatisfactory" rating<sup>12</sup> (Table 4).

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<sup>12</sup> CAMELS rating are a supervisory tool to identify those banking companies that are having problems and require increased supervision. Under this rating system, banking companies are assigned two sets of ratings i) performance ratings, based on six individual ratings ii) an overall composite rating, based on a comprehensive assessment of the overall condition of the banking company. Both the ratings are expressed by using a numerical scale of "1" to "5" in ascending order of supervisory concern. "1" representing the best rating, while "5" indicating the worst.

**Table 4: Trend in CAMELS Rating of Banks during 2002-2011**

Year	Number of banks in each category				
	Strong	Satisfactory	Fair	Marginal	Unsatisfactory
As of end 2002	9	21	7	10	2
As of end 2003	15	11	11	10	2
As of end 2004	12	15	10	8	4
As of end 2005	13	16	8	6	4
As of end 2006	3	31	7	5	2
As of end 2007	6	29	5	6	1
As of end 2008	2	28	10	4	4
As of end 2009	3	32	8	4	1
As of end 2010	5	32	7	2	1
As of end 2011	2	33	9	2	1

Source: Annual Report, BB (On the basis of five components of CAMEL banks are rated from 2002-2005 and six components of CAMELS banks are rated from 2006-2011).

### Assessment of Macroeconomic Indicators

The operation of a financial system is dependent on overall economic activity. Financial institutions are significantly affected by certain macroeconomic developments. Recent empirical analysis has shown that certain macroeconomic developments have often predated banking crisis, which suggests that financial system stability assessments need to take into consideration the broad macroeconomic picture, particularly factors that affect the economy's vulnerability to capital flow reversals and currency crisis. The relationship may describe by the following simple schematic view<sup>13</sup> :

- (1) GDP ↑ → NPL ↓ → financial stability ↑,
- (2) Lending rate ↑ → inflation ↑ → NPL ↑ → financial stability ↓, and
- (3) High real interest rate ↑ → BoP crises ↑ → financial stability ↓.

Bank's asset quality depend on economic growth because low or declining aggregate growth rates often weaken the debt-servicing capacity of borrowers and contribute to increasing credit risk. It is observed from Table-5 that over the period aggregate growth rates showed an increasing trend, which indicates increasing debt servicing capacity of borrowers and thus reducing credit risk for banks i.e. reducing NPL. Besides, the risk coming from sectoral growth ( up and down) remains moderate for banking system because a slump or boom in the sectors where financial institutions' loans and investments are concentrated could have an immediate impact on financial system soundness. It deteriorates the quality of financial institutions' portfolios and profitability margins and lower their cash flow and reserves. The trend of growth in agriculture sector exhibited a fluctuation during FY 90-FY11. Industry and service sector's growth showed an increasing trend during FY 90-FY11 (Table 5). In the face of global economic slow down and financial crisis, overall economic growth of Bangladesh registered an impressive growth in the recent time which softens financial distress.

<sup>13</sup> This Schematic is adopted from FSR, BB, 2006, Page-183.

**Table 5: Trend in Sectoral and overall economic growth (in percent)**

YEAR	GDP		Agriculture		Industry		Service	
	Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
1990S	4.79	0.72	3.25	2.48	6.43	1.80	4.50	0.66
2000S	5.83	0.67	3.31	1.53	7.51	1.05	6.10	0.55
FY11-FY12	6.51	0.27	3.77	1.75	8.84	0.90	6.33	0.38
FY90-FY2012	5.44	0.88	3.32	1.95	7.14	1.58	5.39	1.01

Source: Author own calculation based on BBS's data.

Note: S.D = standard deviation which proxies for volatility

An estimated result of correlation coefficient between NPL and GDP of -0.67 for the sample period 1991-2012 indicate that if GDP increases by one percent then NPL decreases by 0.67 percent (Table 6). We may conclude that increase of GDP pushes down NPL which ensures financial stability in banking system in Bangladesh.

**Table 6: Estimate result of Correlation among macroeconomic and financial variable**

Variable		Correlation	T-statistic	Probability
npl	G_gdp	-0.666479	-3.997978	0.0007
rle	G_gdp	-0.515405	-2.689734	0.0141
Rle	Npl	0.636798	3.693555	0.0014
nlr	G_gdp	-0.575199	-3.144650	0.0051
Nlr	Npl	0.637777	3.703130	0.0014
Cab	G_gdp	0.712530	4.541539	0.0002
Cab	Npl	-0.722995	-4.680196	0.0001
cab	Nlr	-0.563780	-3.052696	0.0063

Note: G\_GDP= real GDP growth, NPL= nonperforming loan ratio to total loan, RLE= real lending rate, NLR= nominal lending rate, and CAB = current account balance as percent of GDP. Sample period: 1991-2012 and data frequency: yearly Sample size: 22



It is argued that high lending rate both real and nominal pushes inflation up and GDP down which leads to increase NPL and degrade financial stability. Estimated results show that correlation coefficient between RLE and GDP is -0.52 and the correlation between RLE and NPL are 0.63 which implies that prevailing high lending rate is distress for banking system (Table 6).

It is learnt that a large current account deficit (as percent of GDP) could signal vulnerability to a currency crisis with negative implications for the liquidity of the financial system, especially if the deficit is financed by short-term portfolio capital inflows (Evans et al. 2000). Data on current account balance as percent of GDP showed a positive during FY06-FY11<sup>14</sup>. Current account balance as percent of GDP reached positive 0.78 percent, on average, during 2000s from a negative 2.49 percent during 1990s (Table 7). It is quite good position for facing financial vulnerability in future. Estimated result shows that correlation coefficient between CAB and NPL is -0.72 which implies a good position or surplus in CAB lead to decrease NPL in banking system which helps financial stability (Table 6).

A low ratio of international reserves (in the central bank and financial system as a whole) to short-term liabilities (domestic and foreign, public and private) is seen, particularly by investors, as a major indicator of vulnerability (Evans et al. 2000). Another popular indicator of reserve adequacy is gross official reserves in months of imports of goods and services. Data show that official reserve in term of month increased to 3.60 month in 2011 from 1.2 month in 1990. It was 3.05 months coverage during 2000s and 3.99 month during 1990s.

It is more difficult to assess credit and market risks during volatility in inflation. A high volatility in inflation raises portfolio risk and erodes the financial institutions' information base for planning, investment, and credit appraisal. On the other hand, a significant and rapid reduction in the rate of inflation could lead to lower nominal income and cash flows, thereby adversely affecting the liquidity and solvency of financial institutions (Evans et al. 2000). Data show that inflation, on average, increased to 9.71 percent during FY11-FY12 from 5.97 percent in 2000s and 4.83 percent in 1990s. Volatility, as measured by standard deviation, came down to 1.29 during FY11-FY12 from 2.45 in 2000s (Table 7).

**Table 7: Trend and Volatility in inflation, Exchange Rate, CAB and Reserve**

		1990S	2000S	FY11-FY12
Inflation (%)	Mean	4.83	5.97	9.71
	S.D	2.74	2.455	1.29
Exchange rate depreciation (%)	Mean	-4.13	-3.12	-7.86
	S.D	2.36	3.43	2.15
CAB (as percent of GDP)	Mean	-2.49	0.78	1.11
	S.D	1.51	1.68	0.29
Reserve in month of imports (number)	Mean	3.99	3.05	3.45
	S.D	1.62	0.94	0.21

Source: Authors' own calculation. Note: S.D = standard deviation which proxy volatility

<sup>14</sup> BB, Annual Report (Various Issues).

A large real exchange rate appreciation could weaken the export sector to service debt. On the other hand, a large depreciation could improve the capacity of the export sector to service its debt but, at the same time, it could weaken the debt-service capacity of non-export related domestic borrowers. Moreover, large changes in the exchange rate could put pressure on the financial system either directly by changing asset values or indirectly via possible effects on the real economy (Evans et al. 2000). During FY11-FY12, exchange rate depreciated, on average, about 7.86 percent which was 3.12 percent in 2000s and 4.13 percent in 1990s. The volatility in exchange rate also lowered during last a couple of year as compared with that of in 2000s (Table 7).

## V. Conclusion

The analysis indicate that total CAR of banking system increased to 11.4 percent at the end of December 2011 and declined to 10.46 percent in December 2012 from 6.7 percent at the end of December 2000, reflecting a good health of overall banking system in Bangladesh. Although CAR of banking system of Bangladesh has been increasing over time, it is below as compared with that of SARRC countries. It is observed from cross-country scenario that India, Sri Lanka, and Pakistan maintained CAR at 13.5 percent, 14.5 percent, and 14.1 percent respectively in 2011.

The analysis of non performing loan shows that NPL ratio for PCBs and FCBs have been declining since 1990 while the same for SCBs and DFISs showed a mixed trend during 1997-2012. The gross NPL ratio for all banks declined to 6.20 percent in 2011 from the peak 41.10 percent in 2000. The ratio again increased to 10.03 percent at the end of 2012 due to sharp increase in NPL of SCBs.

Data on expenditure-income (EI) ratio show that the EI for all banks came down to 68.60 in 2011 from 99.90 in 2000 reflecting a mark improvement was pronounced in SCB over PCBs during the recent time. The trend of ROA and ROE for all banks exhibited mixed trend during 1997-2012. An analysis of these indicators reveals that the ROA for all banks declined to 0.64 percent at the end of 2012 from the peak of 1.78 percent at the end of 2010 due to dismal performance of SCBs and DFISs. The ROA of PCBs and FCBs shows an irregular trend but gains a strong position. The ROE for all banks declined to 8.20 percent at the end 2012 from the peak of 21.72 percent at the end of 2009 due to a substantial dropped in ROE of SCBs to negative 11.87 in 2012 from the peak of 26.2 percent in 2009.

The CDR, on average, was 99.37 percent in 1990s and 98.42 percent in 2000s. In February 2011, Bangladesh Bank instructed banks to maintain their CDR within a certain level<sup>15</sup> (BB, FSR, 2011). At the end of December 2012, overall CDR for banking system came down to 76.59 (The Prothom Alo, 26 February 2013). An analysis of data show that total liquidity ratio was within the range of 23.38 percent and 26.50 percent during 1997-2011 and excess liquidity was within the range of 4.46 percent and 9.80 percent during the same period.

The analysis of trend in MPI indicates that banking sector in Bangladesh demonstrated a moderate level of stability in the recent year despite of dismal performance of SCBs and DFISs. The PCBs and FCBs stand on sound footing in resilience in terms of MPI's performance.

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<sup>15</sup> For Conventional Banks up to 85 Percent and Islamic Shariah based banks upto 90 Percent.



In the face of global economic slow down and financial crisis, overall economic growth of Bangladesh registered an impressive growth in the recent time which softens financial distress. An estimated result of correlation coefficient between NPL and GDP is -0.67 for the sample period 1991-2012 which indicate that if GDP increase one percent then NPL decrease by 0.67 percent. We may conclude that increase of GDP pushes down NPL which ensures financial stability in the banking system in Bangladesh.

It is argued that high lending rate both real and nominal pushes inflation up and GDP down which leads to increase NPL and degrade financial stability. Estimated results show that correlation coefficient between RLE and GDP is -0.52 and the correlation of RLE and NPL are 0.63 which implies that prevailing high lending rate is distress for banking system.

An analysis of data on current account balance as percent of GDP showed a positive during FY06-FY11. Current account balance as percent of GDP reached positive 0.78 percent, on average, during 2000s from a negative 2.49 percent during 1990s. It is quite a good position for facing financial vulnerability in future. Estimated result shows that correlation coefficient between CAB and NPL is -0.72 which implies a good position or surplus in CAB leading to decrease NPL in banking system which helps financial stability.

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## Summary of Macro-prudential Indicators

<b>Aggregate Micro-prudential Indicators</b> Capital adequacy Aggregate capital ratio Frequency distribution of capital ratios <b>Asset quality</b> Lending Institution Sectoral credit concentration Foreign currency -denominated lending Nonperforming loans and provisions Loans to loss making public sector entities Risk profile of assets Connected lending Leverage ratios Borrowing entity Debt-equity ratios Corporate profitability Other indicators of corporate conditions Household indebtedness <b>Management Soundness</b> Expense ratios Earnings per employee Growth in the number of financial institutions <b>Earnings and Profitability</b> Return on asset Return on equity Income and expense ratios Structural profitability indicators <b>Liquidity</b> Central bank credit to financial institutions Segmentation of interbank rates Deposits in relation to monetary aggregate(M1, M2) Loans –to-depositors ratios Maturity structure of assets and liabilities (liquid asset ratios) Measures of secondary market liquidity <b>Sensitivity to market risk</b> Foreign exchange risk Interest rate risk Equity price risk Commodity price risk <b>Market based indicators</b> Market price of financial instruments, including equity Indicators of excess yields Credit ratings Sovereign Yield spreads	<b>Macroeconomic Indicators</b> Economic growth Aggregate growth rates Sectoral slumps <b>Balance of payments</b> Current account deficit Foreign exchange reserve adequacy External debt(including maturity structure) Terms of trade Composition and maturity of capital flows  <b>Inflation</b> Volatility of inflation  <b>Interest and exchange rates</b> Volatility of interest and exchange rates Exchange rate sustainability Exchange rate guarantees  <b>Lending and asset price boom</b> Lending booms Asset price booms  <b>Contagion effects</b> Trade spillovers Financial market correlation  <b>Other factors</b> Directed lending and investment Government recourse to the banking system Arrears in the economy
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Source: Evans et al (2000), IMF Occasional paper-192, p- 4



# Emergence of Islamic Banking: Why and How?

Afzalul Haq 1

## Abstract

The article unveils the circumstances which led to emerge Islamic banking and finally comments on its future. Basically Islamic banking is the outcome of the efforts to materialize the concept of 'banking without interest'. In today's global society, economic life is absurd without banking which is fundamentally based on interest. But interest is prohibited in Islamic life. This dilemma caused the emergence of Islamic banking as an alternative discipline. Initially Islamic banking drive was confined within mere designing of different interest-free modules as alternatives to corresponding conventional banking products. At least some of those modules are now seen producing better result than those of traditional banking in terms of resilience, justice and distribution of wealth. Recent growth trend of Islamic banking is also excellent. All these indicate a bright business future of Islamic banking. But business success is not enough. Eventually to fulfil Shariah objectives of Islamic economics as a whole, Islamic banking must do more including gradual enhancement of PLS or profit loss sharing based activities.

## Introduction:

Human civilization has evolved banking as an integral part of Economics since long. Of late, correspondingly, Islamic banking has also occupied its position in Islamic economics. Nowadays many academic curricula contain Islamic banking as an alternative to conventional or traditional banking. But with reference to the genesis of banking and that of Islamic banking, we must admit that conventional banking has got much longer history. Naturally the former has also passed through many more phases of evolution than Islamic banking. As evident from history as well as different texts on economics, 'interest' has been a very important issue therein. And undoubtedly banking has emerged as an industry basically based on this very concept of interest.

But Islamic code of life suggests an economy free from interest because the Quran directly prohibits it. Naturally in the economic theorem of Islam, there remained no room for interest and therefore no banking module was dreamed or visualized in Islamic economics. As the idea of banking was conceived on the basis of the very philosophy of interest, the former (banking) must not be referred to have ever belonged to Islam or the Islamic society. As rooted from the concept of interest, banking is certainly a creation of conventional economics.

On the other hand although banking did not prevail in the early days of Islam, different business modules (of Islamic economics) were available in the Islamic society since long.

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Some of those modules or modes were subsequently adopted in Islamic banking as well. That adoption was accomplished for the sake of avoiding interest of modern banking. Those modes were in the use of the ancient Islamic society, as different forms of practical business, trade and mercantile or commercial ventures. Even our last prophet Muhammad (pbuh) himself was also engaged in some of such businesses. But we cannot term any such business as banking of today.

### **Methodology**

This paper is a small harvesting of the intakes the author has so far received by way of his study and review of different literature on Islamic Economics, Banking and Finance. The study of such human written literature has been reconciled with the study of the divine Quran, Hadith and their commentaries. Recently studied few such books & journals have been named in the References of the article. Finally the academic intakes have been reconciled with the author's practical experience in different banks and financial institutions the first one being Islami Bank Bangladesh Ltd. Association of the author with the Islamic banking leaders and resource persons has also given indirect input in the article through their interaction in formal, informal, national and international seminars symposia and road shows etc.

### **Objectives**

The core objective of the study is to pinpoint the circumstances which caused the emergence of Islamic banking as an alternative discipline. To achieve this prime objective, the study covers the following objectives:

- i) To portray the scenario that has led the pious people to be associated with the banking industry.
- ii) To unearth the turning point that has moved the concept of 'Not to bank' towards 'Bank without interest'.
- iii) To give a focus on difference between Interest and Profit.
- iv) To see how interest based transactions of conventional banks have gradually been restructured into non-interest transactions.
- v) To indicate the inherent strength and beauty of Islamic banking vis-à-vis objective of Shariah vs Islamisation of the methodology for Shariah compliance.
- vi) To apprehend future of Islamic banking.

### **Genesis – Banking VS. Islamic Banking**

If we look for the origin or background of Islamic banking, we must have a peep into the genesis of 'banking in general'. Primarily banking was merely a process of lending and borrowing of money. Perhaps the process originated in the hands of goldsmiths, merchants and Mahajans or any such affluent class of the society. Through evolution, it attained the institutional shape to bridge between the lender and borrower. Banking as of today is nothing but a corporatised, refined and extended shape of that intermediary function. However, at present, banking also encompasses many other ancillary services. Those services were subsequently adopted in banking according to the gradual demand of the day.

If we talk of corporate form of a banking institution, as we understand it today, Islamic banking had never been a visible parallel organisation to conventional banking until, say the latter half of the last century. So it is very important to study the circumstances which necessitated the emergence of Islamic banking as a separate discipline. As the study reveals, we must recall those religious people who used to mark their erstwhile bank accounts with a noting of 'No-interest'. Many people were rather beyond the purview of banking channel for long, to save themselves from falling into the religious curse. Banking and Islam were then treated mutually exclusive. Adopting one of them automatically rejected the other. Thus the two words namely bank and interest became synonymous.

### **Turning point**

In course of time, banking emerged as a very important activity of human civilization. Gradually taking part in banking activities became essential to remain associated with the economic wheel of the modern global village. Banking thus appeared as the part and parcel of human livelihood. Such an emerged importance on banking activities made that pious group change their earlier view of refraining from the purview of banking. They then rather thought it better to get associated with the global finance industry; but obviously not at the cost of religion. Consequently, instead of banking in general, interest was particularly targeted as the vital issue to address. Prohibition of interest in Islamic life then turned their concentration exclusively to interest instead of banking at large. 'Not to bank' concept was thus revised as a move to 'bank with religion' or 'bank without interest'.

As the prime source of income of a bank is interest, and interest arises from loan / lending & borrowing, loan transactions of conventional banking were identified first. Then it was decided that loan transactions must be avoided as a way of earning in religious banking. So lending system was required to replace by any other permissible mechanism. It is worth mentioning that other subsequently extended ancillary functions and non-funded business activities of modern banks were initially set aside in the secondary tier of the drive to make 'banking without interest' possible. These activities were regarded as non-prime issues because interest as a direct element, was absent from most of those ancillary services. It was also perceived that loan or 'qard' might exist in interest-free banking only as an exceptional case i.e. as a non-business and non-earning benevolent transaction.

From another aspect it has also been viewed that banking has emerged as a business; a commercial venture. Now, to save a target group from interest-income, banking must not be transformed into a non-business charitable organisation. Interest-free banking must not mean cost-free, income-free banking. Rather banking is to remain a business or commercial organisation; but that business must be based on Islamic fundamentals. A business would naturally have an expectation for a permissible return. Then the question came, in Islamic banking business, what return to expect, instead of interest? Very logically 'profit' was identified as the first solution to replace interest. That idea necessitated differentiating between interest (riba) and profit.

### **Interest vs. Profit**

The difference between interest and profit thus came into discussion at large on many occasions. The issue also got place in many a text on Islamic banking, Economics, Finance as



well as other socioeconomic and religious studies. A synopsis of outcome of such studies and researches to differentiate between 'interest' and 'profit' is portrayed in the following paragraphs.

Interest in the Quranic language is 'riba'. Naturally it is an Arabic word, which literally means excess, addition or increase etc. As a religious jargon, riba denotes an excess or addition related to loan. Expressed in another way, we may say that in English riba is called interest, which is defined as a charge on borrowed money. Purview of interest covers simple interest, compound interest and exorbitant interest or Usury as well. Interest implies a predetermined positiveness or mandatory increase from a deal in money.

On the other hand, 'Profit' is an English word. Profit means an advantage or benefit, financial gain or an excess of returns over outlay. Profit is the money gained in business or from selling something for more than its original cost and/or 'an excess of income over expenses'. Prominent dictionaries also define 'profit' in the similar terms. For example,

Oxford Advanced Learner's Dictionary of Current English by A.S. Hornby defines Profit as 'the money that you make in business or by selling things, especially after paying the cost involved.'

Chambers 21st Century Dictionary defines Profit as 'the money gained from selling something for more than its original cost' and/or 'an excess of income over expenses.'

A deal exclusively in money, known as a financial transaction, is not enough to result in a profit. There must be a real transaction. That is, to enable a deal to generate profit, there must be an underlying asset related to that deal. When the concept of profit enters into the realm of business it must get the shape of an equation. The equation is 'Profit = Revenue minus Cost'.

Thus a profit may possess any sign. Negative profit, if any, is termed as loss. So, profit is the result or outcome of a venture, business or trade etc. Outcome of a business is naturally expected in the positive form of profit; but both way i.e. positive or negative (loss) is practical.

So unlike interest, profit does not originate from the money per se. Profit originates from a venture where money is used as equity or capital i.e. as a factor of production. When money gets the form of capital or investment, it bears the expectation of reward (profit) and at the same time the risk of incurring loss as well. Profit results from equity sharing and/ or trade and hence permitted by Shariah but interest is not. The Quranic verse is '...And Allah has permitted trade and forbidden interest ...' (Sura Baqara: 275).

### **Divergent views on bank interest**

In the meantime, before the above conclusion on interest and profit was arrived, a fresh controversy raised on the issue. Scholars were divided as to whether bank-interest at all to fall within the prohibited 'riba'. Thus an apparent divergence of thought emerged on the issue. One group was of the opinion that riba must include all sorts of interest irrespective of their any qualified terms like low, high and/ or for commercial or consumption purpose etc. The other group argued that at least a few specific type of interest, like bank-interest, must remain beyond the purview of Quranic prohibition of riba. The latter also tried in particular, to

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establish the religious base for justification and hence to legalize bank-interest. Although they firmly believed that riba was completely haram (forbidden), they did not agree that bank-interest would also similarly be a forbidden item. Some of their key arguments to keep bank interest beyond the purview of Quranic riba are as follows:

- i) Bank interest has reduced the exorbitant (say 10% per month i.e. 120% per annum) rate of interest prevailing in the erstwhile informal / individual sector. Thus bank interest has rather relieved the society from unbearably high rate of mahajani interest.
- ii) Only the compound interest and exorbitant interest or usury are prohibited in the Quran. So simple interest and/or low interest of bank would not be regarded as prohibited one.
- iii) Bank borrowing is substantially used in the commercial sectors resulting in increase of the GDP (Gross Domestic Product) for benefit of the mass people of the country. Such a good deed must be permissible.
- iv) Banks are approved or licensed by the government and hence cannot be outright ignored. Bank interest is also unavoidable in the modern society. Religion cannot bar an unavoidable action or item.
- v) Differential or subsidized (rates of) interest, specially meant for weak sector or a distressed group, targeting welfare must not have been adjudged unjust or unlawful by the religion.
- vi) Interest within the range of inflation rate is rather a justice to the lender/ creditor in consideration of purchasing power or time value of money.
- vii) Intergovernmental interest-based loans are not supposed to be harmful or unjust, although individual or personal deals may have the scope to cause harm to each other.
- viii) Charging interest on rich borrower is not unjust and so on.

All such arguments to legalize bank interest continued for quite a long period. The arguments were placed from personal levels to institutional, national and even to the global (such as the OIC, Organisation of the Islamic Cooperation) periphery. The scholars who believed in the unconditional prohibition of interest (including that of the banking sector), acknowledged the possibility of doing any isolated material good deeds by way of dealing with bank-interest. But at the same time they opined that no such plea of doing welfare could at all suffice to overrule the Shariah prohibition of interest.

#### **Global consensus on unconditional prohibition of interest**

The Quran declared interest unconditionally prohibited. Had it been desired, the Quran could make the prohibition of interest conditional. For example, there are so many 'if's in the Quranic verses which derive the rules of inheritance / succession as outlined in Sura Nesa (verses 11-12 ). These are in fact different conditions to determine how much of a deceased asset each successor will get under different circumstances. But prohibition of interest is not subject to any such condition. So mere human arguments cannot make a revealed prohibited item of riba permitted (halal) on any plea. The scholars, however, brought all the arguments of the opponents under threadbare analysis and frequent review. Then they reached the consensus that interest must have been unconditionally prohibited as directed by the Quran, the prime source of Shariah (Islamic jurisprudence).



Yes, there are some people who do not yet believe that bank interest is also prohibited. But any such view or opinion is now considered extremely personal and mere a one-sided or cornered opinion. Any such inference is strongly separated from the mainstream consensus and hence treated as an exception. The global convergence of the concerned scholars confirms the unconditionality of prohibition of interest. Moreover, *riba* and interest are only the word meaning of each other in Arabic and English. They must not be differentiated. And interest must have been prohibited irrespective of its low or high rate, its usage for consumption or commercial purpose, be it applied in inflationary or non-inflationary economy, exercised personally or institutionally and so on. This has been the official verdict of the contemporary leading Islamic scholars.

Finally with the consensus of the OIC countries, particularly through establishment of the IDB (Islamic Development Bank) in 1975, it was globally concluded that bank-interest should also fall within the purview of *riba*. The OIC's official definition<sup>1</sup> of Islamic bank has made a clear indication that an Islamic bank must be devoid of interest. Had the bank interest considered permitted in the definition given by the OIC, there must not have been any commitment to ban the same in any operation of an Islamic bank. Their definition clearly indicates the ban of interest in Islamic banks. Therefore, interest must be avoided irrespective of the sectors where it originates from or wherever the concerned fund is used in. Thus the concept of interest was globally clarified and disseminated among the stakeholders.

Thus few but very essential things were made clear. Firstly, profit is entirely unlike interest. Secondly, for prohibition purpose there is no difference among *riba*, interest and usury. Thirdly, bank interest is also haram as prohibition of interest in the Quran is unconditional. Finally it was also clarified that one need not leave religion to remain with banking i.e. banking could be possible without interest. This clarification initiated collective drive to also replace bank interest by profit. The drive suggested turning the loan transactions of conventional banks into equity sharing ventures to earn profit instead of interest.

### **Drives to design alternative module of banking**

An alternative module of banking then started designing. Under this module, banking transactions no more remained in the form of borrowing and lending. Rather money should flow as capital or equity and have a form of partnership between the religious bank and its clients. Those clients may belong to any side of the bank's Balance Sheet i.e. asset client and/or deposit client. On the deposit side, the depositor would get share of income the bank earns by utilizing the former's fund. Similarly on the Asset side, loans (financial transactions) were also converted to capital. That is, Islamic finance would mean to make investment in the form of partnership or equity finance. On the asset side, however, other few ways to finance were also initiated. One such way was to convert the loan or debt transactions into real transactions, backed by underlying asset. Such an idea developed efforts to convert or restructure conventional interest based loan transactions, broadly into either of the two ways. Firstly, to transform financial transactions (debt finance) into real (asset backed) transactions. This transformation includes i) Trade finance (through buying & selling) and ii) Lease finance or renting of non-fungible<sup>2</sup> assets. Secondly, to adopt equity finance investment or profit-loss sharing partnership business.

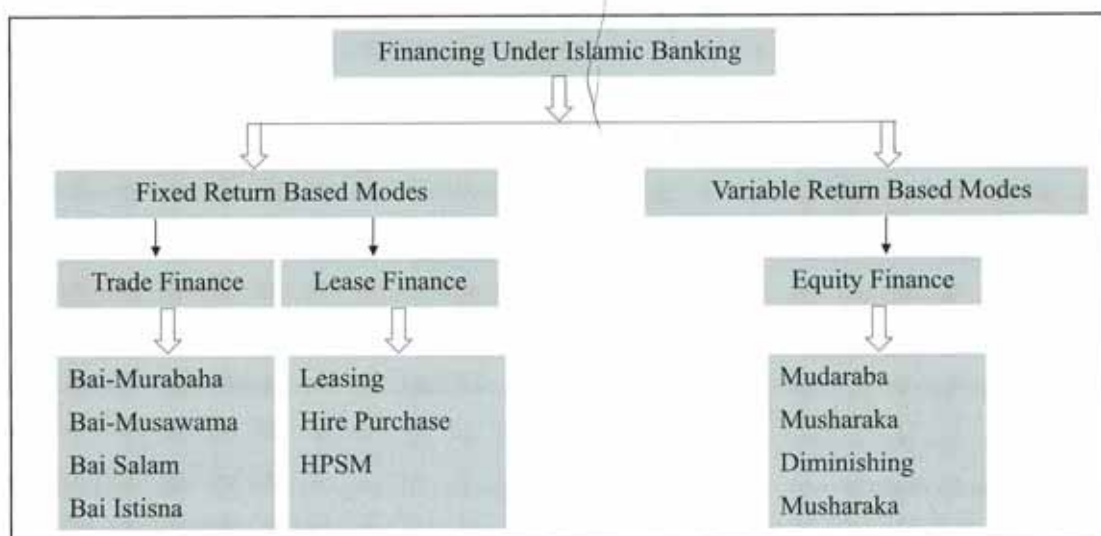


## Financing modules

Lending function of conventional banking, based on interest earning, was restructured having, among other forms, the following avenues for application of fund:

**In a nutshell major financing modes under Islamic Banking are :**

Bai Murabaha (Sale on disclosed profit): Bai means trading or sale. Murabaha means profit (i.e. cost plus). So Bai-Murabaha means sale at a profit or it is a mark up sale. It is thus a trade on cost-plus concept. Under this mode, bank sells goods (as opposed to money) at a profit to its particular client. Here the seller (bank) must declare the amount of cost of the goods and profit thereon distinctively. Again under murabaha, sales price once fixed cannot be changed / enhanced afterwards for extension of time for repayment, if any



Bai Musawama<sup>3</sup> (Sale without reference to cost price): In a sale, if the mandatory stipulation of declaration of profit amount is waived (or not asked for) unlike Murabaha, it is called the 'Musawama' sale or Bai-Musawama. Most of our day to day shopping (say in the shopping malls) fall under Bai Musawama mode of transaction. An Islamic bank uses this mode, where it does not or cannot disclose the applied profit or mark up for any reasons what so ever.

Bai Salam (Sale on Advance payment of price): It is a trade whereby the seller undertakes to supply some specific goods to the buyer at a specific future date against receipt of advance payment. Thus under Bai-Salam, the price is paid on spot (advance) and delivery of goods is deferred. Islamic banks use this mode of investment in some specific sectors including agriculture. Bai Salam is also called Bai –Salaf.

Bai-Istisna (Advance sale of items to manufacture): Bai Istisna is also a kind of sale on advance payment like Bai Salam. But there are some specific differences between the two. The subject of Istisna is always a thing which needs manufacturing while Salam can be applicable for anything, no matter whether it needs manufacturing or not.

Lease, Hire Purchase and HPSM (Hire Purchase under Shirkatul Melk or Equity participatory Hire Purchase): Among rental based finance, the common ones are Lease and Hire Purchase.

Arabic terms of them are 'Ijara' and 'Ijara – bil – bai' respectively. Although both of these mechanisms of financing have been allowable in Islamic banking (if customized for Shariah), in Bangladesh a new hybrid product has been designed and it is named HPSM. This mode is a synthesis of some features of Hire-Purchase and some features of a specialized partnership called Shirkatul Melk. Mudaraba (Partnership between equity and skill / labour with profit-sharing agreement): In Mudaraba investment, bank is the provider of fund and the client is the manager of fund. The provider of fund is called Saheb/ Rab Al Maal and the manager of fund is called the Mudarib. Profit of the business is distributed between the two, according to a pre-determined ratio. Genuine loss, if any, is to be borne by the bank as the sole provider of the fund. It is therefore called profit sharing mode.

Musharaka (A partnership agreement to share equity and profit & loss): Musharaka investment is a partnership or joint venture where bank and the client both provide fund in equal or unequal proportion and share profit as per agreed ratio. Genuine loss, if any, is borne by the partners according to their capital ratio. It is called profit loss sharing or PLS mode of investment.

Mudaraba and Musharaka are the modes of Investment where the concept of 'Risk and Reward of Ownership' becomes transparent. This is why under these modes of investment the genuine loss of business, is compulsorily borne according to the capital ratio of the parties concerned irrespective of any other terms and conditions of the business.

Diminishing Musharaka: This is one of the varieties of Musharaka. It is a sort of venture capital. Under this mode, the share of a party (out of two or more) of the partnership gradually diminishes paving the way to the other party /parties to exclusively own the business.

### **Deposit collection modules**

Any one of the above mechanisms, so far discussed, may be applicable only when bank plays the role of the provider of services or it lies at the paying end. But as in the role of recipient, a bank can neither receive a trading commodity nor can it receive other capital goods or non-fungible items. Rather deposit to bank, for the purpose of business (as opposed to custodian through Locker service) means deposit of money only. So in deposit collection (as opposite to financing/ lending function), Islamic banks have designed the following mechanisms:

1. Al-Wadiah (As substitute of Current Account)
2. Qard (As another substitute of Current Account)
3. Mudaraba (As substitute of all interest bearing deposit Accounts)

Al-Wadiah: Islamic banks operate Current Accounts on the principle of Al- Wadiah. Under this principle an Islamic bank commits to refund money deposited with such accounts on the demand of customers. On the other hand, the bank takes authorisation from customers that the bank may utilize their money. Customers do not bear any loss in respect of any such account.

Qard: Islamic banks may also collect Current Account deposits on the basis of Qard Hasan. According to Shariah principle of Qard Hasan, money deposited in such an account is a benevolent loan from the depositor to the bank. As such unlike Al Wadiah, in case of Qard the bank need no authorisation or any specific permission of the depositors to use the borrowed fund. The bank owes the client only the principal amount borrowed.



Mudaraba: In case of practising Mudaraba, as a mode of collecting fund the bank receives deposits from the depositors with the authority that the bank will have exclusive right to manage or invest the fund. Profit resulting from deployment of such deposits is shared between the bank and the depositor at a pre-agreed ratio. Loss (if any), not resulting from the negligence of the bank or any of its representative, is to be borne by the depositors. In Islamic Banking Savings, Special Notice, various Term deposits and deposits under different Schemes are conducted on this principle.

Each mode or mechanism that has been adopted in Islamic banking (be it either as a source or application of fund), has got specific rules and regulations to be complied with in the light of respective aspects of Shariah. An Islamic banker must, therefore, be conversant with the modus operandi and stipulations of the concerned modes of Shariah. This is essential because those transactions actually run according to their respective original discipline, where they are adopted from. Those modes may come from different bai or trade and/or other business concerned.

#### **Alikeness of Interest and Profit**

It is worth mentioning that operation of asset-products (lending) of Islamic banking in most of the cases, cannot demonstrate the visible difference between Islamic banking and the Conventional one. Failure of an Islamic bank to often explicitly demonstrate its distinction mainly lies in dominance of its fixed return based methods (Murabaha and Leasing/ Hire Purchase) over variable return based equity finance (Mudaraba & Musharaka) methods. Fixed return based Islamic modes often make confusion among the stakeholders and as such the question of alikeness or resemblance of profit and interest is raised by different quarters.

#### **Beauty of Islamic Banking and ISR method of profit distribution**

On the other hand, when we point at the Liability (borrowing) side, particularly in deposit mix of any Islamic bank, there is substantial dominance of sharing (Mudaraba deposit) method. By virtue of yielding variable return, (linked and proportional to the bank's income), this Mudaraba principle of collecting deposit may be the milestone to show the difference and the inherent beauty of Islamic banking. This is because variable return on Mudaraba deposit makes stronger sense of rationale and justice over the predetermined fixed rate of interest (irrespective of the profitability of the bank) of Conventional banking.

So, as far as the Mudaraba deposit product is concerned, the cost thereon (i.e. the rate of profit on Mudaraba deposit) must not be a predetermined fixed rate. It is a fully dependent variable. So, to find the cost of deposit under Mudaraba contract, it needs a two tier calculation. Income or revenue derived from deployment of the concerned deposit is to workout first. Only then it is possible to finally arrive at the emerged Rate of Profit for the fund provider. Thus the cost of Mudaraba deposit, in Islamic banking is an output as opposed to input (as in case of a Conventional bank). We, therefore, demonstrate the cost of mudaraba deposit as a function of investment income. Mathematically it is

$DC = f(I_R)$  where,

$D_C$  = Cost of Mudaraba Deposit,

$f$  = function of (dependent on) &

$I_R$  = Revenue (or income/ yield) from Investment.



Islamic bank's cost of Mudaraba deposit ( $D_c$ ) is presented to the Mudaraba depositors as their profit on concerned deposit. This cost on the part of bank, is correspondingly profit on the part of the depositors. IR is the gross return of the bank, earned from deployment of the Mudaraba deposits.

This equation establishes the direct relationship between the profit on a client's deposit and the bank's yield earned by deployment of that deposit. For bank, it is like 'Pay as you earn.' For example, let the function ( $f$ ) is defined simply as the product of (i) income sharing ratio or  $ISR^4$  between the bank & depositor and (ii) bank's investment yield. The ISR for different types of depositors may vary. A simplified hypothetical different ISR may be as follows:

**Table-1 : Income Sharing Ratio (ISR) For Different Mudaraba Depositors**

Types of Deposit	ISR (Depositor: bank)	ISR Defined As		Total
		Depositor's Share	Bank's Share	
Mudaraba SND	30:70	30%	70%	100%
Mudaraba Savings	60:40	60%	40%	100%
Mudaraba Term	80:20	80%	20%	100%

Table-1 above reveals that if an Islamic bank earns Tk.100 by investing the Mudaraba SND Deposit, the bank would distribute Tk.30 as profit to the concerned depositor and retain the rest Tk.70 as the bank's share. If the bank's fund is from Mudaraba Savings account, then the deposit would earn a profit of Tk.60. In case of Term deposit, the depositor would be entitled to profit of Tk.80. Corresponding retention of earning by the bank would be Tk.40 and Tk.20 for Savings and Term deposits respectively.

Practically bank earns from the pool of combination of funds of all types of deposits. Let us assume that the aggregate yield on Investment<sup>5</sup> of the bank for a particular period is 16%. Then the rates of profit (as cost of deposit in the equation) for the above 3 types of Deposits for that period would arrive as under:

**Table-2: Calculation of Rate of Profit on different Mudaraba Deposits**

Types of Deposit	Yield Rate	Depositor's Share	Rate of Profit (Cost) on Deposit
1	2	3	4= (col.2× col.3)
Mudaraba SND	16%	30%	04.80%
Mudaraba Savings	16%	60%	09.60%
Mudaraba Term	16%	80%	12.80%

Alternatively to express purely on mathematical terms we may just put the values in the equation to find profit rate on any sort of deposit. For example, the rate of profit on Mudaraba Savings A/c (with an ISR of 60:40 i.e. 60% for the depositors) would be

$$\begin{aligned}
D_c &= f(I_R) \\
&= \text{ISR} \times \text{Yield} \\
&= 60\% \times 16\% \\
&= 09.60\%
\end{aligned}$$

Thus we observe that cost of deposit (i.e. profit given on Mudaraba deposit) can visibly differentiate Islamic banking from its Conventional counterpart. In Conventional, it is prefixed interest rate; but in Islamic banking, cost of deposit can never be an independent variable and as such must not be predetermined. It is variable, dependent on the bank's yield / income. A single characteristic of cost of Mudaraba deposit being the function of investment income or yield can be treated as the 'Litmus-test' for judging authenticity of practically complying with Mudaraba principle by any Islamic bank.

### **Adoption of different business modules from other fields of Islamic Economics**

Let us now talk of the asset side issues of an Islamic bank. Financial transactions of loans of conventional banks are also converted into capital or equity finance to make the related transaction shariah compliant for Islamic banks. This is also done from the same spirit to share income between the bank and the client. In fact this is the main theme or essence of Mudaraba or profit sharing concept of Islamic banking, be it as a source or application of fund. As stated earlier some other permissible ways to finance are also adopted by Islamic banks. One such way is to make real transactions like trade, instead of loan or debt transactions. Each of such real transactions has got specific *modus operandi* adopted from the respective discipline of Islamic economics. Of course, there has been customization of the features while practising those in the banking arena. This customization has been imperative because those modes are in fact hired or adopted from other fields (not banking). Concerned *modus operandi* therefore must follow their respective original discipline of business or trade of Islamic economics.

### **Primary achievement vs. spiritual foundation of Islamic Banking**

Achievement of the drive for Islamic banking primarily lies in washing out or gradually abolishing 'interest' in the realm of alternative banking. Interest-free banking is typically called Islamic banking. Yes, a bank to be truly Islamic, it needs to possess other qualities; but the most essential criterion is to be free from interest. It is also true that initially Islamic banking was a project to make 'banking sans interest' possible; not to make it superior or competitive even. Alternative modes were designed or adopted just to avoid interest. Out of such alternatives as stated above, the asset-based real transactions (as opposed to mere financial transaction) and profit-loss sharing features (as opposed to fixed interest based method) of Islamic banking transactions, have by this time, been adjudged as better alternatives. Equity finance of Islamic banking transparently differentiates. Any mode of equity finance also exhibits the inherent beauty of Islamic Banking. This beauty is demonstrated by virtue of its yielding variable return, as opposed to the predetermined fixed rate of interest in conventional banking.

If this equity sharing concept of Islamic economics can be properly applied accompanied by adequate legal support, it is very likely that gradually Islamic banking would enter into the mainstream. The growth rate of Islamic banking for the recent decades indicate the rising



trend of gradually increasing its stake in the total banking. Islamic banking can bring about a new paradigm of justice and equity in the society through operation of profit loss sharing based business modules of equity finance. In fact sharing mechanism is the generic term of true Islamic banking, where Mudaraba and Musharaka products can be treated as its organic or indigenous products. They may, however, be surrounded by derivatives like HPSM and bai or other trade-based products.

Again, although profit-loss sharing is the main spirit of Islamic banking, some other fixed return based methods occupy the lion's share of the assets of any Islamic bank. There is no harm in using different systems or modes under the single umbrella of Islamic banking, provided that the individual modes or methods are treated with their respective extreme independence. A variable-return-based mode of finance should not be compared to a fixed return based one. They are independent ones. So, again a trait of a fixed return based method would not be expected from the variable return based one and vice versa. Similarly a specific character or feature of a fixed return based mode must not be pushed into a variable return based mode. For example, Mudaraba (Strictly a variable return based mode) depositors must not be offered a fixed rate of return in any way. Any such practice shall virtually kill the spiritual foundation of Islamic banking.

### **Conclusion and future of Islamic Banking**

Although we must admit that Islamic banking is derived by way of intensive screening (mainly for avoiding interest) from the conventional banks of today, all the conventional modes need not to be essentially imitated and cultured in the realm of Islamic banking. Because in doing so, if there is any fundamental deviation from Shariah, on the plea of market demand to satisfy all the existing clients of the conventional banks, it may cause the ruin of the spirit. Extreme imitation of conventional modes merely with labels of Shariah compatibility may be enough for business success. But in terms of maqasad or objective of Shariah, dominance of profit loss sharing or PLS modes is essential.

In the backdrop of global financial meltdown since 2007, we have already experienced the comparative resilience of conventional banking and Islamic style of banking worldwide, as commented even by the Vatican. Final fate of Islamic banking depends to a great extent on the quality of the people who are entrusted with the responsibility to implement the system. Ideally Islamic banking is a value-based and ethically guided financial operation. So it demands strict adherence to the rule of 'principle to override or prevail over practice'. Islamic banking players must simultaneously deserve both, credit for fair play and / or discredit for infringement. Future is the Judge to evaluate the superiority between Conventional and Islamic banking. In the meantime both will run on their respective ways.

(Opinions expressed in the article are exclusively of the writer himself and not necessarily of the organisation he is serving)

### **Foot Notes**

1. The OIC defines Islamic bank as "a financial institution whose statutes, rules and procedures expressly state its commitment to the principles of Islamic Shariah and to the banning of the receipt and payment of interest in any of its operations."



2. A non-fungible asset means an asset that can be used more than once and service thereof can be separated from the asset/s itself. For example, a car being non-fungible can be used more than once, but its CNG or fuel as a fungible item cannot.
3. Bai Musawama investment is not named in the practices of Islamic banking in our country. Instead, such an investment is rather widely termed here as Bai Muajjal. Literally muajjal means to defer and thus bai muajjal is a sale on credit, as opposed to sale for cash or spot payment. But to differentiate from Murabaha such a mode should rightly be termed as Bai Musawama. Because a Murabaha (for declared profit) can simultaneously be Muajjal (for deferring payment). So, differentiation between Murabaha and Muajjal does not make any sense. Obviously differentiating between Murabaha referring to cost and Musawama i.e. without reference to cost makes better sense.
4. The ISR or income sharing ratio is the proportion of distributing earning of a bank between the bank and the depositor. In fact sharing ratio is the essence of equity finance i.e. Mudaraba and Musharaka. Such a ratio is the basic principle for distribution of profit among the partners of any Mudaraba or Musharaka venture. The ISR does not mention any rate of profit on the deposit or capital. It is only a proportion of the yield to allocate between parties concerned.
5. We must bear in mind the wider purview of the term Investment in Islamic banking operations. Besides deployment of fund in Shares and Securities, as confined in the conventional definition of investment, most of all other means of financing also come within the purview of investment in Islamic Banking. All items taken together under the heads of Credit/ Loans & Advances and Investment in a Balance Sheet of a traditional bank are substituted by a single common term of Investment in case of an Islamic bank. In Islamic banking, all these are commonly known as investment. Only a few additions like Qard may be exceptionally apparent beyond the purview of investment in a Balance Sheet of an Islamic bank.

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## **Introduction to Bangladesh Bank Training Academy (BBTA)**

Bangladesh Bank Training Academy (BBTA) is a training wing of central bank of Bangladesh. Bangladesh Bank pursues tasks of capacity building and human capital development in order to prepare skilled human resources in central bank as well as for commercial banks. BBTA organizes different training courses, training workshops, conferences, seminars and other related activities on main topics of economics, banking and finance, financial sector development, human resources development and macroeconomic management. It was established in 1977.

### **BBTA's Mandate**

The purpose of the Academy is to undertake training activities for enabling the officials of central bank and the banking sector to perform their jobs efficiently well-equipped with the latest knowledge of economic, financial and banking developments. To this end, BBTA extends its all-out efforts to facilitate training to personnel engaged in the financial sector. It also works to modernize its library and information center to collect, systematize and disseminate information in the financial arena. Recently, a plan has been adapted to reorganise BBTA library as a Knowledge Management Centre (KMC). This new role puts more weight on BBTA for knowledge creation and application. Since information is important to create new knowledge for educating staff and professionals, we hope that it would contribute to the creation of knowledge and disseminate knowledge for use by others.

### **BBTA's Strategic Objectives**

Bangladesh Bank has adopted its 5-year Strategic plan 2010-2014 and bestowed responsibilities upon BBTA (Strategy # 13, Objective 13.2) to adopt all-out efforts to enhance professional excellence and grooming of the officers of Bangladesh Bank. To fulfill the target of the plan document, BBTA has been employing its full capacity to providing need-based training to the officials both from central bank and commercial banks; continuously striving to diversify the contents of its courses in order to ensure their consistency with evolving training needs; facilitating the practical application aspects of knowledge of economics, banking and finance; and developing training as a scientific discipline.

In order to achieve the above mentioned strategic objectives, BBTA has introduced the following initiatives.

1. Building and enhancing training capacities of the trainers;
2. Improving quality, efficiency, impact and cost-effectiveness of training programs;
3. Linking training with real-world cases and experiences;
4. Building training partnership programs with the public and private sector domestic and overseas training institutions;

5. Building and maintain the BBTA financial institutions information system;
6. Utilization of the Internet for dissemination of the Academy's biannual Journal 'Thoughts on Banking and Finance';
7. Building a database on trainers and training institutions in the field of banking and finance; as well as
8. Facilitating the digitization of BBTA documents.

### **Organization**

The Executive Director is the head of the Academy. There are six wings to look after the administration, training and research programs of the Academy.

### **Location**

The Academy is located at Mirpur, Dhaka, Bangladesh.

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