

Financial Development–Economic Growth Nexus: A Case Study of Bangladesh

by

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I. INTRODUCTION

The existence of correlation between financial development and economic growth is well established by the theoretical as well as empirical evidence. The presence of correlation between financial development and economic growth is initially articulated by Gurley-Shaw (1955) followed by Goldsmith (1969), McKinnon (1973) and Shaw (1973). Gurley-Shaw (1955) provided convincing evidence of co-evolution of the real and the financial sectors without attributing any specific direction of causation which is again confirmed by Bencivenga-Smith (1998). Goldsmith (1969) also finds evidence of strong correlation between financial development and economic growth in his cross-country study. McKinnon (1973) and Shaw (1973) advocate financial liberalisation based on the belief that it will increase savings as well as real credit supply which will in turn induce a higher volume of investment and faster economic growth (Dixon 1997, p.752). Evidence of strong correlation between financial development and economic growth in these studies convincingly established a hypothesis that a well-developed and better functioning financial system supports faster economic growth.

To examine the prediction of the hypothesis that in the long-run financial development results higher investment and output growth, this study investigates the finance-growth nexus in Bangladesh during 1976-2005 based on a long-run structural vector autoregressions (SVARs) model specified by Blanchard-Quah (1989). Under the long-run SVARs model, it is assumed that financial development has long-run impact on investment and income per capita. When an economy starts to grow it creates immediate additional demand for financial services and helps grow a better financial system. At this stage the positive impact of financial system on economic growth could be modest. As development proceeds, a better and well functioning financial system is established. A well developed financial system can contribute at a

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greater extent to income growth by reducing market frictions (including information and transaction costs), pooling risks, easing trade and contracts (Levine 1997, p. 691). With a view to examining the impact of the Financial Sector Reform Programme (FSRP), which was launched in 1990, on the causal link among the variables, the SVARs technique has been applied on three samples: (i) full sample period 1976-2005; (ii) pre-FSRP period 1976-1990; and (iii) post-FSRP period 1991-2005.

The rest of the paper is organised as follows: Section II outlines an overview of the financial development in Bangladesh and section III discusses the methodology of the study. Sections IV and V respectively analyse the identification restrictions and contain data analysis. Section VI discusses empirical results while section VII contains concluding remarks of the study.

II. AN OVERVIEW OF FINANCIAL DEVELOPMENT IN BANGLADESH

Financial intermediaries essentially involve in transferring funds in exchange of goods, services, or promises of future return. Development in the financial sector raises the overall efficiency of the financial institutions. As argued by Ross Levine (1997) that a developed financial system reduces transaction costs, information asymmetries, market frictions and pools risk. A well-developed financial system has been widely understood as a stimulant in accelerating economic growth by mobilising savings and facilitating investment in an efficient manner. As "financial development" lacks any precise definitions, following the practice of existing literature [King-Levine (1993a and 1993b), Levine (1997 and 1999), Levine-Zervos (1998), Beck-Levine-Loayza (2000a and 2000b)] some indicators of financial development may be used for effective policy formulation, implementation and evaluation. Accordingly, three alternative indicators of financial development, such as domestic credit to the private sector by banks to GDP ratio, total deposits to GDP ratio and broad money (M2) to GDP ratio for Bangladesh economy have been used.

Domestic credit to the private sector as a per cent of GDP (denoted by cr_y) is one of the popular indicators of financial development. It includes all the credit issued to the private sector by all financial institutions which gives the degree of financial intermediation and measures the financial resources provided to the private sector through loans and advances, purchase of non-equity securities, and trade credits. The second indicator of financial development is total deposits (demand plus time) as a per cent of GDP (denoted by dep_y) which is relatively broader measure of financial development as it includes all the liquid liabilities of the financial system excluding currency in circulation. A third indicator, broad money as a per cent of GDP (denoted by $m2_y$), is basically the liquid liabilities of the financial system in

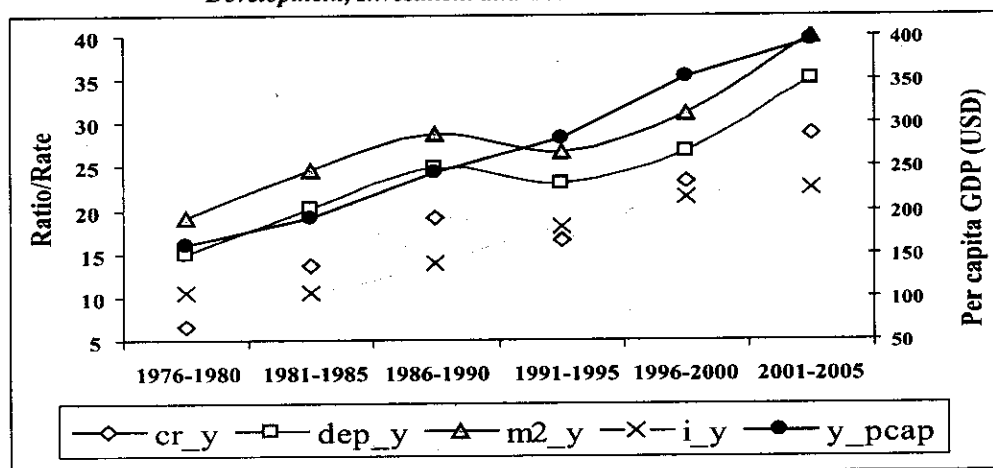
Bangladesh that includes currency plus demand and interest-bearing liabilities of financial intermediaries. This is the broadest measure of financial development and is considered to be a typical measure of financial “depth.” It also indicates the degree of monetisation with respect to the real economy.

The process of financial development in Bangladesh got its momentum through the financial sector reform started in the early 1980s. The banking arena of Bangladesh was in a state of disarray, particularly since its independence in 1971 as sequel to bad lending practices, which resulted in an accumulation of huge non-performing loans. The internal weakness of the system was not easily recognizable due to deceptive and artful accounting jugglery. Interest earnings were entered into in the books of account on an accrued basis, provisions for bad debt were highly inadequate. In the process, the capital base of the nationalised commercial banks (NCBs) was silently eaten up, posing threat to the stability to the financial system as a whole. To infuse competition in the financial system two banks were denationalised in 1984 and a number of new banks were permitted to operate in the private sector in 1986. At the same time, a National Commission on Money, Banking and Credit was constituted by the Government to identify problems and suggest remedies of the problems in the banking sector. The reform in the financial sector was needed to ensure safety, soundness and efficiency in the banking sector. Largely based on the experts’ suggestions, Government adopted a number of institutional and policy reform/liberalisation measures since 1989-90. These were aimed at liberalisation of deposits and lending rates and make them flexible to meet market needs with a view to improving allocation of resources, replacement of direct credit control with indirect monetary instruments, strengthening of prudential guidelines for bank supervision by the Central Bank, establishment of appropriate accounting policies including loan classification and provisioning, improvement in capital base of banks and strengthening the legal framework of debt recovery and regulations affecting financial institutions by improving regulatory power of the Bangladesh Bank, good governance of the public financial institutions, and efficiency of the legal framework.

With a view to investigating the historical overview of the above indicators of the financial development and its association with investment activities (measured by fixed capital formation as a per cent of GDP denoted by i_y) as well as per capita income (denoted by y_{pcap}), annual data during 1976-2005 are used. The data as presented in Figure 1 as well as in Table 1 show that all three indicators of financial development display steady increasing trend during 1976-2005, indicting widening and deepening of the financial system in Bangladesh overtime with a structural break in 1991. Note that the FSRP was launched in 1990 to shift the policy stance gradually towards indirect control. Prior to 1990, the policy was based on direct control over

various instruments, such as the volume and direction of credit and interest rates. Investment as a per cent of GDP and per capita income (in current USD) also display a similar pattern and move broadly together reflecting a close association among financial development, investment and per capita income during the period.¹

Figure 1
Trends in Some Indicators of Financial
Development, Investment and Economic Growth



It has been observed from Table I that the average credit, deposit and broad money to GDP ratios increase substantially from 6.6 per cent, 14.9 per cent and 19.0 per cent respectively in 1976-1980 to 28.8 per cent 35.01 per cent and 40.0 per cent respectively in 2001-2005, reflecting an overtime steady growth in financial deepening or financial development in Bangladesh. At the same time the investment-GDP ratio as well as income per capita also shares the similar up-ward trend during that period.

¹ This apparent graphical association does not necessarily imply any causal link among them. In view of justifying this association, however, a sophisticated econometric technique (long-run SVARs model) has been used in section VII and found the evidence of long-run causal link among financial development, investment and per capita income.

TABLE I
TRENDS IN SOME INDICATORS OF FINANCIAL
DEVELOPMENT, INVESTMENT AND INCOME

Period	lr	cr_y	Dep_y	m2_y	i_y	y_pcap
1976-1980	11.09	6.59	14.86	19.03	10.44	160.0
1981-1985	13.68	13.67	20.23	24.54	10.51	192.0
1986-1990	14.71	19.08	24.75	28.67	13.87	242.0
1991-1995	13.90	16.58	23.07	26.68	17.93	283.0
1996-2000	13.83	23.17	26.70	31.01	21.51	353.0
2001-2005	12.33	28.83	35.08	40.02	22.63	395.0

- Notes:**
1. lr = Weighted average annual interest rate on lending by banks.
 2. cr_y = Domestic credit to the private sector as a per cent of GDP.
 3. dep_y = Total deposits as a per cent of GDP.
 4. m2_y = Broad money as a per cent of GDP.
 5. i_y = Gross fixed capital formation (gross investment) as a per cent of GDP.
 6. y_pcap = GDP per capita at current US dollar.

- Sources:**
1. On-line version of International Financial Statistics (IFS), IMF.
 2. World Development Indicator CD ROM 2003, World Bank.
 3. Annual Report and Economic Trends (various issues), Bangladesh Bank and
 4. Authors' estimates.

The scatter-plots for the various indicators of financial development vs. investment-GDP ratio and income per capita have shown in Figures 2 through 4. The scatter-plots of the three indicators of financial development vis-à-vis investment as well as per capita income strongly support the existence of co-movement between financial development and economic activity (Figures 2 and 3). Besides, almost a linear relationship is observed in another scatter-plots diagram between investment-GDP ratio and per capita income (Figure 4).

Figure 2

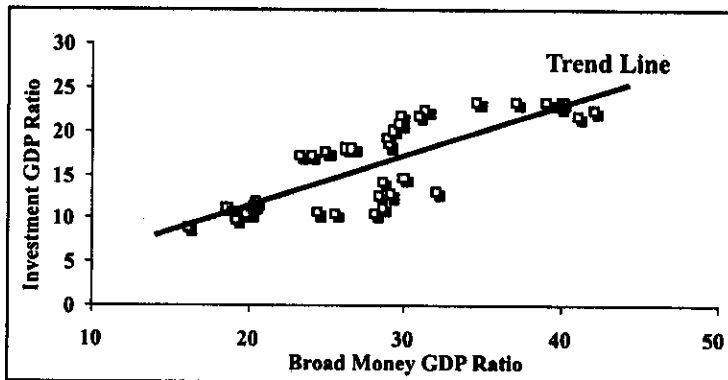
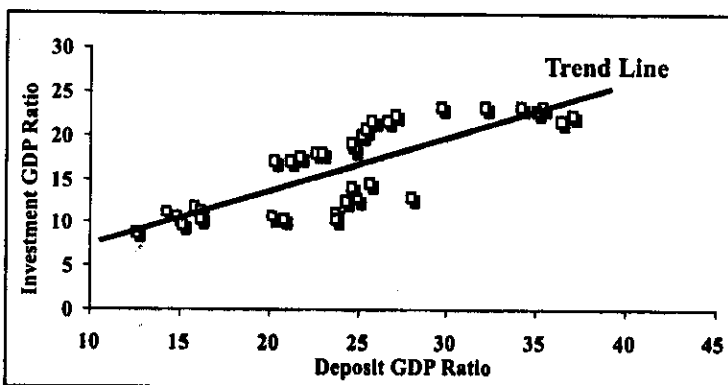
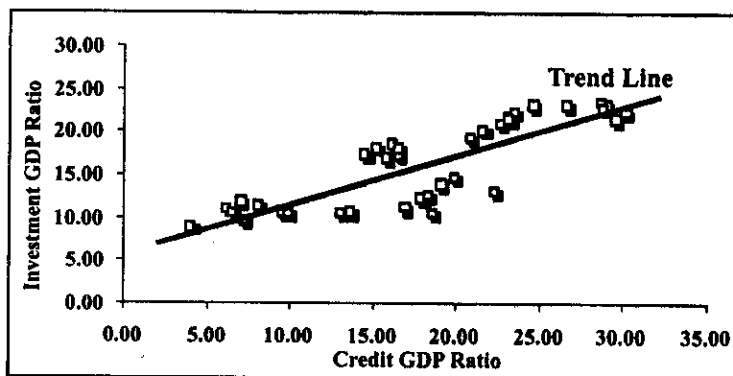
Financial Development and Investment Relationship

Figure 3

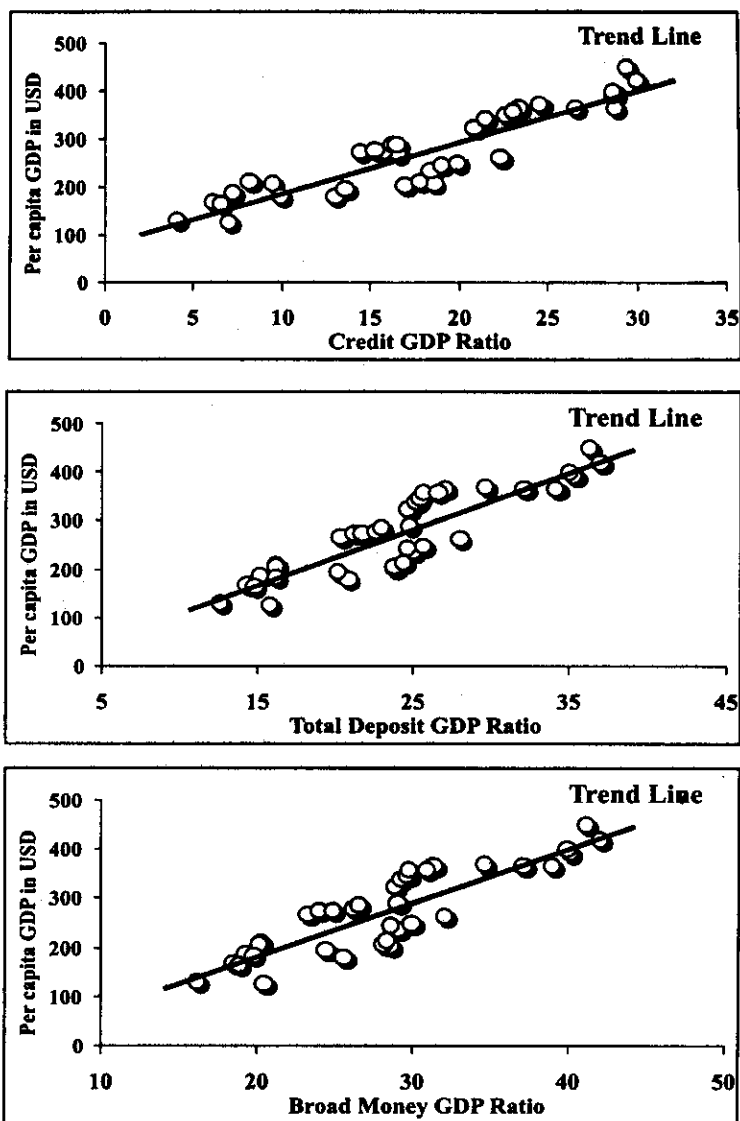
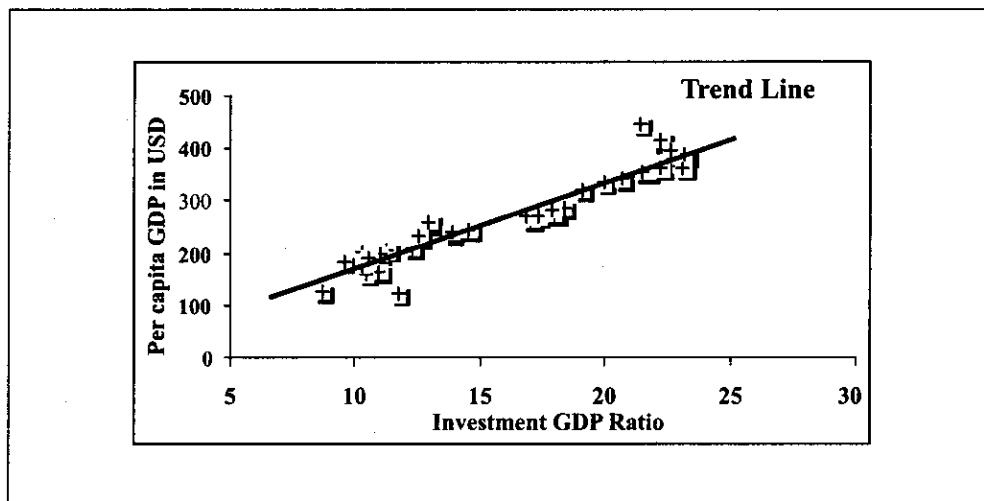
Financial Development and Per Capita GDP Relationship

Figure 4
Investment and Per Capita GDP Relationship



III. METHODOLOGY

Structural macroeconometric models, such as the Klein interwar model, the Brookings model, the BEA model, the St. Louis model and the Taylor model that are based on hundreds of equations, are replaced by the vector autoregressions (VARs). The problem of identification and endogeneity is associated with these structural macroeconometric models which can easily be overcome by the VARs approach. Sims's (1980) seminal work introduces VARs that allows feedback and dynamic interrelationship across all the variables in the system and appears to be highly competitive with the large-scale macroeconometric models in forecasting and policy analysis. The unrestricted VARs model assumes that each and every variable in the system is endogenous and does not impose any *a priori* restrictions. Because it does not impose any *a priori* restrictions and is based on reduced form equations, it is difficult to reconcile VARs with economic theory and to provide any meaningful interpretations of the estimated parameters.

In order to overcome the above difficulties with the standard unrestricted VARs, some studies, such as Bernanke (1986) and Blanchard-Watson (1986), come up with a structural VARs (SVARs) model that allows contemporaneous structural restrictions. Shapiro-Watson (1988) and Blanchard-Quah (1989), on the other hand, develop an alternative SVARs model that allows long-run structural restrictions. Nonetheless, the long-run structural models do not impose any contemporaneous

restrictions, they allow to determine short-run dynamics in the data through impulse response functions (IRFs) and variance decompositions (VDCs). As the objective of this paper is to investigate long-run relationship between financial development and economic growth in Bangladesh, a Blanchard-Quah (1989) type of long-run structural model is estimated.

IV. IDENTIFICATION RESTRICTIONS

In order to investigate the long-run relationship among financial development and investment and per capita income, a system of equations based on the long-run SVARs model is specified where a set of economically meaningful identification restrictions on the data is required. Consider the following production function:

$$Y=f(K,AL) \quad (1)$$

Here, Y = Real output, K = Capital, L = Labour and A = Technology. Dividing equation (1) by effective labour (AL), we get the following intensive form production function:

$$y=f(k)$$

We know that change in capital is nothing but investment where per capita income is an increasing function of investment or capital formation. Therefore,

$$\dot{k} = I = sy \Rightarrow y = f(I) \quad (2)$$

Where ' I ' and ' s ' are investment and rate of saving respectively.

Assuming that investment (I) is an increasing function financial development (F), equation (2) can be written as

$$\dot{k} = I = f(F) \quad (3)$$

Inserting equation (3) into (2), we get

$$y = f(I, F) \quad (4)$$

The above functional relationship among per capita income, investment and financial development can be expressed as F (financial development) $\Rightarrow I$ (investment) $\Rightarrow y$ (income per capita) meaning to say that financial development generates investment and investment generates higher per capita income. This chain of causality can be expressed as:

$$I = f(F) \quad (5)$$

$$y = f(I, F) \quad (6)$$

Based on the functional relationship specified in equations (5) and (6) and incorporating a policy variable, the short-term real lending rate (r/r), we can specify

the following long-run functional relationship among lending rate, financial development, investment and GDP per capita.

$$e_t^{rlr} = \varepsilon_{1t} \quad (7)$$

$$e_t^F = A_{21}e_t^{rlr} + \varepsilon_{2t} \quad (8)$$

$$e_t^I = A_{31}e_t^{rlr} + A_{32}e_t^F + \varepsilon_{3t} \quad (9)$$

$$e_t^y = A_{41}e_t^{rlr} + A_{42}e_t^F + A_{43}e_t^I + \varepsilon_{4t} \quad (10)$$

Here e_t^i is the estimated residual of i^{th} equation from standard VAR model, A_{ij} is the long-run response of i^{th} variables to j^{th} structural shocks and ε_{it} is the structural shocks from the i^{th} variable in the system. The restrictions stated in equations 7-10 have some interesting implications regarding financial development-economic growth relationship in that it asserts financial development has long-run effect on investment and per capita income. Income per capita, on the other hand, has no long-run effect on financial development. Blanchard-Quah's (1989) technique of SVARs is employed to estimate the long-run response matrix.

V. DATA ANALYSIS

In line with the standard practice of the finance-growth literature, annual data on financial development as proxied by the domestic credit to the private sector as a per cent of GDP², gross fixed capital formation as a per cent of GDP, per capita GDP at current USD and, a policy variable, real lending rates during 1976-2005 are used to estimate the model. As Blanchard-Quah's (1989) technique of long-run SVARs requires all variables to be stationary, a series of unit root tests, such as Dickey-Fuller (DF 1981), Phillips-Perron (PP 1988), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS, 1992) are employed to determine the order of integration for each of the variables used in the study. The results of unit root tests are reported in Table II, indicating only the real lending rate is I(1) or non-stationary while rest of the variables are trend stationary. Because I(1) variable is inappropriate for Blanchard-Quah's SVARs estimation, the lending rate is used in its first differenced form and is found to be stationary.

² Two other variables, such as total deposits as a per cent of GDP and broad money (M2) as a per cent of GDP are also used for possible alternative indicators of financial development.

TABLE II
RESULTS OF UNIT-ROOT TESTS

Variables (in natural log)	without trend			with trend			Decision
	ADF	PP	KPSS	ADF	PP	KPSS	
Rate							
Nominal lending rate (lr) ^φ	I(1)	I(1)	I(0)	I(1)	I(1)	I(1)	I(1)
Lending rate at 1 st difference (dlr) ^φ	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)
Real lending rate (rlr) ^φ	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)
Financial development							
Domestic credit to the private sector as a per cent of GDP (lcy)	I(0)	I(0)	I(1)	I(0)	I(0)	I(0)	I(0)
Total deposit as a per cent of GDP (ldy)	I(0)	I(0)	I(1)	I(0)	I(0)	I(0)	I(0)
Broad money as a per cent of GDP (lmy)	I(1)	I(1)	I(1)	I(0)	I(0)	I(0)	I(0)
Investment							
Gross fixed capital formation as a per cent of GDP (liy)	I(1)	I(0)	I(1)	I(1)	I(0)	I(0)	I(0)
Income							
Per capita GDP at current USD (lycap)	I(1)	I(1)	I(1)	I(1)	I(0)	I(0)	I(0)

Notes: 1. ϕ = without log, I(1) = unit-root and I(0) = stationary.

2. Lag length for ADF tests is decided based on Akaike's information criterion (AIC).
3. Maximum Bandwidth for PP and KPSS test is decided based on Newey-West (1994).
4. All the tests are performed on the basis of 5% significance level.

VI. EMPIRICAL RESULTS

In order to generate the long-run response matrix, initially we need to estimate a 4-variable unrestricted VAR model where the lag length is decided based on Akaike information criterion (AIC) making all the residuals white noise. The estimated results of Blanchard-Quah's SVARs model for the three samples are presented in Table III where domestic credit-GDP ratio alone is used as an indicator of financial development.

The estimated long-run response matrix for the full sample (top part of the Table III) indicates that financial development has statistically significant long-run positive impact on both the investment-GDP ratio and on per capita GDP.³ A one per cent positive shock to financial development (credit-GDP ratio in this case) will generate

³ Two other indicators for financial development such as total deposits as a per cent of GDP and broad money (M2)-GDP ratio are also produce similar results regarding financial development—economic growth nexus which are not reported here but available on request.

about 0.15 per cent positive impact on investment-GDP ratio and about 0.22 per cent positive impact on per capita income meaning more domestic credit to the private sector generates more investment activities and hence more per capita income. The estimated results also indicate that there is a positive and significant relationship between investment activities and per capita income. In the long-run a one per cent positive shock to investment-GDP ratio will generate about 0.22 per cent positive impact on per capita income. The long-run response of financial development, investment and per capita income with respect to real lending rate changes, however, does not appear with the expected signs. The results of the long-run response matrix for the pre-FSRP period (middle part of the Table III) remain broadly counter-intuitive where the long-run responses of investment-GDP share and income per capita are insignificant and appear with negative signs. This may be due to predominant role of nationalised banks during the post-FSRP period where the banking arena of Bangladesh was in a state of disarray, as sequel to bad lending practices, which resulted in an accumulation of huge non-performing loans. The practice of administered interest rate with the low degree of monetisation is another added phenomenon during the post-FSRP period.

The estimated parameters of the long-run response matrix during post-FSRP period (bottom part of the Table III) appear with the expected signs. There is statistically significant and negative impact of real lending rate on investment activity, financial development and income per capita. Domestic private sector credit as a ratio of GDP has long-run positive impact both on investment share of GDP and on income per capita. A one per cent increase in the private sector credit as a ratio of GDP will generate about 0.10 per cent positive impact on investment-GDP ratio as well as on income per capita. This finding during the post-FSRP period is very much expected, as the introduction of the FSRP in 1990 shifts the policy stance towards indirect control along with gradual increase in the credit share of private banks in addition to gradual decrease of non-performing loans. In general, the findings of the long-run response matrix imply the view, as argued by Ross Levine and others, that financial development has long-run direct as well as indirect impact on per capita income by reducing market frictions, pooling risks, and easing trade and contracts.

TABLE III
ESTIMATES FOR THE LONG-RUN RESPONSES TO ONE S.D.
STRUCTURAL SHOCKS

I. Full sample period 1976-2005

$$e_t^{cr-y} = 0.93*** e_t^{rlr} \quad (8a)$$

(5.42)

$$e_t^{i-y} = 0.95*** e_t^{rlr} + 0.15*** e_t^{cr-y} \quad (9a)$$

(6.98) (3.44)

$$e_t^{y-pcap} = 0.84*** e_t^{rlr} + 0.22*** e_t^{cr-y} + 0.22*** e_t^{i-y} \quad (10a)$$

(6.60) (4.29) (6.89)

II. Pre-FSRP period 1976-1990

$$e_t^{cr-y} = 0.63*** e_t^{rlr} \quad (8b)$$

(3.73)

$$e_t^{i-y} = 0.23*** e_t^{rlr} - 0.03 e_t^{cr-y} \quad (9b)$$

(4.53) (-1.15)

$$e_t^{y-pcap} = 0.26*** e_t^{rlr} - 0.03 e_t^{cr-y} + 0.11*** e_t^{i-y} \quad (10b)$$

(4.11) (-0.89) (3.50)

III. Post-FSRP period 1991-2005

$$e_t^{cr-y} = -0.39*** e_t^{rlr} \quad (8c)$$

(-4.52)

$$e_t^{i-y} = -0.14*** e_t^{rlr} + 0.10*** e_t^{cr-y} \quad (9c)$$

(-3.64) (4.48)

$$e_t^{y-pcap} = -0.35*** e_t^{rlr} + 0.10*** e_t^{cr-y} + 0.01*** e_t^{i-y} \quad (10c)$$

(-5.08) (5.42) (3.74)

- Notes:**
1. Figures in parentheses are z-statistic (t-value).
 2. The results in the above table are estimated when domestic credit to the private sector as a per cent of GDP is used as an indicator of the financial development. Results for the other two indicators of financial development, such as total deposits as a per cent of GDP and broad money (M2)-GDP ratio, are found to be similar which are not reported here but available on request.
 3. *** = significant at 1 per cent level.

VII. SUMMARY AND CONCLUSION

The intention of this paper is to investigate the long-run relationship between financial development and economic growth, particularly the long-run impact of financial development on investment and per capita income. Accordingly, a system of equations based on some theoretical predictions is specified and estimated using Blanchard-Quah's (1989) technique of SVARs. A series of scatter data plots is also used to substantiate the existence of co-movement between financial development and per capita income showing steady increasing trend in all the indicators of financial development, investment-GDP ratio and income per capita with a clear indication of a close association among them during the period 1976-2005. This apparent association does not necessarily imply any causal link between financial development and per capita income. The overtime trends in all the indicators of the financial development witness a structural break in 1991, the year following the introduction of FSRP. The estimated parameters of the long-run response matrix, particularly in post-FSRP period, strongly complement the apparent association between the various indicators of financial development and income per capita.

Although the results of the long-run response matrix during pre-FSRP period remain broadly misleading, the overall finding of the estimated SVARs model indicate that financial development has a long-run positive impact both on investment-GDP ratio and income on per capita. The results also confirm that investment's share of GDP has long-run impact on per capita income as well. Thus, financial development has direct as well as indirect (via investment) long-run impact on per capita income. These results, therefore, support the main hypothesis of the study that financial development has long-run impact on income per capita. As the results for the pre and post-FSRP period differ significantly, the role of a competitive environment in the financial sector is very important in Bangladesh. The introduction of the FSRP in 1990 plays a key role in creating a competitive environment by increasing the relative credit share of private commercial banks (PCBs) than those of nationalised commercial banks (NCBs).

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