

INTEREST RATES AND INVESTMENT SPENDING RELATIONSHIP IN BANGLADESH

SHAWKAT ALI FERDOUSI

Introduction

Investment, which is a spending devoted to enhancing or maintaining the existing stock of capital in the economy provides goods and services necessary for better standard of living. Moreover, it has greater importance as a policy tool. Target growth in GDP is made possible by influencing the level of investment. This is done through policies that affect the rate of interests, where the underlying assumption is that investment is negatively related with the rate of investment.

Historically, economic theories have suggested negative relationship between investment and interest rates. Changes in either nominal or real interest rates translate into a direct impact on investment spending leading to desired movements in the real economy. Specifically, the Keynesian framework suggests that a decrease in lending rate reduces the cost of investment resulting in higher profit margin for the investors. On the other hand, Mckinnon and Shaw (1973) established that increase in deposit rates encourages depositors to accumulate enough savings for financing investment spending in an economy and vice versa.

The difference between lending and deposit rates, called the *spread* is a crude measure of the cost of efficient resource intermediation process in the economy,. LDCs with financial market imperfections are characterized by higher spreads due to factor such as lack of competition, non-performing loans, high administrative costs etc. To reduce the financial intermediations cost and achieve higher economic growth developing countries of Asia and Latin America started implementing various Financial Sector Reform Programs (FSRPs) from the mid 1970s through 1980s.. Bangladesh initiated the FSRP at the beginning of the 1990s.

Efficient allocation of credit in the financial market was one of the key objectives of FSRP in Bangladesh. It attempted to develop a well functioning financial system by moving from an administered interest rate regime towards a market driven interest rate operation regime thereby promoting market forces to play role in allocating resources and credit for efficient investment and economic growth. In such backdrop, it may be legitimate to investigate the role of interest rates on investment spending in Bangladesh.

Although interest rate is believed to be the key determinant of the level and direction of investment spending, non-economic factors have had significant influence on investment potential of Bangladesh. In fact, the available literature shows little evidence of valid and significant relationship between interest rate and investment spending in Bangladesh. This research attempts to conduct a simplistic analysis to find the relationship between interest rate and investment. Besides, the relationships among other variables such as the rate on deposit, level of savings, income etc. that likely to influence the determination of the level and direction of investment spending will be examined. Finally, this paper attempts to find if there is one or more key factors that may be addressed to influence the level of investment effectively.

Methodology

The methodology involves estimating an econometric model as well as simple, statistical indicators like correlation, and trend analysis. To investigate the impact of interest rates on investment spending, a simple regression function for the two variables has been used. The starting point of model formulation is;

$$I = f(LR, SR, S, Y, ER) \dots\dots\dots (1)$$

- Where, I = Investment
 LR = Interest rate on loans
 SR = Interest rate on savings
 S = Gross Domestic Savings
 Y =GDP
 ER = Exchange rate

Investment is not a function of interest rate alone. Factors like income, savings, and saving rate along with lending rate are important issues in setting the level of investment. That is why it is necessary to incorporate all of them in the regression function and test the marginal impact of each of them on investment.

Accordingly, the estimating equation used in this study is;

$$I = \alpha + \beta_1LR + \beta_2SR + \beta_3S + \beta_4Y + \beta_5ER + e(2)$$

where, the term *e* is the stochastic error term that captures the impact of all other variables not included in the model.

Model Validation

The coefficient β_1 , which gives the change in investment due to one unit change in lending rate is expected to be negative. Other slope coefficients ($\beta_2, \beta_3, \beta_4$) are expected to have positive values since their associated variables, interest on savings, and income respectively should influence investment positively. The coefficient β_5 can take positive or negative values depending on how a rising trend in exchange rates influence the level of domestic saving. The expected impact is determined by the composition of our import and export commodities. In case of heavy import of capital machineries β_5 will be negative while a positive β_5 will probably indicate heavy spending on production of export commodities.

Date Source

All the data to be used are in nominal terms in 1995-06 constant price. The time series data are taken from the revised national income estimates by BBS. Under the revised accounting system the BBS provides comparable data for 1980-2006. Therefore, the sample will be of 26 annual observations. For the last period i.e. fiscal year 200506 provisional data (BBS, May-2006) will be used.

Interest Rates and Investment in Bangladesh

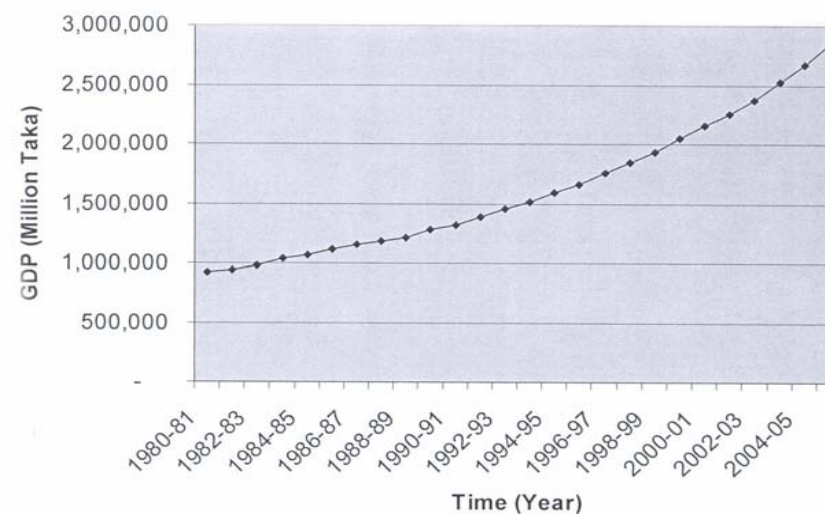
Trend analysis

In this analysis, various relationships that are apparent from graphical plotting of the various interacting variables are presented first. Then some of the cause and effect relationships among the variables have been explored. The data source is Bangladesh Bureau of Statistics (BBS). The following table-1 provides statistics of macroeconomic indicators of Bangladesh.

Year	CPI	GDP (Mill Tk)	Investment as percent of GDP	Investment (Mill tk)	Gross Domestic Saving as % of GDP	Domestic Savings (Mill tk)	Interest Rate on Loans
1980-81	29.43	923,598	17.62	162,738	12.53	115,727	13.07
1981-82	34.11	945,547	17.82	168,496	12.54	118,572	13.53
1982-83	38.78	983,521	16.97	166,904	9.88	97,172	13.55
1983-84	43.46	1,034,474	15.92	164,688	9.97	103,137	13.75
1984-85	48.14	1,067,818	16.32	174,268	11.88	126,857	14.50
1985-86	52.22	1,113,185	16.70	185,902	12.46	138,703	14.66
1986-87	59.46	1,154,732	16.02	184,988	11.09	128,060	14.70
1987-88	63.25	1,179,665	16.30	192,285	10.68	125,988	14.66
1988-89	68.56	1,210,482	16.70	202,150	12.25	148,284	14.61
1989-90	71.21	1,282,400	17.05	218,649	12.86	164,917	14.83
1990-91	77.13	1,325,224	16.90	223,963	14.48	191,892	14.99
1991-92	80.65	1,392,004	17.31	240,956	13.86	192,932	15.12
1992-93	82.86	1,455,680	17.95	261,295	12.54	182,542	14.39
1993-94	85.57	1,515,140	18.40	278,786	13.10	198,483	12.78
1994-95	93.16	1,589,761	19.12	303,962	13.32	211,756	12.22
1995-96	100.00	1,663,240	19.99	332,482	14.90	247,823	13.41
1996-97	102.53	1,752,847	20.72	363,190	15.90	278,703	13.69
1997-98	109.74	1,844,478	21.63	398,961	17.41	321,124	14.02
1998-99	118.69	1,934,291	22.19	429,219	17.71	342,563	14.16
1999-2K	122.78	2,049,276	23.02	471,743	17.88	366,411	13.86
2000-01	125.28	2,157,353	23.09	498,133	18.00	388,324	13.75
2001-02	127.62	2,252,609	23.15	521,479	18.16	409,074	13.16
2002-03	134.18	2,371,006	23.41	555,053	18.63	441,718	12.78
2003-04	142.01	2,519,680	24.02	605,227	19.53	492,094	11.16
2004-05	151.21	2,669,740	24.53	654,887	20.01	534,215	10.52
2005-06	160.83	2,848,979	24.97	711,390	20.26	577,203	10.72

Table - 1: Basic Economic Data of Bangladesh (1980 - 2006)

Figure - 1 : Year wise GDP in million Taka



Source : BBS

Figure - 2 : Year wise investment in million Taka

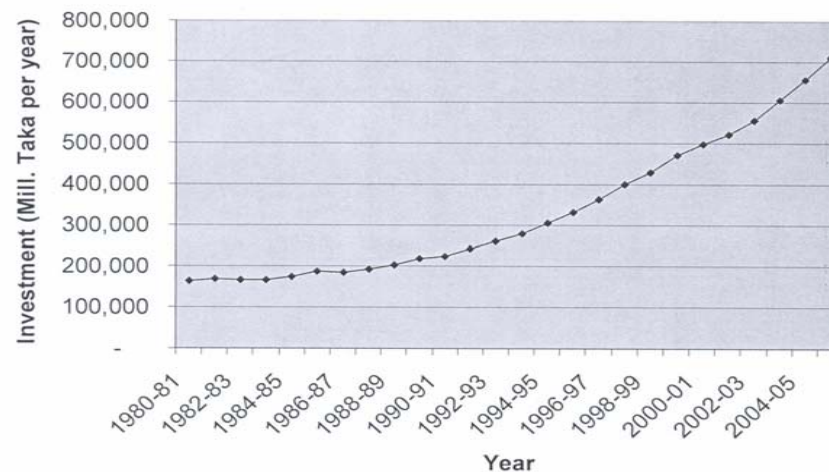
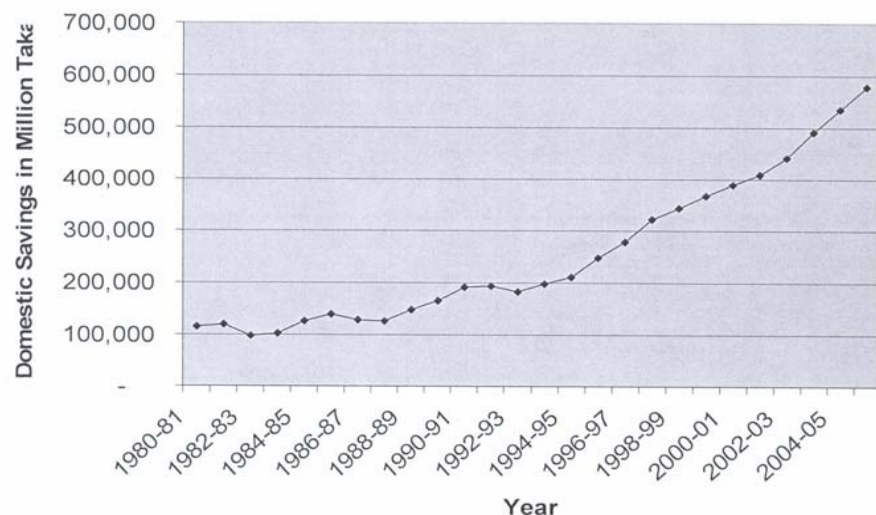
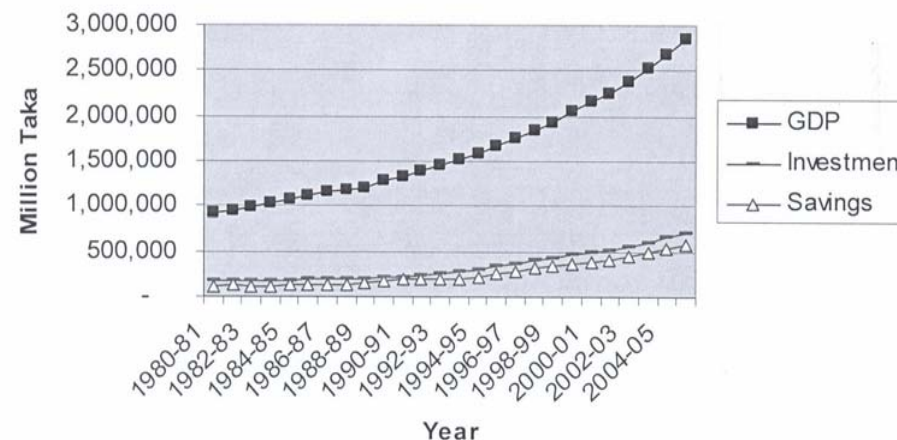


Figure – 3 : Year wise domestic savings



Trends show that income, investment, and savings all have increased in increasing rates over the 26 year period. These are only common time trends. Further investigation is required to find if there is any cause and effect relationship for all the variables moving at the same direction. Upward trends of these variable are easily traceable from the growth in population, which ultimately translate into the growth of the size of the economy, increase in demand, and rising capacity of the economy to meet demand.

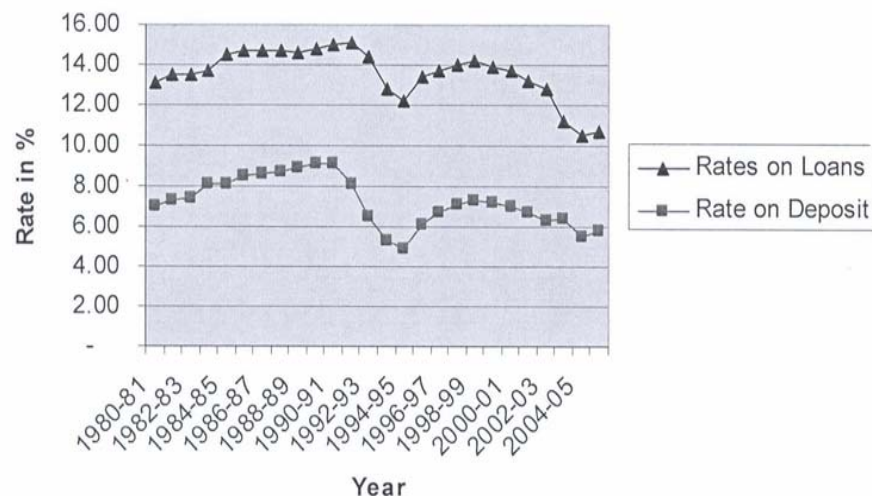
Figure-4 : Trends of GDP, Investment and Savings



However, superimposing the three trends on a single plane gives some insights about the increase in productivity. Figure - 4 shows that both investment and savings have moved together. Although all the three variables have increased in the same direction over the time, the gap between GDP and the other two variables, investment and savings has increased. This *may* suggest consistent increase in the productive capacity of invested capital over the study period.

A constant intermediation cost is an important finding. The following figure shows that interest rates on both deposit and loan have moved at the same directions implying a constant *spread* between the two.

Figure - 5: Trends of Weighted Average Interest Rate on Loans and Deposit



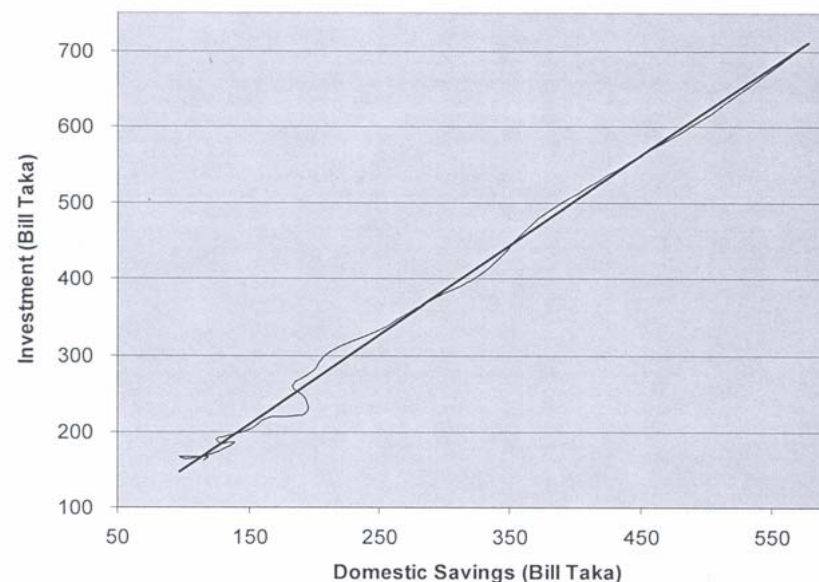
A constant spread, which is an acceptable approximation of the intermediation cost of the financial system, implies lack of inefficiency in the intermediation process. Over the period, competitive forces should have narrowed the spread.

Correlation Analysis

Correlation is the degree to which two variables are linearly related whether through direct causation, indirect causality, or statistical chance. Correlation coefficient, commonly denoted by r shows how two variables are associated. Although r does not confirm any cause and effect relationship, it is a good parameter to look at for variables with known or predetermined relationships. We have computed correlation coefficient between our choice variables. Most of the relationships are in conformity with results expected from theoretical perspectives.

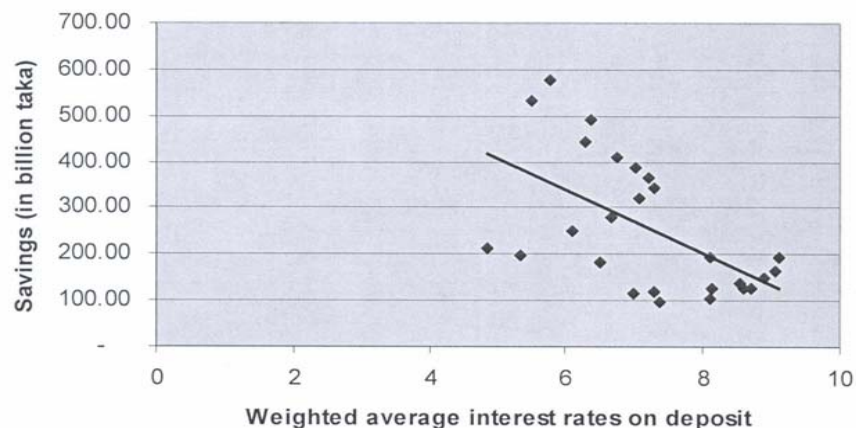
Although a higher level of saving does not necessarily translate into a higher level of investment is primarily dependent on availability of sufficient loanable fund. Savings provide the required loanable fund. Therefore, a positive correlation between the two is expected. Figure-a shows strong and positive correlation between savings and investment.

Figure-6 : Correlation between domestic savings and domestic investment



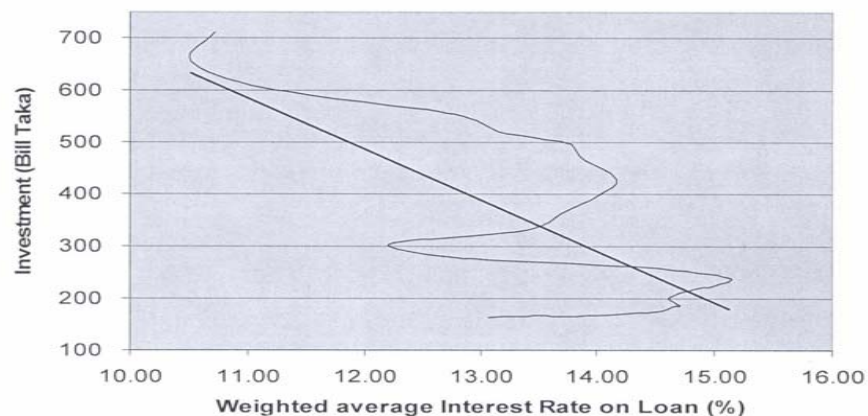
Savings is expected to be an increasing function of interest rates on deposit. But as figure - 6 shows savings is negatively (although weakly) correlated with the deposit rate. This does not explain why the relationship is negative. But this much can be concluded that deposit rate is not a determining factor for the volume of savings. Other behavioral factors determine the volume of savings.

Figure – 7 : Correlation between weighted average interest rate on deposit and savings.



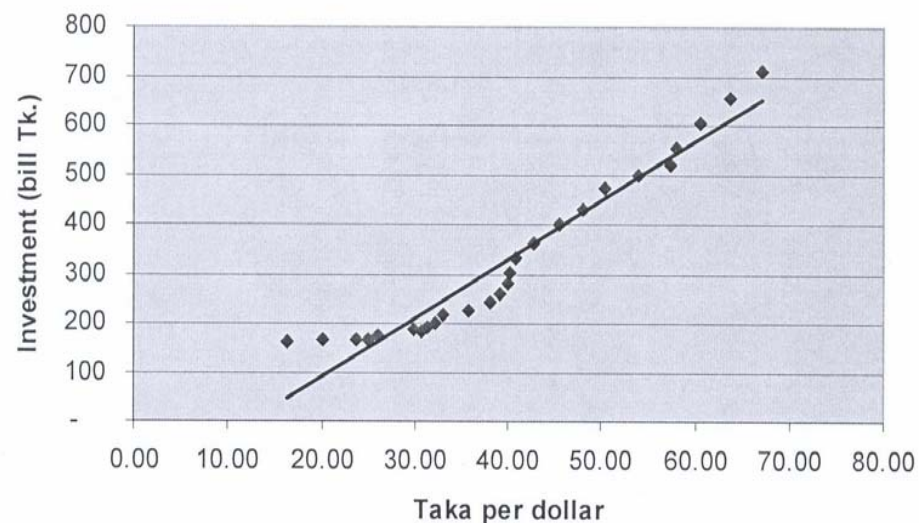
An important correlation is depicted in figure – 7. Investment is negatively related with interest rates on loans. Interest rate is the price of loanable fund. Simple supply-demand rule says that a rising rate will reduce the level of investment while a falling rate will increase it. Although a negative correlation is observed, the pattern is not as linear as expected.

Figure – 8 : Correlation between weighted average interest rate on loans and investment



Finally, figure -9 shows a nearly perfect positive correlation between exchange rate and investment. A rising exchange rate induces investors to spend heavily on export commodities. Whether this is the case is not confirmed from the simple correlation. Further investigation is required to see if there exists any causal relationship at all between exchange rate and investment.

Figure – 9 :Correlations between exchange rate and investment



The correlation between various pair of variables are presented in the following table.

Table – 2
Cross Correlation Coefficients

	GDP	Investment	Savings	Lending rates	Deposit rates	Exchange rate
GDP	1.00	1.00	0.99	-0.70	-0.60	0.99
Investment	1.00	1.00	1.00	-0.73	-0.60	0.97
Savings	0.99	1.00	1.00	0.71	-0.56	0.97
Lending rates	-0.70	-0.73	-0.71	1.00	0.80	-0.61
Deposit rates	-0.60	-0.60	-0.56	0.80	1.00	0.30
Exchange rate	0.99	0.97	0.97	-0.61	0.30	1.00

Source : BBS data and Economic Trend, Bangladesh Bank.

Regression Analysis

Although correlation analysis gives us some idea about the association between variables, it is of little use in making inference on the cause and effect relationship. If a cause and effect relationship exists between two variables, correlation coefficient will reflect that. But the reverse is not true. To find the true relationship, if there exist any, a regression function has been run.

Methods of establishing valid relationship among variables by regressing time series data have long been on the assumption that all time series data are stationary. Recent development in the econometrics literature (Engle & Granger, 1987) calls for testing the data for stationary. Regressing on data that are not stationary runs into the risk of having a spurious regress i.e. relationship that is not real.

Some of the recent studies by the Policy Analysis Unit (PAU) of Bangladesh Bank using time series data on GDP, Investment, Savings, Interest Rates, and Inflation etc. of Bangladesh have confirmed that these are stationary on their level form. Therefore, estimated equation (2) has been estimated assuming that all data are stationary.

The Minitab output of the OLS regression is presented below. The regression equation is

$$I = - 62.7 + 0.272 \text{ GDP} + 0.438 \text{ S} - 0.54 \text{ IL} - 0.56 \text{ ID} - 3.63 \text{ ER}$$

Predictor	Coef	SE Coef	T	P
Constant	-62.70	58.61	-1.07	0.297
GDP	0.27207	0.07934	3.43	0.003
S	0.4377	0.17 92	2.44	0.024
IL	-0.535	3.147	-0.17	0.867
ID	-0.561	2.908	-0.19	0.849
ER	-3.628	1.500	-2.42	0.025

S = 8.191

R-Sq = 99.8% R-Sq(adj) = 99.8%

Analysis of Variance

Source	DF	SS	MS	F	F
Regression	5	724875	144975	2160.85	0.000
Residual	20	1342	67		
Error					
Total	25	726216			

R denotes an observation with a large standardized residual

Source	DF	Seq SS
GDP	1	719317
S	1	4353
IL	1	731
ID	1	81
ER	1	392

Unusual Observations

Obs	GDP	I	Fit	SE Fit	Residual	St Resid
3	984	167.00	149.73	3.11	17.27	2.28R
11	1325	224.00	239.22	4.12	-15.22	-2.15R

R denotes an observation with a large standardized residual.

Interpretation of the Estimated Regression Function

In above analysis, t statistics and p values suggest that only income, savings, and exchange rate have significant impact on investment. All these coefficients are significant at less than 2.5% level. Coefficients of income (GDP) and savings are positive suggesting that one million increases in each of them will have impact of .27 and .43 million increase in investment respectively.

Contrary to our findings in trend analysis, exchange rate negatively influences the level of investment. Heavy import of capital machinery is a possible explanation of this finding.

The very unusual finding is the insignificant influence of interest rates on investment. Both deposit and lending rates have similar amount and direction of impact on investment. But the coefficients are not significant as suggested by very low t ratio and very high p values. These findings are in conformity with the few studies that have been conducted to find the interest responsiveness of investment in Bangladesh. So far, interest rates in Bangladesh have been found to have weak or no impact on investment spending. Traditional approach to influence interest rates may cause little or no change in investment.

With a high R^2 the model has a higher degree of fitness. 99% of the variation in investment spending is explained by this model.

Conclusion

Economic development is a function of investment in productive goods and services. Investment everywhere is believed to be influenced by interest rates. Therefore, interest rates have always been a tool for influencing investment. However, in case of Bangladesh, interest rates seem to have little impact on investment. Consequently, it becomes imperative to focus on other economic and non economic factors that determine the level and direction of investment. Investment

friendly environment and efficient financial system is more important than providing low cost fund for increasing investment spending. Once these two will be ensured, investment will probably be more responsiveness to interest rates giving policymakers true instrument to use.

References

- Islam, M. Ezaz and M. Nurunnahar Begum (2005) "Is Investment Demand Sensitive to Interest Rate in Bangladesh? An Empirical Analysis." *Bank Parikrama*, BIBM, Vol. 30(1), pp-69-84.
- Ahmed, S. and Md. E. Islam (2006). "Interest Rate Responsiveness of Investment Spending in Bangladesh: A V AR Approach." Working Paper Series: WP 0608, Policy Analysis Unit (P AU), Research Department, Bangladesh Bank.
- Dornbusch, R. and S. Fischer. (2001). *Macroeconomics*. 8th ed. New York: McGraw-Hill Inc.
- Rahman, M. Abdur (1984). "A Review of Acceleration Principal of Investment", *Bangladesh Economic Studies*, Vol-I, No.-1. pp-51-58
- _____(2006) National Accounts Statistics (Provisional Estimates of GDP, 200506 and Final Estimate of GDP, 2004-04), NA W, BBS, Ministry of Planning: Planning Division.
- _____(2000) National Accounts Statistics (Revised Estimates, 1989-90 to 199899), SNAB, NAW, BBS, Ministry of Planning: Planning Division.
- _____(2001) National Accounts Statistics (Gross Domestic Product, 20002001). NAW, BBS, Ministry of Planning: Planning Division.
- _____*Economic Trends*, Various issues, Bangladesh Bank.