CHAPTER VI

BUILDING BLOCKS OF THE MODEL

6.1 Production block

In macroeconomics, production function relates the amount of output produced in different sectors of the economy to the amounts of inputs used, the amounts of labor, capital, and materials and supplies actively employed. An increase in any input, while holding constant the other inputs, must increases the amount of output. In the production block of Bangladesh economy, three equations have been specified- one for each agriculture, manufacturing and service sector. For brevity, the service sector includes all producing sectors except agriculture and manufacturing. In each sector, production depends on capital stock, which is indispensable for each unit of production in an economy. It means that the more the size of capital, the more the level of production in each sector of Bangladesh.

In addition, imported intermediate and raw materials act as constraint to production in agriculture and manufacturing (Hossain, 1995). To import these, Bangladesh is to pay a lot of foreign currency. For this, the supply of this input is restricted but the productive activities in both agricultural and manufacturing are directly reliant on this. Hence, it is included as an explanatory variable in the production function. Najma & Atul (1996) have attempted to measure the impact of adoption of new methods in agricultural sector. They identified that generally the farmers of Bangladesh have harvested three rice crops in one year- two are more traditional, while the third is of the new-technology, high-yielding variety (HYV), which has spearheaded the so-called 'Green Revolution' in rice. However, due to the lack of time-series data related to HYV, the effect of fertilizer has been included in the production function of the mode. In agriculture, fertilizer acts as a constraint on production. In fact, this is the compound given to plants to promote agricultural growth. Again, arable land is one of the key factors of agricultural production and

thence it is an explanatory variable in agricultural production function. Over again, the 'price of oil' also acts as a constraint on agro-production, because to modernize the agricultural activities some modern equipments are needed to be utilized and to operate these equipments 'oil' is one of the most primal inputs especially for irrigation purpose. Empirically this is the first initiative to include fertilizer, land, and oil price in a macroeconometric model for Bangladesh.

Furthermore, in a labor surplus economy labor does not act as a constraint to production. Therefore, labor is not included in the production function. Besides, weather conditions comprising amount and distribution of rainfall, sunshine etc. exert significant influence on Bangladesh agriculture sector. In this regard, an index of rainfall is included in the agricultural production as a proxy for weather conditions. Here, it is to be mentioned that still the agriculture of Bangladesh in many parts is a gambling of monsoon. It means that if the rainfall is neither too high nor too less but moderate, the production is at a satisfactory level and the vice versa.

The growth rate in manufacturing sector has been criticized as unutilized and the industrial sector in Bangladesh is one of the least successful areas of economic reforms (Reza & Mahmood, 1995). Though it is generally expected that market oriented reform will increase competition and eliminate the unrealized productive capacity of enterprises, Sahota (1991) has argued that there is substantial unrealized productive capacity in the manufacturing sector in Bangladesh even after several years of reforms. Hence, the specification of determinants of value added in manufacturing sector of Bangladesh has remained as a real challenge to build macroeconometric model. However, Hossain (1995) has used capital stock and import of intermediates and raw materials to determine total production in manufacturing sector. Furthermore, the empirical results conducted by Omar and Khan (2007) have suggested that long-run economic growth in Bangladesh is largely explained by physical capital and real interest rate and growth remains unaffected by short-term changes in labor force and secondary enrolment ratio. They observed that while financial liberalization has had significant negative impacts on economic growth

implying that financial reforms failed to attract new investment due to adverse investment climate, the effects of trade and capital account liberalizations were rather insignificant, possibly due to weak supply response and lack of credibility of such reform programs. Bangladesh will not reap the full benefits of any comprehensive liberalization measures unless it can improve infrastructure and quality of governance, the paper argues.

In the service sector, secondary school enrollment is an important factor of production, because the productivity of service holders depends on their knowledge level, skill, and technical know-how and to determine these, secondary school enrollment has been selected as a proxy to measure the size of educational system. Factually, secondary school enrollment is the new inclusion in the macroeconometric model of Bangladesh. Therefore, the production functions are specified as follows:

$$VAGR = \beta_0 + \beta_1 KAGR + \beta_2 MR + \beta_3 FER + \beta_4 LAND + \beta_5 OIL + \beta_6 RAIN$$

$$VMAN = \beta_7 + \beta_8 KMAN + \beta_9 MR$$

$$VSER = \beta_{10} + \beta_{11} KSER + \beta_{12} SSE$$

where,

VAGR	=	value added in agriculture
KAGR	=	capital stock in agriculture
MR	=	import of intermediates and raw materials
RAIN	=	*rainfall index*[18]
VMAN	=	value added in manufacturing
KMAN	=	capital stock in manufacturing
VSER	=	value added in services
KSER	=	capital stock in services
FER	=	***fertilizer***[19]
OIL	=	***oil Price***
LAND	=	***total arable land***
SSE	=	***secondary school enrollment***

[18] Variables expressed in *italic* are meant to exogenous variables. This is true for the entire research.

[19] Variable expressed in bold *italic* is meant to a newly included exogenous variable. This is true for whole thesis proposal.

Some might argue that fertilizer can be included under capital stock. In the context of Bangladesh economy, fertilizer is a supply constraint. Therefore, it should be considered separately.

However, following Hossain model (1995), in the absence of better measure for sector specific capital stock, capital stock is generated by applying perpetual inventory method:

$$KAGR = (1-\delta)\, KAGR(-1) + IAGR$$
$$KMAN = (1-\delta)\, KMAN(-1) + IMAN$$
$$KSER = (1-\delta)\, KSER(-1) + ISER$$

where,

IAGR	=	real investment in agriculture
IMAN	=	real investment in manufacturing
ISER	=	real investment in services

From the analysis of Jorgenson, Dale, Yun, Kun-Young (2002), it is observed that the accelerator model stresses that planned investment is demand induced. That is, the demand for new plant and machinery comes from the demand for final goods and services. Here, investment demand is divided into private investment and public investment. Public investment is a policy variable. Private investment is classified by sectors. Besides, public investment does not crowd out private investment in developing countries like Bangladesh (Hossain, 1995). Rather, it complements private investment. Real total public investment appears as an argument in the investment function instead of sectoral public investment as public investment has inter-sectoral effects. For example, investment in infrastructure creates favorable impact on all types of private investment. Accordingly, sectoral investments are specified as functions of real sectoral credit and real public investment. That is,

$$IAGR_P = B_{13} + B_{14}\, CAGR_P + \beta_{15} rAGR_P + B_{16}\, GI$$
$$IMAN_P = B_{17} + \beta_{18}\, CMAN_P + \beta_{19} rMAN_P + \beta_{20}\, GI$$
$$ISER_P = \beta_{21} + \beta_{22}\, CSER_P + \beta_{23} rSER_P + \beta_{24}\, GI$$

where,

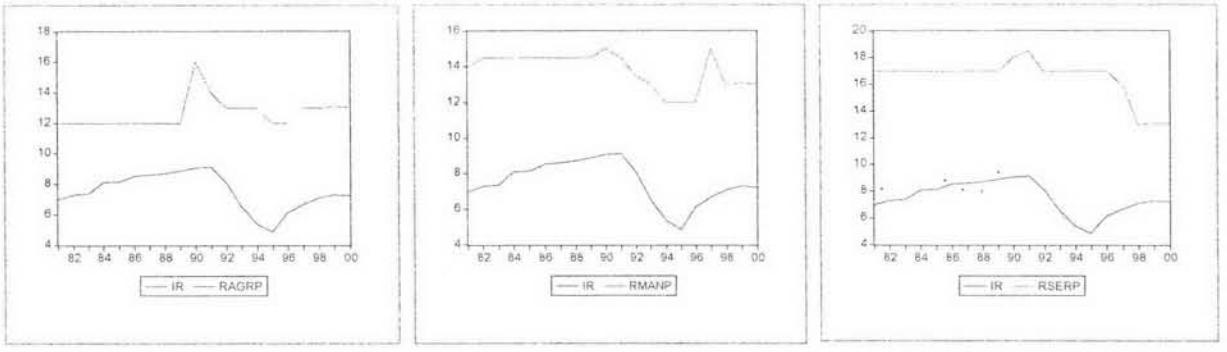
IAGR $_P$	=	real private investment in agriculture
IMAN $_P$	=	real private investment in manufacturing

$ISER_P$	=	real private investment in services
$CAGR_P$	=	real credit to agriculture
$CMAN_P$	=	real credit to manufacturing
$CSERP_P$	=	real credit to services
$rAGR_P$	=	***interest rate in agriculture***
$rMAN_P$	=	***interest rate in manufacturing***
$rSER_P$	=	***interest rate in services***
GI	=	real government investment

However, in the existing model, interest rate is not an argument in the investment function. It is assumed that availability of credits is a constraint to private investment. However, this presumption cannot explain the real world phenomena. Therefore, sector-specific interest rates have been incorporated in the investment functions of different sectors.

it is to be mentioned in this context that by theory there has to be the same pattern in all interest rates of different sectors in line with the bank rate (IR). To testify this conventional presumption, the following figure has explored that not all sector-specific interest rates are linked with the bank rate of Central Bank to commercial banks.

Figure 6.1: Patterns of Sector-wise Interest Rates Comparing with Bank Rate



From regression analysis, it has been found that, in equation 6.1, the coefficient values for interest rates in agricultural and service sectors are statistically insignificant to consider. Only interest rate in manufacturing has a linkage with bank rate of Bangladesh Bank. However, as the value of coefficient of correlation is not so

high, it can be concluded that there is visibly no relationship between bank rate and interest rates in different sectors.

Box 6.1: Relationship of Different Interest Rates and Bank Rate

IR =	**-7.15 + 0.18*RAGRP + 0.93*RMANP - 0.03*RSERP**				..... (6.1)
t	= (-2.09)	(0.96)	(4.88)	(-0.21)	
p value	= (0.05)	(0.35)	(0.00)	(0.84)	
F-statistic	= 9.52	P (F-statistic) = 0.00		$R^2 = 0.64$	

6.2 Expenditure block

The expenditure block consists of only one equation for private consumption, where private consumption expenditure is a function of *disposable income*, which is derived from the *Keynesian Absolute Income Hypothesis* (Keynes, 1936). According to this theory, consumption is a non-linear function of income. As income rises, consumption will rise but not necessarily at the same rate. Historically, this hypothesis was much more refined during the 1960s and 1970s, notably by American economist James Tobin. In line to determine private consumption of the economy, many theories have been emerged including relative income hypothesis (Duesenberry, 1949), permanent income hypothesis (Friedman, 1957), life-cycle hypothesis (Ando & Modigliani, 1957) etc. However, circulating by the absolute income hypothesis, the people of Bangladesh want to keep pace with the previous consumption status by nature. Furthermore, Rahman (1990) identified that disposable income including remittances from abroad and private consumption of the previous year along with two dummy variables have determined total private consumption of Bangladesh economy. Hence, the private consumption is specified as a function of *disposable income* and *lagged consumption*. It is to be mentioned that the government consumption has been treated in the government block.

$$CON = \beta_{25} + \beta_{26} YD + \beta_{27} CON(-1) + \beta_{28} CCR + B_{29} COB$$

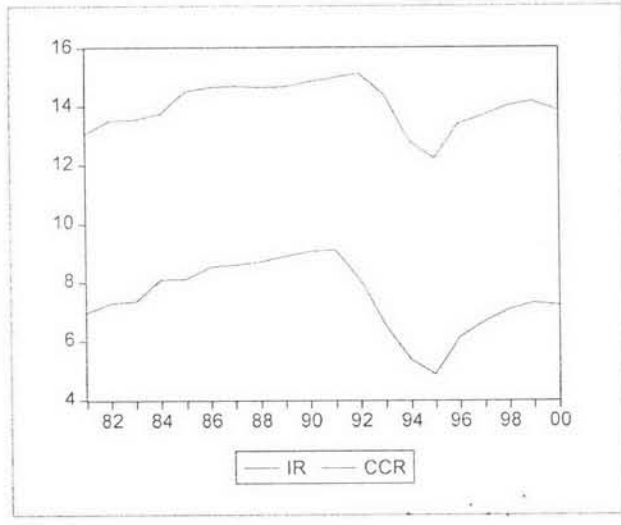
where,

CON	=	private consumption
YD	=	disposable income

CCR = ***Consumer Credit Rate***
COB = ***Currency Outside Banks***

In economic literature, present income or standard of living in comparison to the highest income attained in the past or highest level of standard of living maintained in the past is called "Ratchet Effect". Due to this effect, the consumers are forced to maintain their consumption status even by borrowing money and many financial institutions have been practicing to lend money for specific consumption purpose. Hence, in this model, consumer credit rate has been included as an explanatory exogenous variable to explain private consumption. However, consumer credit rate has to be in line with the bank rate of the central bank to the commercial banks that has also been visualized in Figure 6.2.

Figure 6.2: Patterns of Consumer Credit Rate in Comparison to Bank Rate



The relationship between these two variables can also be presented under regression analysis that has been provided in Box 6.2. From the regression result, it is visualized that there is a relationship between bank rate and consumer credit rate of Bangladesh economy.

Box 6.2: Relationship of Consumer Credit Rate and Bank Rate

IR =	**-11.30 + 1.34*CCR**			(6.2)
t	= (-4.47)	(7.44)		
p value	= (0.00)	(0.00)		
F-statistic	= 55.41	P (F-statistic) = 0.00	Adjusted R^2 = 0.74	

6.3 Balance of payments block

According to Hossain and Alauddin (2005), as to the real achievements, led by manufacturing exports especially textiles and readymade garments, total exports consistently grew over the time period. It indicates that trade liberalization has had a positive impact on the growth of exports. In the process of transition, the structure of exports and GDP also changed, the former being in favor of non-traditional exports and latter in favor of services and to an extent, industrial output. However, exports are still highly concentrated in a few commodities, more precisely in one commodity, textiles and readymade garments in the context of Bangladesh economy. The lack of product diversification together with the present state of low export market diversification may, however, render the Bangladesh external sector vulnerable to serious external shocks.

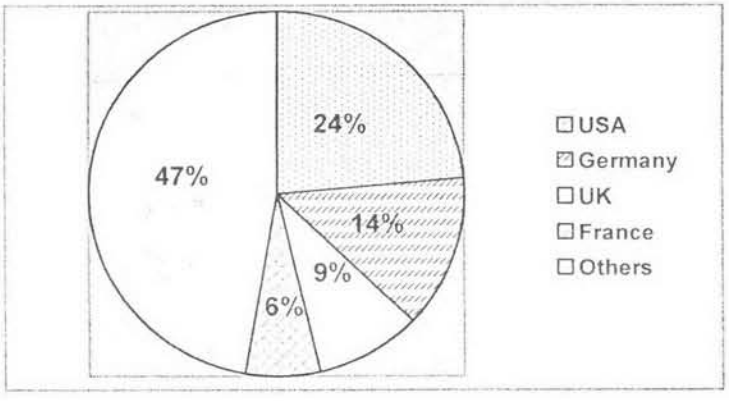
In this model, the balance of payments block consists of eleven equations – 7 equations determine the volume of exports and 4 equations determine the volume of imports.

Exports of jute, jute manufactures, RMG and knitwear, frozen food, tea and leather are specified by corresponding export supply functions. It is assumed that Bangladesh is a price taker in the world market. Consequently the export prices are given by the world market prices. It is assumed that main constraint to export of Bangladesh arises from the supply side. Bangladesh an export whatever it can supply. Export supply is determined by export price relative to domestic price level as well as capacity output. Export supply of RMG and knitwear is also affected by quota

available from the U.S.A. and Canada as well as GSP certificates from the EU. Utilization rate of quota is used as a proxy variable to account for these factors. Last but not least, no international trade equations can be completed without the inclusion of domestic and/or foreign income.

After that, it is conventional to make a presumption that if the income level outside of the economy increases, the demand for domestic goods will be increased and thence it will induce total exports of the economy. In this regard, it is feasible to sum up the real GDP of all major export trading partners of Bangladesh. In 2005, the rudimental exporting partners of the economy include USA, Germany, UK, and France respectively that are shown in Figure 6.3.

Figure 6.3: Major Export Trading Partners of Bangladesh



Source: https://www.cia.gov/cia/publications/factbook/geos/bg.html

In this regard, it is to be mentioned that the time series data of real GDP for each countries has been plotted from International Financial Statistics (IFS) CD-ROM published by International Monetary Fund (IMF).

$$XJ = \beta_{30} + \beta_{31}\frac{PXJ.EXR}{WPI} + \beta_{32}XJC + \beta_{33}FGDP$$

$$XJM = \beta_{34} + \beta_{35}\frac{PXJM.EXR}{WPI} + \beta_{36}XJMC + \beta_{37}FGDP$$

$$XRMG = \beta_{38} + \beta_{39}\frac{PXRMG.EXR}{WPI} + \beta_{40}XRMGC + \beta_{41}QUOT + \beta_{42}FGDP$$

$$XFF = \beta_{43} + \beta_{44}\frac{PXFF.EXR}{WPI} + \beta_{45}XFFC + \beta_{46}FGDP$$

$$XT = \beta_{47} + \beta_{48}\frac{PXT.EXR}{WPI} + \beta_{49}XTC + \beta_{50}FGDP$$

$$XL = \beta_{51} + \beta_{52}\frac{PXL.EXR}{WPI} + \beta_{53}XLC + + \beta_{54}FGDP$$

$$XN = \beta_{55} + \beta_{56}\frac{PXN.EXR}{WPI} + \beta_{57}XNC + + \beta_{58}FGDP$$

where,

XJ	=	export of jute
PXJ	=	*export price of jute*
EXR	=	*exchange rate (taka per U.S. Dollar)*
WPI	=	wholesale price index
XJC	=	*rate of capacity utilization in export of jute*
FGDP	=	*foreign GDP of major export partners*
XJM	=	export of jute manufacturers
PXJM	=	*export price of jute manufacturers*
EXR	=	*exchange rate (taka per U.S. Dollar)*
XJMC	=	*rate of capacity utilization in jute manufacturing sector*
XRMG	=	export of readymade garments
PXRMG	=	*export price of RMG*
XRMGC	=	*capacity utilization rate in RMG sector*
QUOT	=	*Quota*
XFF	=	export of frozen food
PXFF	=	*export price of frozen food*
XFFC	=	*rate of capacity utilization in export of frozen food*
XT	=	export of tea
PXT	=	*export price of tea*
XTC	=	*capacity utilization in tea sector*
XL	=	export of leather
PXL	=	*export price of leather*
XLC	=	*capacity utilization rate in leather sector*
XN	=	export of non-traditional products[20]
PXN	=	***export price of non-traditional products***
XNC	=	***capacity utilization rate in non-traditional products***

[20] In this proposal, variable expressed in shaded bold font is meant to a newly included endogenous.

In this model, Export supply function for non-traditional products has been included, as the total share of these exported goods has been increasing almost progressively.

Chang, Ho, and Huang (2005) have made a study on determining import demand function. In this study they empirically re-analyzed the aggregate import demand function that shown that import volume, domestic income and relative price are co-integrated. Moreover, Dutta and Ahmed (2006) explored that import volume is found to be co-integrated with relative import price and real GDP. They suggested that import-demand is largely explained by real GDP, and is generally less sensitive to import price changes. Import liberalization is found to have had little impact on import demand.

Factually, in the context of Bangladesh, import of food-grains, raw materials and intermediate goods, capital goods and consumer goods are explained in the model. Food-grains import is specified as a function of import price relative to domestic price of food-grains and real food-aid. Imports of raw materials and intermediate goods are determined by import price relative to domestic price of raw materials and gross domestic product. Capital goods import is related to import price relative to domestic price of capital goods, real non-food aid and aggregate investment in the economy. Investment demand in the economy creates demand for capital goods imports. Finally, consumer goods demand for imports has standard specification- import price relative to domestic price and gross domestic product being the explanatory variables. In the absence of suitable price, variable wholesale price index is used as a proxy variable in the latter two cases. Furthermore, domestic income level is also one of the key factors to determine the imports of the economy and thence included in the all import demand functions of the model.

$$MF = \beta_{59} + \beta_{60}\frac{PMF.EXR}{WPIF} + \beta_{61}FAID + \beta_{62}GDP$$

$$MR = \beta_{63} + \beta_{64}\frac{PMR.EXR}{WPIR} + \beta_{65}GDP$$

$$MK = \beta_{66} + \beta_{67}\frac{PMK.EXR}{WPI} + \beta_{68}NFAID + \beta_{69}INV + \beta_{70}GDP$$

$$MC = \beta_{71} + \beta_{72}\frac{PMC.EXR}{WPI} + \beta_{73}GDP$$

where,

MF	=	import of food grains
PMF	=	*import price of food grains*
EXR	=	*exchange rate (taka per U.S. Dollar)*
WPIF	=	**wholesale price index of food grains**
FAID	=	*real food aid*
MR	=	import of intermediates and raw materials
PMR	=	*import price of intermediate goods and raw materials*
WPIR	=	wholesale price index of raw materials
GDP	=	gross domestic product.
MK	=	import of capital goods
PMK	=	*import price of capital goods*
WPI	=	wholesale price index
NFAID	=	*real non-food aid*
INV	=	real investment
MC	=	import of consumer goods
PMC	=	*import price of consumer goods*

6.4 Government block

Government block is divided into two parts- government revenue and government expenditures. Rahman (1990) suggested that public expenditure is a function of total revenue and total foreign aid receipts of the economy.

Government revenue originates from tax and non-tax sources. Because of substantial dependence of tax on imports, taxes are divided into import duties, other trade taxes and internal taxes. Import duties and trade taxes are related to imports. However, tax revenue earned from import duties has been linked to value of imports in this model for the reason that government of a country increases the tax rate when the import costs or value of imports increases in a specific period of time. It means that an increase in imports will boost an increase in tax revenue. Again, trade taxes are influenced by the same factor. In fact, international trade taxes are levied on imports and exports but the major source of international trade tax revenue is import

duties followed by export duties in Bangladesh. Therefore, the elimination of trade taxes can reduce the revenue of the government (if tax base is not enlarged) and as a result, public savings will be reduced. This is also going to reduce the investment, which is not good for the economy. Internal taxes are specified as a function of nominal GDP and its own lagged value to reflect partial adjustment. Similarly, non-tax revenue is made a function of nominal GDP and its own lagged value to reflect partial adjustment. Though internal taxes and non-tax revenues are both functions of nominal GDP, two separate functions are estimated as they are of different nature having different degrees of response to changes in income.

$$REVM = \beta_{74} + \beta_{75} MV$$
$$REVT = \beta_{76} + \beta_{77} MV$$
$$REVIN = \beta_{78} + \beta_{79} GDPV + \beta_{80} GREVIN(-1)$$
$$REVNT = \beta_{81} + \beta_{82} GDPV + \beta_{83} GREVNT(-1)$$

where,

REVM	=	revenue from import duties
MV	=	value of imports
REVT	=	revenue from other trade related taxes
REVIN	=	revenue from internal taxes
GDPV	=	nominal gross domestic product
REVNT	=	revenue from non-tax sources

Furthermore, government expenditure is divided into consumption expenditure and investment expenditure. Consumption expenditure includes both consumption expenditure and transfer payments. Expenditures are made to depend on nominal GDP, its lagged value as well as total government expenditure, where nominal GDP is the total value of a country's annual output of goods and services and the lagged dependent variable reflects certain degree of irreversibility in consumption expenditure. A time trend is included to capture stronger role of the government in its traditional activities despite market-oriented reforms. As mentioned before investment expenditure is regarded as a policy variable.

$$GCE = \beta_{84} + \beta_{85}GDPV + \beta_{86}GCE(-1) + \beta_{87}TGE + \beta_{88}T$$

where,

GCE	=	government consumption expenditure
GDPV	=	nominal gross domestic product
TGE	=	Total government expenditure
T	=	*time trend*

6.5 Monetary block

There are only a handful of empirical studies on the demand for money for Bangladesh. Hossain (2006) recently estimated demand for narrow and broad money for Bangladesh using a totally outdated partial adjustment method (PAM). Siddiki (2000) used annual data from 1975 to 1995 to estimate the demand for real broad money (M2) with the bounds test approach, which was popularized to estimate demand for money functions by Bahmani-Oskooee and Rehman (2005). Ahmed (2001) studied the existence of a long run demand for narrow and broad money functions for the period 1974-1995. Although these are pioneering studies for Bangladesh, each of these studies has limitations. Nonetheless, after conducting a brief review of these studies, it has found that Siddiki (2000) finding is perhaps the only study that is econometrically satisfactory. However, his estimate of income elasticity at more than three is highly implausible. The other two studies by Hossain (2006) and Ahmed (2002) are econometrically unsatisfactory because they have ignored unit roots in the variables and their summary statistics are biased.

In the paper of Rao B. B., Kumar S., (2007), they have used time series approach and the Gregory and Hansen technique for structural breaks to estimate the demand for real narrow money for Bangladesh. Their study reveals that there exists a co-integrating relationship between real narrow money, real income and nominal rate of interest after allowing for structural breaks. Our estimates imply that there is a well- determined and stable demand for money in Bangladesh and perhaps following the financial reforms in the 1980s, demand for narrow money has declined by a small

amount. This result is to be expected because financial reforms improve the efficiency with which money is used in transactions.

The monetary system of Bangladesh consists of the Bangladesh Bank (the central bank) and the scheduled banks. They interact with the public and create money held by the public. Government budget deficit provides an important mechanism for proving monetary base in Bangladesh.

$$M = \beta_{89} + \beta_{90} CREDP + \beta_{91} GBD + \beta_{92} IR$$

where,

CREDP	=	nominal credit to the private sector
GBD	=	government budget deficit
IR	=	***Interest Rate (central bank rate)***
M	=	money supply

Interest rate is regulated by the government. There is also rigidity in the interest rate because of the oligopolistic structure of the banking system. The equilibrating mechanism in the monetary sector does not work through the demand for and supply of money determining the rate of interest. Rather, the change in money supply affects the price level. Accordingly, demand for money is not modeled in this exercise. However, recently the central bank of Bangladesh has been changing interest rate for controlling money supply of the economy. One question can be raised in the context- what makes the nominal value of money in existence equal to the amount that people want to hold? One fundamental way to make that correspondence happen is for interest rates to change. A fall in interest rates increases the amount of money that people wish to hold; a rise in interest rates decreases that amount they want. So interest rate has been considered in this model as a determinant of money supply. Therefore, the total money supply is specified as a function of private sector credit, government deficit, and interest rate.

6.6 Price block

Rahman and Momen (2004) have explored how money, price, output, exchange rate, inflation and investment of Bangladesh play role in the economy through impulse response analysis. Price and inflation shocks have negative effect on money, money responds positively to changes in output, investment and exchange rate. Output grows initially after a shock of broad money and declines rapidly with a significant negative response. Investment responds immediately and positively to output shock, the response being powerful. Response of inflation is immediate and positive to money and price impulses, immediate and negative to shocks of output and investment.

The GDP deflator is determined by money supply, real GDP, import price index and lagged price level of the economy. Here, money supply is included as an important explanatory variable of GDP deflator because it is linked to rise in price level of an economy by the "monetary exchange equation". Again, the change in real GDP has an effect on GDP deflator, which captures the changes in quantity and is insensitive to the price level. In other words, in macroeconomics, if the money supply grows faster than real GDP growth, change in price level is likely to follow.

Another important factor affecting GDP deflator is price imports. Here, it is essential to be noted that price imports should be actual transaction prices, which can be directly recorded. The price should be recorded at the time when the transaction occurs (ownership changes) rather than when the goods are ordered, which in certain cases can be significantly different. In fact, price imports serves as one indicator of the economy's total supply of goods and services while GDP, the premier indicator of economic performance, is final demand less imports. Thus the price imports influences the GDP deflator inversely.

Furthermore, the lagged price level also affects GDP deflator in the way that when comparing GDP between years, nominal GDP and real GDP capture different elements of the change. Nominal GDP captures both changes in quantity and changes

in prices. Real GDP, on the other hand, captures only changes in quantity and is insensitive to the price level. Because of this difference, after computing nominal GDP and real GDP a third useful statistic can be computed. That is, the GDP deflator in most systems of national accounts measures the difference between the real GDP and the nominal GDP. In effect, the GDP deflator illustrates how much of the change in the GDP from a base year is reliant on changes in the price level. Therefore, the GDP deflator function is shown as under:

$$PGDP = \beta_{93} + \beta_{94} M + \beta_{95} GDP + \beta_{96} PM + \beta_{97} PGDP(-1)$$

where,

PGDP = GDP deflator
PM = *price imports*

PART IV EMPIRICAL RESULTS AND DISCUSSIONS