CHAPTER V

MODEL SPECIFICATION

5.1 Specification of Variables

Literally, macroeconomists use a numerous number of macroeconomic indicators to feel the pulse of aggregate economy. There is no hard and fast rule to make a shortlist based on priority for macroeconomic indicators. It is to be recalled that Gordon (1990) has specified six basic macroeconomic issues including unemployment rate, inflation rate, productivity of labor, interest rate, government budget deficit, and foreign trade deficit. By following almost the same criteria, the model used in this dissertation has differentiated all macroeconomic indicators into 6 key building blocks including Production, expenditure, balance of payments, government, monetary, and price blocks.

In production block, aggregate production function has been reformulated followed by capital stock, private investment and real credit equations. In expenditure block, consumption function has been incorporated with the concept of consumer credit rate effect. In balance of payments block, export supply and import demand functions have been incorporated. After that, government revenue and expenditure sectors have been included to build government block. Only money supply function has made the monetary block by adding rate of interest along with government budget deficit and credit in private sector. Finally, the concept of inflation rate has been added in terms of GDP deflator under the last building block, i.e. price.

5.2 Imposition of Assumptions

As assumptions are most vital ingredients in theorizing the sophisticated economic observations, this research has presupposed the following assumptions for constructing the macroeconometric model of Bangladesh economy.

a) In all five sectors (i.e. primary, secondary, tertiary, quaternary and quinary), production depends on capital stock.
b) Imported intermediate and raw materials act as constraint to production in agriculture and manufacturing
c) The economy is labor-abundant, i.e. labor does not act as a constraint to production.
d) Bangladesh is a price taker in the world market. Moreover, main constraint to export of Bangladesh arises from the supply side.
e) The equilibrating mechanism in the monetary sector does not work through the demand for and supply of money determining the rate of interest.

5.3 Formulation of Hypothesis

The critical step in theorizing is formulation of hypothesis. A hypothesis is a statement, which is tested either for its validity or for its rejection. In this perspective, the hypothesis for measuring the performance of the macroeconometric model, which is proposed in this dissertation, is: *"Monetary policy along with exchange rate policy is more effective than fiscal policy for economic development of Bangladesh economy."*

It is to be recalled that interest rate, real total government expenditures and exchange rate have been considered as policy variables to measure the effectiveness of monetary, fiscal and exchange rate policy respectively.

5.4 Prediction towards functional relationship: A logical postulation

A scientific prediction is not the same thing as a prophecy. The scientific prediction is a conditional statement that takes the form: *If something is done, then such and such things will follow*. Hence, it is obvious to follow some conventional economic philosophies regarding the determination of simultaneous relationship among dependent and independent variables of this macroeconometric model. The model captures different linkages, as they exist in the economy of Bangladesh.

a) Production affects consumption expenditure, imports and thus foreign exchange reserves, government revenue and government consumption expenditure. Finally, it affects the GDP deflator and the wholesale price index.

b) Banking sector credit to the private sector affects sectoral investments, which work through the capital stock to affect output.

c) Money supply is affected by external sector, prevailing interest rate and government sector, which in turn affects GDP deflator, wholesale price index and wholesale price of raw materials.

d) Wholesale prices influence exporters' choice of export and importers decision to import. Prices are determined based on the indicators outside of the model (i.e. exogenous).

e) Public investment influences private investment, which moves the economy through various linkages as mentioned earlier.

f) Total supply of money in the economy depends on demand deposits, time deposits, and currency outside the banking system.

g) Gross domestic expenditures comprise of consumption, investment, government expenditures along with net international trade balances.

Depending on the above philosophies, the following identities can be structured to set up as a base of fabricating overall macroeconometric linkages prevailing in Bangladesh economy.

$$\mathbf{CAD} = \mathbf{XV + NSIT - MV} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (I_1)$$

where,

CAD = current account deficit
XV = value of exports
NSIT = net services, income, and current transfers
MV = value of imports

$$\mathbf{CREDP} = \mathbf{CAGRP + CMANP + CSERP} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (I_2)$$

where,

CREDP = nominal credit to the private sector
CAGRP = *real credit to agriculture*

CMANP = *real credit to manufacturing*
CSERP = *real credit to services*

GBD = TGE – TREV + RESB ..... (I_3)

where,
GBD = government budget deficit
TGE = total government expenditure
TREV = total government revenue
RESB = *residual in the budget balance*

GDP = VAGR + VMAN + VSER ..... (I_4)

where,
VAGR = value added in agriculture
VMAN = value added in manufacturing
VSER = value added in services

GDPV = PGDP * GDP ..... (I_5)

where,
GDPV = nominal gross domestic product
PGDP = GDP deflator

IAGR = IAGRP + IAGRG ..... (I_6)

where,
IAGR = real investment in agriculture
$IAGR_P$ = real private investment in agriculture
IAGRg = *real government investment in agriculture*

IMAN = IMANP + IMANG ..... (I_7)

where,
IMAN = real investment in manufacturing
$IMAN_P$ = real private investment in manufacturing
IMANg = *real government investment in manufacturing*

ISER = ISERP + ISERG ..... (I_8)

where,
ISER = real investment in services
$ISER_P$ = real private investment in services
ISERg = real government investment in services

INV = IAGR + IMAN + ISER ..... (I_9)

where,
INV = real investment
IAGR = real investment in agriculture
IMAN = real investment in manufacturing
ISER = real investment in services

GI = TGE + GCE ..... (I_{10})

where,

GI = real government investment
TGE = *real total government expenditures*
GCE = real government consumption expenditures

MV = MF.PMF.EXR + MR.PMR.EXR + MK.PMK.EXR + MC.PMC.EXR ..... (I_{11})

where,

MV = value of imports
MF = import of food grains
PMF = *import price of food grains*
EXR = *exchange rate (taka per U.S. Dollar)*
MR = import of intermediates and raw materials
PMR = *import price of intermediate goods and raw materials*
MK = import of capital goods
PMK = *import price of capital goods*
MC = import of consumer goods
PMC = *import price of consumer goods*

XV = XJ.PXJ.EXR + XJM.PXJM.EXR + XRMG.PXRMG.EXR + XFF. PXFF.EXR + XT.PXT.EXR + XL.PXL.EXR + XN.PXN.EXR ..... (I_{12})

where,

XV = value of exports
XJ = export of jute
PXJ = *export price of jute*
EXR = *exchange rate (taka per U.S. Dollar)*
XJM = export of jute manufacturers
PXJM = *export price of jute manufacturers*
XRMG = export of readymade garments
PXRMG = *export price of RMG*
XFF = export of frozen food
PXFF = *export price of frozen food*
XT = export of tea
PXT = *export price of tea*
XL = export of leather
PXL = *export price of leather*
XN = export of non-traditional goods
PXN = *export price of non-traditional goods*

TREV = REVM + REVT + REVIN + REVNT..... (I_{13})

where,

TREV = total government revenue
REVM = revenue from import duties

REVT = revenue from other trade related taxes
REVIN = revenue from internal taxes
REVNT = revenue from non-tax sources

YD = (GDP – TREV) + TP ..... (I_{14})

where,
YD = disposable income
GDP = real gross domestic product
TREV = total government revenue
TP = *transfer payments*

GDE = CONSUMP + (IAGRP + IMANP + ISERP) + (GI + GCE) + (XV – MV) ..... (I_{15})

where,
GDE = Gross Domestic Expenditure
CONSUMP = private consumption

DD = M – TD – COB ..... (I_{16})

where,
DD = demand deposits
M = money supply
TD = time deposits
COB = currency outside banks

Therefore, it is sensible to visualize the behavior of this newly structured model by tracing out the following Diagram 5.1 depicting causal relationships among macroeconomic variables based on the selected building blocks.

Diagram 5.1: Macroeconometric model of Bangladesh: A causal relationship