A MACROECONOMETRIC MODEL OF STABILISATION AND GROWTH FOR PAKISTAN*

by

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Abstract

The paper develops a structural simultaneous equations macroeconometric model for Pakistan using the Keynesian open macroeconomic framework in a medium-term setting. The model consists of a number of blocks on the real sector, price level, public finances, monetary policy, external sector, employment and poverty respectively. The model is estimated over the period 1980-81 to 2008-09, using the OLS technique. *Ex*-post simulation of the model produces satisfactory results. Forecasting with the model over the next three years reveals the potential trade off between inflation and growth. Recommendations are then made on the optimal choice of policies such that trade-off can be minimised from the viewpoint of impact on employment and poverty. It turns out that fiscal policy involving a jump in public investment produces better results than an expansionary monetary policy or adjustment in the exchange rate.

1. INTRODUCTION

The economy of Pakistan is going through a period of low growth and high inflation. During the last three years the GDP growth rate has averaged at 3 percent and the rate of inflation at 14.5 percent. The consequences have been increasing unemployment and rapidly rising poverty.

The objective of this paper is to set up a macroeconomic model of Pakistan such that various policy options can be examined for raising significantly the growth rate of the economy once again. The model will highlight the trade-off of pursuing a high growth strategy with respect to the rate of inflation and the size of the deficits on the fiscal account and in the current account of the balance of payments. This will demonstrate the feasibility and sustainability of such a strategy in the Pakistani context. An attempt will be made to identify within this trade-off, the strategy which impacts less on poverty and unemployment.

The paper consists of five sections that are organized as follows. Section II presents the literature review and summarizes the various approaches that have been adopted for stimulating the economy in a period of low growth. Section III gives the specification and the estimated equations of the model. Section IV gives the results of the simulations. Section V presents the conclusions.

2. LITERATURE REVIEW

The literature on stabilisation and growth is rich and based on the experience of various developing countries. A number of authors highlight the fact that macroeconomic policies in developing countries often tend to be pro-cyclical, which exacerbate, rather than alleviate, the adverse impact of the downturns on the long-run growth path [Lane (2003) and Ilzetzki and Végh (2008)]. As opposed to this, developed countries are more prone to follow counter-cyclical fiscal and monetary policies to emerge from recessions, as described by Walsh (2009) and Lane (2003). During the recent financial crises most developed countries, including the USA, have followed such policies. Many developing countries, like India and China, has also provided a strong fiscal stimulus to raise the growth rate in the short run.

At the individual policy level, there is hardly any unanimity on the use of which macroeconomic policies should be used to stimulate growth. There is some disagreement on whether the stabilisation and growth policies should be formulated actively [Auerbach (2005)] or the automatic stabilisers should be allowed to work [Perry (2008)]. Various

discretionary policies have been discussed in the literature [LAM (2005); Hossain and Chowdhury (1996); Federal Reserve Bank of Kansas City (2002); Ilzetzki and Végh (2008); Perry (2008); Lane (2003); and Walsh (2009)].

During the last two decades, the role of IMF Programs on the process of economic stabilisation and growth has been extensively studied. Most studies reach the conclusion that the IMF stabilisation programs hardly lead to any increase in economic growth [Allen (2004); Haque and Khan (2002); and Taylor (1988)], rather in some cases it is found that they reduce growth [Barro and Lee (2003); Mussa and Savastano (1999); Doroodian (1993); and Hutchison (2004)]. However, these programs appear to have greater impact on reducing the budget deficit and current account deficit as well as the rate of inflation [Dreher (2004) and Haque and Khan (2002)].

3. SPECIFICATION AND ESTIMATION OF THE MODEL

The model uses Keynesian open economy macroeconomic framework in a medium term setting. A key feature of the model is its level of aggregation. On the one hand, the model is sufficiently detailed to give a reasonably complete account of the behaviour of the main macroeconomic variables of the Pakistani economy, on the other hand, it is kept relatively small to facilitate estimation and simulations. The model attempts to capture the effect especially of fiscal, monetary, and exchange rate policies.

3.1 The Structure of the Model

The model contains 18 equations: 11 behavioural equations and 7 identities in six blocks. Including exogenous and policy variables, there are 40 variables in the model. The model is based on the Keynesian aggregate demand framework and output of the economy is driven by aggregate demand. The focus in Pakistan is on demand management first to cut-down inflation rate and second to control the current account deficit given the limited foreign exchange reserves. Aggregate demand is derived by summing the main expenditure components of GDP. These components are either expressed by behavioural equations or are exogenously determined.

Data Sources

The time period of the model estimation is 1980-81 to 2008-09. Over this period, the data for the GDP and many macroeconomic series is based on two base years: the first base year is the 1980-81 and the second base year is 1999-2000. Therefore, the data for these series is, first, made consistent on the 1999-2000 base year using the standard splicing technique and secondly the data for the GDP components are made consistent to meet the basic national income accounts identity

given in equation (1). Any discrepancy in the identity was met through the adjustment in private consumption expenditure. The data is collected from the various Pakistani sources, like the *Economic Survey, FBR Year Book; Handbook of Statistics on Pakistan Economy, SBP Annual Report,* and *SBP Statistical Bulletin* and international sources, like the *World Development Indicators (Online version)* and *International Financial Statistics 2009 (Online version).*

I. The Real Sector

The basic **Keynesian Identity** is

$$\boldsymbol{Y = C_P + C_G + I_P + I_G + X - M + \Delta S} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where,

Y = Gross Domestic Product
C_P = Private Consumption Expenditure
C_G = Government Consumption Expenditure
I_P = Private Fixed Investment
I_G = Public Fixed Investment
X = Expenditure on Exports of Goods and Services
M = Expenditure on Imports of Goods and Services
ΔS = Change in Stocks

The national identity from the national accounts is the starting point for specifying the macroeconometric model, it is the basic accounting identity and is the IS part of the IS-LM model. In the following, the specification of the underlying equations is presented, starting with private consumption expenditure.

Private Consumption Expenditure

The private consumption expenditure (C_P) function takes the following form:

$$\boldsymbol{C_P = C_P(Y_M(1 - \bar{t}), C_{P-1})} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

relating real private consumption expenditure, C_P, to real disposable income Y_d and one year lagged private consumption expenditure.

The estimated equation is as follows:

$$lnC_P = -0.1320 + 0.4430 lnY_D + 0.5585 lnC_{P_{-1}}$$
(-0.416) (3.247)*[1] (4.261)*
Adjusted R^2 = 0.991, DW-Stat = 2.074
F-ratio = 954.602

Public Consumption Expenditure

The public consumption expenditures (C_G) is a policy variable and specified exogenously in the model as

[1] The asterisks *, **, and *** in the equations denote that the coefficients are significant at the 1, 5, and 10 percent level of significance respectively.

$$\boldsymbol{C_G = \bar{C}_G} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Private Investment

The private fixed investment (I_P) is entirely behaviourally determined, as follows:

$$\boldsymbol{I_P = I_P\left(Y_M, \bar{r}, \frac{\overline{UVICM}\cdot\varepsilon}{P_d}, \overline{I_G}\right)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

In this functional form, real private investment depends upon the real income (Y_M), the real rate of interest ($\bar{r}$), which is given exogenously; and the relative domestic price of the imported capital goods $\left(\frac{\overline{UVICM}}{P_d}\right)$ multiplied by the nominal exchange rate, ε, defined as the unit value index of capital imports (*UVICM*) divided by the domestic price level (P_d); Public investment ($\overline{I_G}$), is taken as another explanatory variable to see whether it crowds-in or crowds-out private investment.

The estimated equation is as follows:

$$lnI_P = -7.8732 + 1.2654lnY_M - 0.0079r_{-1} - 0.1167ln\left(\frac{\overline{UVICM}\cdot\varepsilon}{PD}\right) + 0.1363ln\overline{I_G}$$

(-6.1351)* (21.295)* (-2.017)** (-3.192)* (1.929)***

Adjusted R^2 = 0.984, DW-Stat = 1.560

F-ratio = 345.225

Public Investment

Public investment is another policy variable and is exogenously determined as follows:

$$\boldsymbol{I_G = \bar{I}_G} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Expenditure on Exports of Goods and Services

The expenditure on exports of goods and services takes the following form:

$$\boldsymbol{X = X\left(Y_w, \frac{\overline{UVIX}\cdot\varepsilon}{P_d}\right)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

where Y_W is the world income and the relative competitiveness of the Pakistani goods in the international market is measured by $\frac{\overline{UVIX}}{P_d}$, defined as the domestic unit value index of exports (*UVIX*) divided by the domestic price level (P_d).

The estimated equation is as follows:

$$lnX = 1.2712 + 0.6925lnY_W + 0.0793ln\left(\frac{\overline{UVIX}\cdot\varepsilon}{PD}\right)_{-1} + 0.3666lnX_{-1}$$

(2.606)** (2.929)* (0.307) (1.8206)***

Adjusted R^2 = 0.973, DW-Stat = 2.125

F-ratio = 194.169

Expenditure on Imports of Goods and Services

The expenditure on imports of goods and services takes the following form:

$$\boldsymbol{M = M\left(Y_M, \bar{r}, \frac{\overline{UVIM} \cdot \varepsilon}{P_d}\right)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

with real income (Y_M), the real interest rate ($\bar{r}$), and the relative domestic price of imported goods $\left(\frac{\overline{UVIM}}{P_d}\right)$. The relative price is defined by the ratio of the unit value index of imports to the domestic price level. The real interest rate, in this equation, captures the affect of interest-sensitive imports, like capital goods.

The estimated equation is as follows:

$$lnM = 2.3816 \;+\; 0.7271 lnY_M - 0.0134 r_{-1} - 0.2624 ln\left(\frac{\overline{UVIM} \cdot \varepsilon}{PD}\right)$$

(1.350) (6.164)* (-2.459)** (-1.394)

Adjusted R^2 = 0.954, DW-Stat = 1.186

F-ratio = 80.480

Change in Stocks

Change in stocks is exogenously given to the model,

$$\boldsymbol{\Delta S = \overline{\Delta S}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

II. The Price Level Block

The Domestic Price Level

The domestic price level assumes the following functional form:

$$\boldsymbol{P_d = P\left(\frac{\overline{MM}}{Y_M}, \overline{UVIM} \cdot \varepsilon, P_{d-1}\right)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

In this equation, the domestic price level, P_d, depends on the ratio of the money supply, *MM,* to the real income, Y_M; on the domestic unit value index of imports, *UVIM*, multiplied by the nominal exchange rate, ϵ, and the one year lagged domestic price level. In this equation, the variable MM/Y_M captures the impact of relative monetization of the income on the domestic price level and it is assumed to affect positively. The term *UVIM* captures impact of imported inflation and the one year lagged domestic price level variable reflects the impact of the price expectations in the economy.

The estimated equation is as follows:

$$lnPD = 1.0909 + 0.1072 ln\left(\frac{MM_{-1}}{Y_M}\right) \;+ 0.2176 ln\overline{UVIM} \cdot \varepsilon + 0.5686 lnPD_{-1}$$

(3.424)* (2.124)** (7.338)* (9.324)*

Adjusted R^2 = 0.9995, DW-Stat = 2.721

F-ratio = 10651.060

The Food Price Level

The food price level is another important price variable because it has very strong impact on poverty. It assumes the following functional form:

$$\boldsymbol{P_f = P(P_d)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (10)$$

The estimated equation is as follows:

$$lnP_f = -0.1830 + 1.045lnP_d$$

(-5.568)* (124.584)*

Adjusted R^2 = 0.999 DW-stat = 1.896

F-ratio = 14299.020

III. The Fiscal Sector Block

Government Revenue (RTR)

Government revenue assumes the following functional form:

$$\boldsymbol{RTR = RTR(Y_M, M)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (11)$$

relating the real total revenue collection, *RTR*, to the main elements of the tax bases – the aggregate economic activity, Y_M, and imports of goods and services, *M*.

The estimated equation is as follows:

$$lnRTR = -4.179 + 1.029lnY_M + 0.138lnM$$

(-5.677)* (12.441)* (1.731)**

Adjusted R^2 = 0.978 DW-Stat = 1.348

F-ratio = 188.459

Total Government Expenditure (PUEA)

$$\boldsymbol{PUEA = PUEA[(\overline{C_G} + \overline{I_G}) \cdot P_D/100]} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (12)$$

PUEA depends upon the government consumption expenditure and public investment, as given in the national income accounts.

The estimated equation is as follows:

$$ln(PUEA) = -132067.6 + 1.563ln[(\overline{IG} + \overline{CG}) \cdot P_D/100]$$

(-2.853)* (23.415)*

Adjusted R^2 = 0.978 DW-stat = 1.792

F-ratio = 407.564

Fiscal Deficit (FD)

The final expression in this block is the fiscal deficit, *FD*, identity, which is given by the expression;

$$\boldsymbol{FD = PUEA - (RTR \cdot P_D/100)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (13)$$

IV. The Monetary Sector Block

Monetary policy has two tools, namely, changes in money supply and the interest rate. In this model, the money supply is modelled as behaviourally determined while the interest rate is taken as exogenously set.

Change in Money Supply (DMS)

The change in money supply assumes the following functional form:

$$\boldsymbol{DMS = DMS(FD, \bar{r}, Y_M \cdot P_D/100)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (14)$$

relating the change in money supply to the fiscal deficit, *FD,* the real interest rate, $\bar{r}$, and the real income, Y_M. The real interest rate and nominal income are the traditional measure of change in demand of money. The third determinant of the change in money supply, the fiscal deficit, captures the process of seignorage by the government to finance the deficit.

The estimated equation is as follows:

$$DMS = -45480.670 + 0.4597FD - 7884.368r + 0.0465Y_M$$
$$\text{(-1.352)} \quad \text{(1.921)***} \quad \text{(-2.339)**} \quad \text{(4.796)*}$$

Adjusted R^2 = 0.952 DW-stat = 2.14
F-ratio = 109.134

Money Supply

The money supply is derived through a simple identity as follows:

$$\boldsymbol{MM = DMS + MM_{-1}} \ldots\ldots\ldots\ldots (15)$$

V. Current Account of the Balance of Payments Block

The Current Account (CA)

The current account (as percentage of GDP) is measured through the following identity:

$$\boldsymbol{CA = \frac{X \cdot \overline{UVIX} \cdot \varepsilon - M \cdot \overline{UVIM} \cdot \varepsilon + \overline{NFI} \cdot \frac{P_d}{100}}{Y_M \cdot \frac{P_d}{100}}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (16)$$

This identity is the ratio of the sum of the net exports and net factor income from abroad to the nominal GDP level in the economy.

VI. Employment and Poverty Block

Level of Employment

The employment demand equation is of the following functional form:

$$\boldsymbol{E = E(Y_M, \overline{RW})} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (17)$$

In this functional form, the level of employment is dependent on the real income and the real wage rate, $\overline{RW}$.

The estimated equation is as follows:

$$lnEmp = -0.5962 + 0.4431 lnY_M - 0.4675 ln\overline{RW}$$
(-0.760) (17.816)* (-5.143)*
Adjusted R^2 = 0.987, DW-Stat = 1.549
F-ratio = 433.892

Level of Poverty

The level of poverty assumes the following functional form:

$$\boldsymbol{POV = POV\left(\frac{Y_M}{\overline{Pop}}, \frac{P_f}{P_d}\right)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (18)$$

In this functional form, the level of poverty depends on the real per capita income $\left(\frac{Y_M}{Pop}\right)$, and on the relative food price $\left(\frac{P_f}{P_d}\right)$.

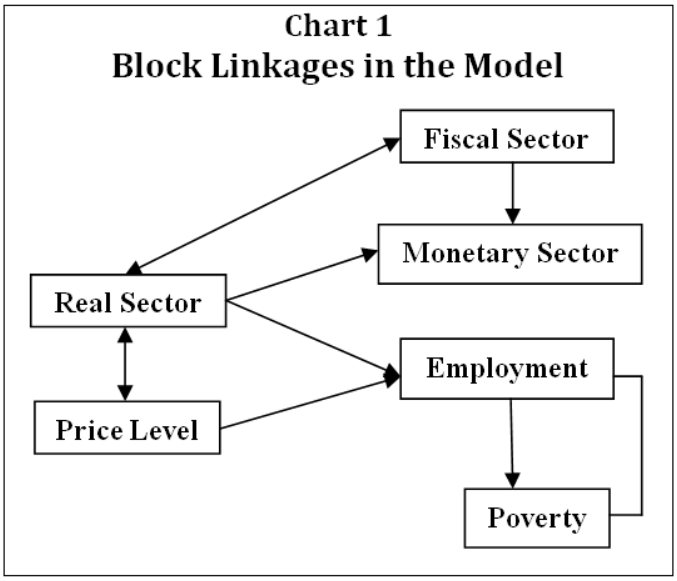
The estimated equation is as follows:

$$lnPov = 15.9778 - 1.2421 ln\left(\frac{Y_M}{\overline{Pop}}\right) + 3.0239 ln\left(\frac{P_f}{P_d}\right)$$
(6.130)* (-4.838)* (2.704)*
Adjusted R^2 = 0.795 DW-stat = 1.813
F-ratio = 22.737

3.2 Block Linkages or the Complete Model

Based on the above specification of the model, it is important to understand how the variables or blocks are linked to each other in the system, as shown in Chart 1. The first is the real sector block, the components of which include equations from other blocks too: two from the fiscal block and two from the external block. Once the components in this block are estimated, we will have an estimate of the GDP, which then will be used in other blocks. The second block is the price level block. The price equation, in this block, is determined through two blocks. These are the monetary block and the external block. This block, in succession, impacts almost all other blocks. Price variables in this model connect the real and monetary sectors. That is, a shock to the monetary sector affects the real

sector through price effects. A shock arising from the real sector also changes the price variable but indirectly via monetary variables. The third block is the fiscal sector block. As can be seen from the Keynesian identity, this block is crucial for determining the aggregate demand. In fact, the public investment is an important variable in determining the private investment. Other impact of the fiscal sector on this block is through the level of direct taxation in the private consumption expenditure equation. Another important influence of this block is on the monetary block, where it is assumed to be an important determinant of the change in money supply.



Monetary block, the fourth block in the model, interacts with other blocks through the money supply and the real rate of interest. It affects the real sector mainly through the price variables. Also, the real rate of interest determines private fixed investment. Real exports and imports of goods and services in the final demand block are also influenced by this block. The fifth block is the international trade block. The main output in this block is the current account deficit, which is determined through the real, the price, and the monetary block. The final block in the model is the social sector and the labour market block, which depends on the outcomes of the first two blocks, namely, the real sector block and the price level block.

4. RESULTS OF MODEL SIMULATIONS

4.1 Policy Variables

There are a number of policy variables in the model. These variables can be categorized into the fiscal policy, monetary policy, and trade policy variables, as follows:

Fiscal Policy Variable

1 Level of Direct Taxation $(\bar{t})$
2 Government Consumption Expenditure $(\overline{C_G})$
3 Public Investment $(\overline{I_G})$

Monetary Policy Variables

4. Real Interest Rate $(\bar{r})$

Trade Policy Variables

6. Nominal Exchange Rate (ε)

4.2 Results of *Ex Post* Simulations

This subsection presents the result of *ex post* simulation for the period observed, 1980-81 to 2008-09. As shown in Table 1, the tracking performance of the model and its forecasting accuracy is satisfactory as evaluated on the basis of the root mean square error (RMSE), mean absolute error (MAE), and the Theil's *U* inequality coefficient. The Theil's inequality coefficient (U) does not exceed the value of 0.1 for any variable, which renders the model well for future policy simulations. This can also be seen from the correlation coefficients (between the actual and simulated series).

Table 1
Criteria for Goodness of Fit of the Simulation Model

Variable	Correlation	RMSE	MAE	Theil's U			Mean (1981-2009)
				Value	Bias[a]	Variation[b]	
LnCP	0.9946	0.0348	0.0278	0.0012	0.0015	0.0161	14.68
LnIP	0.9937	0.0456	0.0358	0.0018	0.0000	0.0032	12.77
LnX	0.9853	0.0768	0.0646	0.0029	0.0001	0.0125	13.08
LnM	0.9827	0.0527	0.0412	0.0020	0.0000	0.0087	13.27
LnPd	0.9998	0.0123	0.0100	0.0015	0.0002	0.0039	4.32
LnPf	0.9996	0.0204	0.0153	0.0024	0.0068	0.0400	4.11
LnRTR[c]	0.9918	0.0327	0.0280	0.0012	0.0000	0.0043	13.31
LnPUEA[c]	0.9903	85876	70269	0.0393	0.0000	0.0049	903573
LnDMS	0.9804	37326	29574	0.0718	0.0000	0.0099	258860
LnEmp	0.9947	0.0216	0.0184	0.0031	0.0000	0.0026	3.53
LnPov	0.9102	0.1051	0.0848	0.0158	0.0000	0.0537	3.31
LnY_M	0.9984	0.0134	0.0120	0.0017	0.0004	0.0056	14.99

Notes: Correlation is a coefficient of actual and simulated series; *RMSE*-root mean squared error; *MAE*-mean absolute error; *Theil's U*-Theil's Inequality Coefficient; Value-value of Theil's U; *Bias*-fraction of error due to bias; *Variation*-fraction of error due to different variation; *MEAN*-mean value of variable over the period.

[a] This component of the Theil's inequality coefficient shows that the cause of discrepancy between predictions and realizations is the difference between their means.

[b] This component of the Theil's inequality coefficient shows that another cause of discrepancy between predictions and realizations is the difference between their variances.

[c] Note that for these two variables, the measurement period is from 1991-2009.

4.3 Policy Simulations

We now turn to the *ex ante* simulations of the model involving medium-term macroeconomic projections from 2010-11 to 2012-13 based on the choice of particular instruments of policy described above. We first develop the 'base scenario' as follows:

base scenario: This scenario as shown in Table 2 essentially reflects the policy stance in the on-going IMF program of Pakistan through a Standby Agreement. The focus of the program is primarily on stabilisation. As such, the fiscal deficit is projected to fall from over 5 percent of

the GDP in 2009-10 to 4 percent in 2010-11 and to 3.5 percent by 2010-13, based on a strong tax effort and containment of expenditure. The current account deficit is to be maintained at relatively low levels of just above 3 percent of the GDP. The inflation rate is to be brought down to low single digit rate of 6 percent by 2012-13.

The policy mix in the base scenario which helps in the attainment of these targets is as follows:

(i) the revenue-to-GDP ratio will have to increase from 12.9 percent in 2009-10 to 14.3 percent in 2012-13, while public expenditure will have to brought down from 18.4 percent of the GDP to 17.7 percent of the GDP, achieved by strong containment of public expenditure and only limited growth in public investment.

(ii) real interest rate maintained at 2.5 percent over the period, implying a relatively contractionary stance of monetary policy.

(iii) enough nominal exchange rate depreciation to ensure that the REER does not appreciate in relation to the level attained in 2009-10.

The consequences of the policy mix in the IMF program is that the economy remains on trajectory of low growth rate of the GDP, projected by the model at 3.5 percent in 2010-11 rising somewhat to 4.4 percent by 2012-13. The unemployment rate continuously rises reaching 10 percent by 2012-13 while an additional 8.9 million people fall below the poverty line in the next three years. The model clearly demonstrates the sharp trade-off between stabilisation and growth implicit in the IMF program.

We now examine the impact on the economy of different forms of stimuli for economic revival as follows:

fiscal stimulus: In this scenario, public investment grows faster by 5 percent each year in relation to the growth rate annually in the base scenario. This implies that public investment is about 15 percent higher by 2012-13. The model simulation reveals the following:

(i) the fiscal deficit is larger by 0.2 percent of the GDP in 2010-11 and by 0.5 percent of the GDP in 2012-13. However, the deficit remains low and within safe financing limits

(ii) the current account deficit is only marginally larger, by about 0.2 percent of the GDP in 2012-13

(iii) the rate of inflation is, more or less, unchanged. While there is some faster expansion of the money supply due to somewhat larger borrowing of the government from the

Central Bank to partly finance the larger deficit this is countered by the supply-side response of higher GDP

(iv) the GDP growth rate rises by 0.4 percent in 2010-11 and by as much as 0.8 percent in 2012-13, not only due to the multiplier effects of higher public expenditure but also more public investment 'crowd-in' more private investment.

The basic conclusion is that the fiscal stimulus via higher public investment is effective in raising the GDP growth rate without jeopardising significantly the process of stabilisation of the economy. The consequence is that by 2012-13 almost half a million more jobs are created and there are almost one million less poor people in relation to the base scenario.

Table 2
Major Economic Indicators under Different Policy Scenarios

	2009-10	Projections[a]							
		Baseline		Fiscal Stimulus		Monetary Stimulus		Exchange Rate Stimulus	
		10-11	12-13	10-11	12-13	10-11	12-13	10-11	12-13
THE REAL SECTOR BLOCK (Growth Rates, %)									
GDP	**4.1**	**3.5**	**4.4**	0.4	0.8	0.0[a]	-0.1	0.1	0.3
Private Consumption	2.3	3.7	4.0	0.2	0.6	0.0	-0.2	0.1	0.2
Public Consumption	2.5	-1.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
Private Investment	-6.9	8.2	8.3	1.3	1.8	0.2	0.7	-0.3	0.1
Public Investment	2.5	4.0	7.5	5.0	5.0	0.0	0.0	0.0	0.0
Exports of Goods and Services	1.6	6.1	3.8	0.0	0.0	0.0	0.0	0.0	0.4
Imports of Goods and Services	-12.7	8.2	4.0	0.4	0.6	0.0	0.0	-0.9	-0.5
THE FISCAL BLOCK (As percentage of GDP)									
Total Revenue	12.9	13.7	14.3	0.0	0.0	0.0	0.0	-0.1	-0.1
Total Expenditure	18.9	17.7	17.7	0.3	0.6	0.0	0.1	0.0	0.0
Fiscal Deficit	6.0	4.1	3.5	0.2	0.5	0.0	0.0	0.0	0.0
THE PRICE LEVEL AND THE MONETARY BLOCK (%)									
Money Supply	9.8	9.2	10.4	0.4	1.0	0.4	0.2	0.2	0.8
Real Interest Rate	3.0	2.5	2.5	0.0	0.0	-2.5	-2.5	0.0	0.0
Rate of Inflation	11.7	9.0	6.3	0.0	-0.1	0.0	0.1	1.1	2.0
THE CURRENT ACCOUNT OF THE BALANCE OF PAYMENTS BLOCK (As percentage of GDP)									
Exports of Goods and Services	14.4	14.5	14.7	0.0	-0.3	0.0	0.0	0.6	1.4
Imports of Goods and Services	19.2	19.8	19.9	0.0	-0.1	0.0	0.7	0.5	1.4
Current Account Deficit	2.8	3.2	3.3	0.1	0.2	0.0	0.6	0.0	-0.1
THE EMPLOYMENT AND POVERTY BLOCK									
Employment (Million Nos.)	51.3	52.2	54.4	0.1	0.4	0.0	-0.2	0.0	0.1
Poverty (% of Population)	33.3	34.7	36.6	-0.2	-0.8	0.0	0.3	0.0	0.0

[a] The projections for fiscal, monetary and exchange rate stimulus show only differences in relation to the baseline scenario.

monetary stimulus: In this scenario, the real rate of interest is brought down to zero in comparison to 2.5 percent in base scenario. Simulation of the model highlights the following:

(i) the rate of monetary expansion is somewhat higher by about 0.2 percent in 2012-13 and, consequently, the rate of inflation is lightly higher
(ii) the fiscal deficit is largely unaffected
(iii) private investment grows faster by about 0.7 percent in 2012-13 and due to the resulting higher demand for imported machinery the current account deficit is larger by about 0.6 percent of the GDP in 2012-13
(iv) the impact on the GDP growth is minimal as much of the incremental aggregate demand spills over into higher imports.

Therefore, a monetary stimulus involving a reduction in the real interest rate is largely ineffective in reviving the economy. Unemployment and poverty levels are, if anything, slightly larger than in the base scenario.

exchange rate stimulus: In this simulation, the nominal exchange rate depreciates at a faster rate of 5 percent annually in relation to the base scenario. Observed effects are as follows:

(i) minimal effect on the fiscal deficit
(ii) exports are stimulated and show faster growth of 0.4 percent in 2012-13 while there is some import compression by about 0.5 percent. Consequently, the current account deficit is somewhat smaller in 2012-13
(iii) the impact on the rate of inflation is perceptible and it is higher by over 1.1 percent in 2010-11 and 2 percent by 2012-13.

The exchange rate stimulus is unsuccessful in raising the GDP growth significantly, by only about 0.3 percent in 2012-13, due partly to the negative impact on the level of private investment. Even this modest enhancement is achieved at the cost of significantly higher inflation. Consequently, the employment and poverty levels remain unchanged at the levels projected in the base scenario.

The basic conclusion that emerges from simulations of the model is that if the objective is to revive the economy then unambiguously the best strategy to follow is to provide a fiscal stimulus via an enhanced level of public investment in the economy. This minimises the trade-off between growth rate and inflation and helps thereby in rising employment and reducing poverty. Other stimuli are not so effective in raising growth while exacerbating inflationary pressures in the economy.

The likely impact of enhanced public investment on growth is likely to be even greater if the PSDP is better prioritized and implemented with emphasis, first, on early completion of mature on-going projects and, second, with a higher share of allocations going to key sectors like power, water, agriculture, education and health.

5. CONCLUSION

The paper has developed an open economy Keynesian aggregate demand model of the economy of Pakistan. The model has 18 equations and 40 variables. The latter include a set of policy variables which enable simulation of the impact on the process of stabilisation and growth of changes in fiscal, monetary and trade policies. *Ex post* simulation of the model from 1980-81 to 2008-09 reveals a satisfactory forecasting capability based on standard measures of predictive accuracy.

The model is used to make medium-term forecasts of economic trends upto 2012-13 with different policy scenarios. The basic scenario captures the policy mix embodied in the on-going IMF program with a strong emphasis on stabilisation by cutting down the 'twin' deficits and bringing down sharply the rate of inflation. The model shows that in this scenario the economy remains in a low trajectory of growth of below 4.5 percent and both unemployment and poverty will continue to rise rapidly.

The policy simulations reveal that if the objective is to revive the economy then unambiguously the best strategy is to provide a fiscal stimulus via a jump in the level of economy, which could also 'crowd-in' private investment. This strategy minimises the trade-off between growth and inflation and helps thereby in raising employment and reducing poverty. Other stimuli, like an expansionary monetary policy or faster depreciation in the exchange rate, are not so effective in raising growth while exacerbating inflationary pressures in the economy.

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