NORTH-HOLLAND

Three-Gap Analysis of Structural Adjustment in Pakistan

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This paper addresses two specific sets of questions. The first main question that has occupied a number of researchers is whether the adjustment programs (advocated by the World Bank and the International Monetary Fund) have had any positive effects to date on macroeconomic performance (i.e., on exports, imports, savings, investment, consumption, and gross domestic product) in Pakistan. The second main question posed here is whether and to what extent external factors aggravated the adjustment process. The purpose of this study has accordingly been to provide systematic quantitative evidence on these fundamental questions, using 1970 to 1993 as the period of observation. We use a three-gap framework to explore the contributions to macroeconomic performance of the adjustment policy reforms and external shocks. The individual and collective effects of adjustment policies and external shocks are measured through a number of simulation experiments. The central finding of the study is that in broad terms, the adjustment programs resulted in a substantial improvement in macroeconomic performance of Pakistan's economy. Furthermore, the adverse effects associated with external shocks appeared to have been severe during the adjustment process.

1. INTRODUCTION

After a decade of significant and substantive adjustment programs, an intense debate has arisen about how the past and future effects of adjustment policies influence macroeconomic performance in Pakistan. The aim of this study is to add another voice

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Received January 1997; final draft accepted March 1998.

Journal of Policy Modeling 22(1):117–138 (2000)

Published by Elsevier Science Inc.

0161-8938/00/$–see front matter
PII S0161-8938(99)00011-3

to this controversy. In particular, the study tries to assess whether or not adjustment policies have had a positive impact on a number of key macroeconomic variables viz. exports of goods and services, imports of goods and services, public sector revenues and investment, private savings and investment, and the level of output in Pakistan. Using simulation methods the study seeks to evaluate adjustment policies in terms both of the direct and of indirect effects that they may have had on these selected target variables. Our interest is not new, and the literature includes several qualitative studies based on "with–without" and "before–after" approaches. Bilquees (1987), for example, after evaluating the 3-year IMF stabilization program under the Extended Fund Facility arrangement for the period 1980–83, concluded that the stabilization programs had accentuated rather than alleviated the structural problems of the Pakistani economy. Nicholas (1988) and Balassa (1989a) compared trends of some macroeconomic performance indicators of Pakistani economy for the periods with and without adjustment programs, and concluded that the increasing or decreasing trends in macroeconomic indicators are due to adjustment reforms (ignoring the effects of all other factors). McCleary (1991) found that the adjustment reforms undertaken during the 1980s improved economic performance and the capacity to respond to economic changes of Pakistan's economy. The findings of McCleary were also supported by M.S. Khan (1991). In another study, Kemal (1994) argued that structural adjustment contributed towards increasing efficiency, but that this had been accompanied by rising income inequalities and poverty in Pakistan. More recently, a qualitative study by Noman (1995) concludes that the aggregate performance of the Pakistan economy has been worse during the 6 years of structural adjustment programs than it was in the previous 6 years. In addition, he suggests that income distribution has sharply deteriorated during the adjustment period.

As a development of the earlier qualitative studies, Naqvi and Sarmad (1993), Vos (1994), and Jansen (1993) provided a number of quantitative insights.[1] Naqvi and Sarmad (1993) explained the nature of the external shocks, the importance of the compensatory external flows, and the relevance of the domestic response variables in the adjustment process in Pakistan. Vos (1994) uses a

[1] All these studies (except Vos) are unpublished; the preliminary results were discussed in a conference organized by the Institute of Social Studies, The Hague, The Netherlands, December 2–3, 1993.

computable general equilibrium (CGE) model for Pakistan to simulate, inter alia, the effects of additional foreign assistance to Pakistan, and found that this would generate "Dutch disease" effects and would, therefore, be unsupportive of a structural adjustment program that was meant to strengthen the export base and the production of traded goods. Regarding adjustment policy variables, Vos found that an additional exchange-rate depreciation would produce mainly (cost-push) inflationary tendencies, erosion of real incomes, and aggregate demand outfall in the medium run. A cut in public expenditure would seem less harmful, and stimulate a shift towards the traded-goods sectors and, in addition, would allow for lower inflation and "crowding in" of private investment in Pakistan. From our point of view, this study has two shortcomings. First, the CGE model is calibrated based on a social accounting matrix for the year 1984, which seems to be rather old, as the adjustment policies started extensively in 1988. Second, some of the elasticities are borrowed from various studies and others are guesstimates, which may not provide an accurate assessment of adjustment policies in Pakistan. In his comparative analysis study, Jansen (1993), in his study of five countries (Mexico, Pakistan, Thailand, Tanzania, and the Philippines), finds that different types of foreign finance have been associated with policy problems and with quite different outcomes in these countries. The World Bank and the IMF have also periodically undertaken reviews of the effectiveness of the structural adjustment programs that have been proposed for Pakistan.[2] Their reviews, however, are generally based on qualitative assessments. These reviews suggest that structural adjustment programs, on average, improved the internal and external imbalances of the Pakistan economy.

In short, there is first a lack of an adequate quantitative methodology for assessing the impact of the structural adjustment reforms; moreover, what studies do exist come to conflicting conclusions. It is, therefore, difficult for policymakers in Pakistan to decide whether to continue with the existing reforms and whether to change them in particular directions. By designing a study that is methodologically more suitable than those found in the existing literature, we hope that this paper will enable policymakers to make more informed decisions on these crucial issues. In particular, we shall examine, theoretically and empirically, two questions

[2]For these reviews see, World Bank (1985, 1988, 1989, 1993).

Table 1: Accounting Identities of a Three-Gap Model for Pakistan

	Capital Accounts				
	Private	**Public**	**ROW**	**All other accounts**	**Σ**
Capital Accounts					
Private	*	0	NF_p	S_p	$S_p + NF_p$
Public	NSS_p	*	NF_g	$T_{nt} + T_t - C_g$	I_g
ROW	0	0	*	$M_g + M_{sr} - X_g - X_{sr}$	NF
All Other Accounts	I_p	I_g	0	*	I
Σ	$S_p + NF_p$	I_g	NF	I	*

that are critical for understanding the effects of adjustment measures on the economic performance of Pakistan's economy. *The first main question here is whether or not adjustment policies (such as exchange rate devaluation, reduction in public current spending, contraction in domestic credit to the public sector, real interest rate changes, additional adjustment lending, and private capital inflows) have had positive effects on certain selected target variables.* In addition, account must be taken of the external shocks to which Pakistan's adjustment reforms were subject during the 1970s and 1980s. Therefore, *the second main question posed here is whether and to what extent external factors (such as oil shocks, terms-of-trade deterioration, foreign interest rate shock, and a slowdown in economic activities in the Middle East) have aggravated the adjustment process in Pakistan.* From a policy perspective, it is obviously desirable to isolate the effects of external shocks from adjustment policies, which indeed, is one of the main limitations of the earlier qualitative studies undertaken in the case of Pakistan.

The paper is structured as follows. In Section 2 a three-gap model for Pakistan is developed. Then in Section 3 the effects of different adjustment policy variables and external shocks on selected macroeconomic indicators are simulated. The final section presents a summary of the main findings.

2. A THREE-GAP MODEL

Table 1 reports the basic accounting identities that are required for the development of a three-gap framework for Pakistan. A brief description of the accounting formulations is as follows. First, the formulation recognizes three types of capital transfers, viz. net private capital surplus transferred to the public sector (NSS_p); net

foreign capital inflows to the private sector (NF_p); and net foreign capital inflows to the public sector (NF_g). Total public revenues are divided into two main components, namely, non-trade revenues (T_{nt}) and trade revenues (T_t). Subject to capital transfers, these revenues are available to financial public consumption (C_g) and public investment (I_g). Aggregate imports are divided into imports of goods (M_g) and imports of factor and nonfactor services (M_{sr}). Similarly, aggregate exports are divided into exports of goods (X_g) and exports of factor and nonfactor services (X_{sr}). The implied aggregate for foreign savings is denoted NF. This, together, with private savings, S_p, and public saving, $T-C_g$, must exactly balance aggregate investment, which is denoted by I.

The accounting identities that are captured in Table 1 imply that

$$S_p + NF_p = NSS_p + I_p \tag{1}$$

$$I_g = T_{nt} + T_t + NSS_p + NF_g - C_g \tag{2}$$

$$NF_p + NF_g = M_g + M_{sr} - X_g - X_{sr} \tag{3}$$

$$I_p + I_g = S_p + T_{nt} + T_t + M_g + M_{sr} - X_g - X_{sr} - C_g \tag{4}$$

The above equations (1 to 4) are the fundamental equations of any three-gap model viz, the fiscal constraint (Equation 2), the foreign exchange constraint (Equation 3), and the saving constraint (Equation 4). This leaves Equation (1), which is redundant because it is implied by and, therefore, can be obtained from Equations 2 to 4. Thus, there are three linearly independent equations (2 to 4) in 13 variables, which leaves 10 degrees of freedom.

We have developed our model from this point onwards in two stages. In the first stage we have endogenized seven of the original variables to produce a first approximation to the final model. Specifically, we have assumed that

$$\begin{aligned}
&\text{(i) } M_g = \beta Y \quad \text{and} \quad M_{sr} = \zeta M_g \\
&\text{(ii) } X_g = wY \quad \text{and} \quad X_{sr} = \epsilon Y \\
&\text{(iii) } T_{nt} = \alpha y \quad \text{and} \quad T_t = \xi M_g \\
&\text{(iv) } S_p = \sigma(Y - T) \quad \text{where} \quad T = T_{nt} + T_t
\end{aligned} \tag{5}$$

This introduces a new variable, Y, which is the gross domestic product, the role of which is essentially to normalize the values of other variables.

Next we define aggregate and private consumption by C and C_p, respectively, where

$$C = C_p + C_g \tag{6}$$

and

$$Y = C_p + S_p + T \tag{7}$$

and, hence, after some standard manipulation of Equations 1 to 7, obtain a set of equations

$$Y = [1/(\mu - \Psi)]\{NF_p + NF_g\} \tag{8}$$

$$I_p = [\sigma(1 - \theta)/(\mu - \Psi)]\{NF_p + NF_g\} + (NF_p - NSS_p) \tag{9}$$

$$I_g = [\theta/(\mu - \Psi)]\{NF_p + NF_g\} + [NSS_p + NF_g - C_g] \tag{10}$$

$$I = \{[\sigma(1 - \theta) + \theta]/(\mu - \Psi)\}\{NF_p + NF_g\} + (NF_p + NF_g - C_g) \tag{11}$$

$$C_p = [(1 - \sigma)(1 - \theta)/(\mu - \Psi)]\{NF_p + NF_g\} \tag{12}$$

$$C = [(1 - \sigma)(1 - \theta)/(\mu - \Psi)]\{NF_p + NF_g\} + C_g \tag{13}$$

where the notation

$$\mu = \beta(1 + \zeta); \quad \psi = w + \epsilon$$

and

$$\theta = \alpha + \xi\beta \tag{14}$$

has been introduced to simplify the various expressions.

The variables appearing on the left-hand side of Equations 8 to 13 are the target variables for our study. Those on the right-hand side are assumed to be exogenous or policy driven. Accordingly, as can be seen by reference back to Table 1, it is to be assumed that all net capital transfers are exogenous or policy driven, as is public consumption expenditure. The simple version of our model is, therefore, to assume that the various parameters that enter into the Equations 5 [and, therefore, (14) also], are constant, from which it follows that the target variables are driven by public consumption expenditures and net capital transfers through a set of linear relationships.

To add some sophistication to this initial model we drop the assumption that each of the parameters introduced in Equations (5) is constant, and replace it with a model of how each parameter

is thought to change over time. The results of doing so are shown in Table 2.

3. EMPIRICAL RESULTS

The seven behavioral functions defined in Table 2 have been estimated by ordinary least squares (OLS) using the time-series data for the period 1970–93.[3] These are generally satisfactory in the sense that the coefficient signs are mostly as expected. More detailed commentary on the results is offered in the following paragraphs.

Imports of goods and services: modeling the parameters β *and* ζ. The regression results of import demand function of goods conform to theoretical expectations. The results show that all the domestic activity variables (proxied by total investment, total consumption, and exports of goods), real exchange rate, exports of services, and lagged imports of goods are significant determinants of import demand in Pakistan. Comparison of the different levels of import elasticities of the three domestic activity proxies developed reveals that the import elasticity of total consumption is higher (more than 1) than the import elasticities of total investment and exports of goods (less than 1) during the estimation period. The high import elasticities with respect to consumption may indicate the higher demand for imported consumer goods in Pakistan because many luxurious consumer goods are not produced in Pakistan. Moreover, people may also prefer imported consumer goods over domestically produced consumer goods. The real exchange rate is considered one of the important policy variables in structural adjustment programs in Pakistan. The estimated parameter for the real exchange rate possesses an appropriately negative sign and is statistically significant at the 95-percent level, suggesting that imports of goods in Pakistan are sensitive to relative import prices. The results for exports of services, mainly workers' remittances, are consistent with *a priori* expectation. Its coefficient is significant, and has the expected positive sign, suggesting that increased remittances significantly encouraged imports of goods in Pakistan during the period under consideration. Lagged imports of goods are significant at the 10-percent level

[3]This is a recursive type model; therefore, we can apply OLS technique in the context of simultaneous equations. Thus, this model does not have a simultaneous equations problem and the OLS estimates seem to be unbiased in this case.

Table 2: Regression Results of the Three-Gap Model for Pakistan (1970–93)

Dependent variables	Explanatory variables	R^2	D.W.[a]
$\log (M_g/Y) = \log \beta$	$2.351 - 0.101\log(RER_m) + 0.646\log(I/Y) + 4.569\log(C/Y) +$ (3.84)! (2.13)!! (4.52)! (8.10)! $0.391\log(X_g/Y) + 0.241\log(X_{sr}/Y) + 0.243\log(M_g/Y)_{t-1}$ (4.12)! (7.79)! (2.07)!!	0.95	1.76
$\log (M_{sr}/M_g) = \log \zeta$	$-0.328 + 0.044\log(RER_m) + 0.357\log(X_g/M_g) + .015\text{IRD} + 0.729\log(M_{sr}/M_g)_{t-1}$ (1.21) (1.04) (1.36) (2.46)!! (3.87)!	0.83	1.46
$\log (T_{nt}/Y) = \log \alpha$	$-0.560 + 0.289\log(I_p/C_p) + 0.465\log(T_{nt}/Y)_{t-1}$ (1.96)!!! (2.11)!! (2.23)!!!	0.66	1.65
$\log (T_t/M_g) = \log \xi$	$-0.541 - 0.108\log(RER_m) + 0.451\log(X_g/M_g) + 0.181\log(X_{sr}/M_g)$ (1.60) (1.69)!!! (2.26)!! (2.13)!!	0.11	1.92
$\log (S_p/Y_p) = \log \sigma$	$-1.917 + 0.019IRR_{dt-1}$ (52.47)! (3.33)!	0.32	2.10
$\log (X_g/Y) = \log w$	$-3.078 + 0.250\log(RER_x) - 0.098\log(PPI) + 0.257\log(W^d) + 0.295\log(X_g/Y)_{t-1}$ (2.46)!! (1.96)!!! (2.37)!! (0.94) (1.45)	0.77	1.48
$\log (X_{sr}/Y) = \log \epsilon$	$-5.178 + 0.112\log(RER_x) + 1.273\log(I_{me}/Y_{me}) + 0.710\log(X_{sr}/Y)t_{t-1}$ (2.90)! (0.80) (2.74)! (7.22)!	0.89	1.87

t-Statistics are given in parentheses. !, !!, and !!! denote statistically significant at 1 percent, 5 percent, and 10 percent levels, respectively.

[a] Although the "h" test is considered to be an alternative test for autocorrelation when a 1-year lagged dependent variable is included as an independent variable, this test is strictly recommended for large samples and its application in small samples is not justified. Durbin's-h test has also another problem, however. The test statistic is undefined in certain circumstances [i.e. when $n.(\text{se}^2) \geqslant 1$, where n is the sample size and se^2 is the square of the estimated standard error of the estimated coefficient of the lagged dependent variable] because the value under the square root sign is negative, as happened with our results. For more details, see Studenmund (1992), pp. 489–490. Therefore, we prefer to report the "D.W." statistic.

with a positive sign, indicating the habit formation of imports of goods on the part of local consumers in Pakistan.

The estimated import function of services also produces sensible results. The real exchange rate variable turns out to be insignificant even with an unexpected positive sign. The insensitivity of imports of services to the real exchange rate depreciation is not surprising, given the fact that Pakistan's economy is heavily dependent upon imports of services. It seems that depreciation in the real exchange rate may not reduce the demand of imports of services, because of insufficient shipping and insurance services in Pakistan. The coefficient of the real interest rate differential (defined as Pakistan's real interest rate minus U.S. real interest rate) is statistically significant with a positive sign. Its estimated parameter suggests that a rising foreign interest rate relative to the domestic interest rate seems to increase foreign loans, and consequently, leads to higher foreign interest payments of the country. Finally, the estimated coefficient of 1-year lagged imports of services is found to be significant with a positive sign, which reflects the strong relevance of current import policy with the previous year's import policy regarding the imports of services in Pakistan.

Exports of goods and services: modeling the parameters w *and* ϵ. Estimation of the export supply function for goods indicates that the real exchange rate has a significant and positive impact on exports of goods during the estimation period, suggesting that a real exchange rate depreciation enhances the competitiveness of exports of Pakistani goods in the world market. Regarding the petroleum price index, the results indicate a significant negative relationship between exports of goods and the petroleum price index, supporting the view that the export sector in Pakistan is relatively energy intensive, and higher petroleum prices have a negative impact on the production and supply of exportable commodities. The estimated coefficients of world demand and lagged exports of goods turn out to be insignificant, leaving inconclusive the question of demand and habit formation on the part of foreigners.

The estimated function for exports of services also produces sensible results. The coefficient of the real exchange rate possesses an appropriately positive sign, but it remains statistically insignificant, leaving inconclusive the impact of exchange rate policy on the exports of services from Pakistan. The economic activity variable proxied by gross investment as a ratio to gross domestic product in the Middle East, is found to positively affect the export of

services from Pakistan. This is primarily because the initial impact of an increase in the price of oil is to increase the oil revenues of oil-producing Gulf countries, which leads to an increase in the level of economic activity in that region. It is, therefore, an increase in investment that further leads to an inflow of the labor force from the labor-exporting countries including Pakistan, which results in an increase in the inflows of remittances from Gulf countries to labor-exporting countries. Note that Pakistan is one of the largest exporters of labor to the Gulf region. This situation brings to mind similar arguments made by Burney (1989), who suggests that increasing economic activity in the Gulf countries (proxied by the level of investment in that region) enhances the flow of remittances into Pakistan. The estimated coefficient of lagged exports of services is found to be highly significant with a positive sign.

Public non-trade and trade tax revenues: modeling the parameters α *and* ξ. The estimated behavioral functions of non-trade and trade tax revenues appear to be free from econometric problems and also confirm *a priori* to theoretical expectations. The estimated coefficient of private investment as a ratio to private consumption is noteworthy in the non-trade revenues function. Its statistically significant coefficient with a positive sign verifies that a higher tax rate on private investment, compared to consumer goods, raised the level of government revenues during the estimation period. It is also reasonable to infer from the estimated coefficient that a higher tax rate on profits over wages results in higher government revenues. Another explanatory variable included in the specification is one-period lagged public non-trade revenues. Its positive and statistically significant coefficient indicates that tax revenues in Pakistan are not entirely dependent on current income. Rather there is some evidence here of a lagged relationship whereby revenues depend on the trend in incomes.[4]

The regression results for the foreign trade tax revenues function show that exports of goods, export of services, and the real exchange rate are significant determinants of public revenues from international trade in Pakistan. The estimated elasticities show that taxes on exports of goods contribute more to the public sector than do taxes on exports of services. The estimated coefficient of the real exchange rate shows a negative and significant association

[4]For further discussion on statistical association between current and lagged public revenues, see Aghevil and Sassanpour (1991) and Khan, M.S. and Knight (1991).

between real exchange rate depreciation and foreign trade tax revenues. This seems to reinforce the results obtained in the imports of goods function that depreciation in the real exchange rate results in a reduction in imports of goods and a consequent decline in custom duties. Lagged trade revenues turned out to be insignificant as an explanatory variable, and, therefore, have been omitted from the estimated equation.

Private savings: modeling the parameter σ. This model treats the domestic real interest rate as one of the important policy variables. Its direct effect on private savings, thus, as well as its indirect effects on target variables, are of great interest. The inclusion of the domestic real interest rate in the specification has a direct impact on private savings during the period under consideration. The estimated coefficient of the domestic real interest rate is found to be positive and statistically significant at the 99-percent level of confidence, which seems to confirm the predominance of the substitution effect over the income effect in Pakistan. This finding also follows Fry (1978, 1980, 1988), Fry and Mason (1982), Gupta (1987), Balassa (1989b), A.H. Khan et al. (1992, 1994), and Iqbal (1993), who all favor a positive association between the domestic interest rate and the domestic savings rate. The estimated elasticity of the domestic real interest rate is 0.02, which suggests that a 1-percent increase in the real domestic interest rate will raise private savings as a ratio of private income by 0.02 percent in Pakistan. The lagged dependent private savings as a ratio of private income remains insignificant and is, therefore, dropped from the estimated equation.

4. SENSITIVITY ANALYSIS

This section outlines a range of experiments that have been made with the model described in the previous section.[5] They reflect qualitative as well as quantitative policy measures recommended by World Bank and IMF programs but cannot pretend to reproduce these precisely, given the complexity of the packages of policies that have been suggested by the Bank-Fund officials and their significant qualitative policy components. Rather, we

[5] Using the Chow (1960) test, we have checked the stability of the estimated coefficients of the three-gap model. Accordingly, the behavioral relationships in the model are apparently stable, and the estimated coefficients can legitimately be used for simulations. For complete results, see Iqbal (1996).

have picked out for analysis some key quantifiable policy measures, which cover both demand-and supply-side effects, on the basis of their performance during the pre-1980 (pre-adjustment) period and post-1980 (adjustment) period. Specifically, the following adjustment policy variables have been selected for analysis: (a) the exchange rate; (b) the domestic interest rate; (c) the level of public current expenditure; (d) domestic credits; (e) adjustment lending; and (f) private foreign capital inflows. These are by no means the only policy measures in the Bank-Fund programs affecting Pakistan, but they are undoubtedly among those that are more important.

Pakistan's economy was affected along with all others by the external shocks of the 1970s and 1980s. In this study, four variables have been chosen to represent external circumstances during the 1970s and 1980s that affected macroeconomic performance in Pakistan. They are: (a) investment as a percentage of GDP in the Middle East, representing economic activities in the Gulf region; (b) the foreign petroleum price index, representing the oil price shock; (c) the US interest rate; and (d) the terms of trade that is defined here as the export price index relative to the import price index. The sensitivity experiments have been undertaken in two steps. The first predicts the values of the endogenous variables for the base year 1993, using the estimated parameters of the model and actual values of the exogenous variables. In the second step, the effect of changes in policy variables and external shocks on these same endogenous variables are computed.

4A. Experimental Design

The changes in policy variables that have been assumed in the sensitivity experiments are: (a) a 10-percent increase in foreign capital inflows to the public sector (NF_g); (b) a 10-percent increase in foreign capital inflows to the private sector (NF_p); (c) a 10-percent reduction in domestic capital transfers to the public sector (NSS_p); (d) a 5-percent reduction in public sector current expenditure (C_g); (e) a 3-percent increase in the real domestic interest rate in the previous year (IRR_{dt-1}); (f) a 10-percent devaluation of the real exchange rate for imports (RER_m); and (g) a 10-percent devaluation of the real exchange rate for exports (RER_x). Similarly, the assumed changes in external shock variables are: (a) a 2-percent increase in the foreign real interest rate over the domestic real interest rate (IRD); (b) a 10-percent increase in the foreign

petroleum price index (*PPI*); (c) a 2-percent contraction in total investment as a ratio to GDP in the Gulf countries (I_{me}/Y_{me}); and (d) a 7.7-percent deterioration in the terms of trade (*TOT*), calculated as a 5-percent increase in the import price index and a 5-percent decrease in the export price index.

The main results of individual sensitivity experiments are summarized in the lower part of Table 3. They suggest that all the target variables are positively affected by the availability of additional foreign capital flows into Pakistan. The main channel through which foreign transfers influence the outcome is through investment. The results also suggest that additional foreign capital flows into the public sector tend to produce stronger effects on all the target variables (e.g., an increase in output by 1.8%; and in aggregate investment of 4.7%) than do foreign capital flows into the private sector (which yield increases in output of 0.9% and of aggregate investment of 2.3%). A plausible reason seems to be that public investment depends more heavily on foreign capital inflows than does private investment. These expansionary effects of foreign capital inflows confirm the findings of Chenery and Strout (1966), Papanek (1973), Voivodas (1974), Stoneman (1975), Mosley (1980), Park (1987), and Iqbal (1990, 1994), all of whom argue that foreign capital inflows stimulate investment in recipient countries.

The share of private capital flows in total foreign capital flows was 13 percent during the preadjustment period 1970–80, increasing to 29 percent during the adjustment period 1981–93, which may be attributed in part to inflows of foreign capital by local as well as foreign investors, which were due, perhaps, to increases in real interest rates. According to the results in Table 3, a 10-percent increase in private capital inflows could be expected to yield increases in gross domestic product by 0.9 percent, of private investment by 2.8 percent, and of private consumption by 0.9 percent.

The Bank-Fund adjustment programs call for a reduction of domestic credit extended to the public sector and an expansion of domestic credit to the private sector so as to reduce the overall role of the public sector in the economy and to encourage the participation of the private sector in commercial and industrial activities. The results of a 10-percent contraction in domestic credit extended to the public sector are seen in Table 3 to imply a decline in public investment and a rise in private investment (equal to 2.7 and 2.2%, respectively).

Table 3: Effects of Changes in Policy Variables and External Shocks on Selected Target Variables

	Changes in policy variables							Changes in external shocks			
	NF_p	NF_g	NSS_p	C_g	IRR_{dt-1}	RER_m	RER_x	*IRD*	*PPI*	I_{me}/Y_{me}	*TOT*
	(Percentage deviations from the base-year results)										
Endogenous variables	Regression results										
X_g	—	—	—	—	—	—	2.41	—	−0.98	—	−1.28
X_{sr}	—	—	—	—	—	—	—	—	—	−10.03	—
M_g	—	—	—	−5.15	—	−0.95	—	—	—	—	−0.49
M_{sr}	—	—	—	—	—	—	—	2.89	—	—	—
T_{nt}	—	—	—	—	—	—	—	—	—	—	—
T_t	—	—	—	—	—	−1.02	—	—	—	—	−0.52
S_p	—	—	—	—	6.01	—	—	—	—	—	—
Target variables	Implied results										
Y	0.88	1.82	—	5.42	—	0.96	1.17	−0.62	−0.48	−2.44	−0.13
I_p	2.83	1.87	2.16	5.93	6.15	1.12	1.20	−0.64	−0.49	−2.50	−0.06
I_g	1.63	8.28	−2.66	15.16	—	0.70	2.18	−1.15	−0.89	−4.53	−0.80
I	2.29	4.74	—	10.07	3.39	0.94	1.64	−0.87	−0.67	−3.41	−0.39
C_p	0.88	1.82	—	5.79	−1.11	1.10	1.17	−0.62	−0.48	−2.44	−0.06
C	0.71	1.47	—	3.73	−0.90	0.89	0.95	−0.50	−0.39	−1.97	−0.05

All the Bank-Fund adjustment programs have emphasized that Pakistan should reduce public current expenditures, particularly through reducing subsidies. Our sensitivity analysis suggests that the effects of a contraction in government current spending appear to be positive, with the effects of a fiscal contraction being generated through two mechanisms. The first is the direct link between public current consumption and public investment: the reduction in government recurrent spending is offset by an increase in public investment as government savings increases. The simulated results show that a decrease in government current spending of 5 percent directly contributes to an increase in government investment by 15.2 percent. The second mechanism works through the impact of a reduction in public current spending on imports of goods, which can be seen in the upper part of Table 3. The net impact on output is substantial—output increases by 5.4 percent relative to its base-year level, which is comparable to results obtained by Vos (1994), who found, using a CGE model for Pakistan, that a cut in public current spending would stimulate a shift towards traded goods, and would allow for lower inflation and "crowding in" of private investment.

Our model recognizes the domestic interest rate as an important policy tool. The Bank-Fund packages require government to raise real interest rates so as to stimulate domestic savings and discourage the flight of private capital. Historically, real interest rates remained negative for most of the 1970s, but became positive for most of the 1980s and early 1990s. The main results of simulating an increase in the real domestic interest rate by 3 percent above those in the base run are reported in Table 3. They suggest that a higher real interest rate discourages private consumption and boosts private investment relative to its base-year level. This is because higher real interest rates raise the propensity to save, and so reduce the propensity to consume, of the private sector.

The nominal exchange rate of Pakistan depreciated from 10 rupees per U.S. dollar in 1982 to 28 rupees per dollar in 1993. Table 3 reports the potential consequences of a 10-percent real exchange rate depreciation on all the selected target variables, with the main transmission mechanism being a reduction in the volume of imports of goods (1% less than the base-year level of imports of goods) which, in turn, leads to lower public sector revenues from the foreign trade sector.

Similarly, a 10-percent devaluation in the real exchange rate has a positive effect on exports so that, overall, the real devaluation

of domestic currency appears to discourage the demand for imports of goods and stimulate exports of goods. The results in Table 3 suggest that production might also increase (by 2.1%), and that aggregate investment might rise (by 2.6%). These findings are consistent with those of several previous studies, notably, M.S. Khan and Knight (1985), Donovan (1981), Doroodian (1993), which show that exchange rate policy, in conjunction with appropriate adjustment policies, can contribute significantly to an improvement in the balance of payments and increases in the level of output. They conflict, however, with Vos (1994), who argued that exchange rate depreciation would be of little help in stimulating exports and the growth of traded goods sectors because it would have a contractionary effect on Pakistan's economy in the medium run.

Moving on from sensitivity in relation to policy variables, we now consider the sensitivity of our target variables to four significant external considerations, the first of which is an increase in the international real interest rate. Table 3 reports the results of increasing those rates by 2 percent above the domestic real interest rate in the base-year level. This has a negative impact on all the selected macroeconomic variables, mainly because of the effect on imports of services.

An increase in the foreign petroleum price index is the second external factor. The fourfold jump in the price of petroleum in 1973–74 and the further substantial increase in 1979–80 significantly affect the adjustment process in Pakistan, so it is not surprising that our experiment shows an increase in the petroleum price index as having a negative effect on all the selected target variables in Pakistan. Underlying this general conclusion, the main route through which an increase in the petroleum price affects all the target variables is through its negative effect on exports.

A third external factor, which also has a strong impact is the level of economic activity in Gulf countries, which affects Pakistan through its influence on workers' remittances. These remittances, have made a significant contribution to Pakistan's balance of payments over the years since the beginning of the 1980s when there was a pronounced increase in workers' remittances from the Gulf countries, which overtook export earnings from traded goods as a source of foreign exchange, reaching a maximum level of 10.4 percent of GDP in 1982–83. (Investment, as a percentage of GDP, was at a maximum level in the Gulf countries of 33.3% in 1981.) However, following this boom, the flow of remittances declined

to only 3.3 percent of Pakistan's GDP in 1992–93 as the reduction in Gulf oil revenues and the crisis of the early 1990s slowed down investment activities in that region, and so reduced the demand for labor from Pakistan. Despite this, Pakistan remains one of the major exporters of labor to the Gulf region. The simulated results reported in Table 3 show that a contraction in economic activity, in the Gulf, as simulated by a 2 percent reduction in the investment/GDP ratio for the Gulf region, appears to produce strong contractionary effects on all the target variables of Pakistan's economy. Overall, production decreases by 2.4 percent and investment by 3.4 percent.

Pakistan's terms of trade have shown a continuous downward trend since 1970. To simulate its effects, the fourth external factor we consider, is an increase by 5 percent of the import price index for nonoil imports and a reduction of Pakistan's export price index by 5 percent. Together, these yield a deterioration in Pakistan's terms of trade by 7.7 percent below the base-year value. The sensitivity experiments reported in Table 3 provide a quantitative assessment of the relationship between these changes in the terms of trade and the selected target variables.

They suggest that such a deterioration in the terms of trade produces contractionary effects on all target variables in the model and a worsening of the current account balance. Domestic output, private and public investment, and private and total consumption are all discouraged. This finding is consistent with that of M.S. Khan and Knight (1985), M.S. Khan (1990), and Doroodian (1985, 1993), all of whom argue that the deterioration in the terms of trade has deflationary effects on economic activities in developing economies.

5. CONCLUSIONS

Structural adjustment reforms advocated by the World Bank and the International Monetary Fund (IMF) began in Pakistan in 1980, and since then, the economy has become substantially more outward-looking, flexible, and market oriented. The Bank-Fund adjustment programs were intended primarily to overcome a variety of macroeconomic distortions as well as a set of deep-rooted structural problems in the economy. After more than a decade of intensive adjustment reforms, still no consensus can be found about the effects they have had on Pakistan's economy. Although there are a number of studies on this question, they

suffer from methodological weaknesses, and they arrive at conflicting conclusions. This study has attempted to redress some of these deficiencies in the existing literature and thereby contribute to a more adequate assessment of structural adjustment reforms in Pakistan. This study addresses two specific sets of questions. The first main question that has occupied a number of researchers is whether the Bank-Fund adjustment programs have had any positive effects to date on macroeconomic performance (i.e., on exports, imports, savings, investment, consumption, and gross domestic product, which are the main objectives of Bank-Fund supported programs) in Pakistan. The second main question posed here is whether and to what extent external factors aggravated the adjustment process in Pakistan. The purpose of this study has accordingly been to provide systematic quantitative evidence of these fundamental questions, using 1970 to 1993 as the period of observation. Regarding the first set of questions, the statistical evidence from the regression and simulation results of the three-gap model for Pakistan allow the following conclusions:

1. A depreciation of the real exchange rate (one of the main elements in Bank-Fund adjustment programs) has a positive impact on exports of goods and a negative impact on imports of goods, and appears, as one would expect, to improve the overall current account balance of the balance of payments of Pakistan's economy. The sensitivity experiments also show that a real depreciation of domestic currency has a positive impact on all the selected macroeconomic target variables. This finding supports such empirical evidence as is currently available, which demonstrates that real devaluation would, on balance, have an expansionary rather than a contractionary effect on economic performance.
2. An increase in the domestic real interest rate emerges as an important instrument that tends to discourage private consumption and enhance private savings and investment in Pakistan. Our sensitivity experiments show that a higher domestic real interest rate has a signifiant impact on the behavior of all key macroeconomic variables. These results are consistent with the view that in a depressed financial system such as is found in Pakistan, an increase in the domestic real interest rate, through liberalizing the domestic financial market, would increase domestic savings. Thus, the real

interest rate targeting appears to be an effective policy tool in achieving Bank-Fund objectives.

3. All the Bank-Fund suggested reform programs emphasize the need to reduce public current consumption, particularly through reducing subsidies. The effects of a contraction in government current spending appear to have a positive effect on all the selected target variables. As one can see from the regression and simulation results, there are two main channels through which the effects of a fiscal contraction appear in the system. The first channel provides a direct link between public current consumption and public investment. The second provides a negative impact of a reduction in public current spending on imports of goods.
4. The Bank-Fund packages also require a reduction in the role of the public sector in commercial and industrial activities in order to encourage the participation of the private sector in economic activity, which was badly discouraged because of the nationalization measures under the previous regime in Pakistan. Both the regression results and simulation experiments support the World Bank view that recycling of domestic credit from the public sector to the private sector encourages local and foreign private investment activities in the economy, and would enhance economic growth in the long-run.
5. In this study, because we have assumed that it was the depreciation of the domestic currency in combination with increased real domestic interest rates that led historically to inflows of foreign capital by local as well as foreign investors, we included private capital inflows among the set of policy variables. And the simulation results show that overall economic performance is indeed improved by inflows of private foreign capital.

Turning now to the second set of questions, we have explored the possibility that external factors (i.e., the terms of trade deterioration, the higher foreign real interest rate, an increase in oil prices, and a slowdown of activity in the Gulf region) aggravated the adjustment process in Pakistan. Our conclusions are: (1) that a deterioration in the terms of trade tends to produce contractionary effects on all the selected target variables. The main channel through which a deterioration in the terms of trade works in the model is through worsening the current account balance of the balance of payments of Pakistan's economy; (2) increase in the foreign real interest

rate has a negative impact on all the selected target variables, mainly through its positive effect on the imports of services into Pakistan; (3) increasing petroleum price index has a uniformly contractionary effect on all the selected macroeconomic variables in the system; and (4) declining economic activities in the Gulf region has a strong negative impact on the target variables through its adverse influence on workers' remittances from the Gulf region, which have been a significant component of Pakistan's balance of payments during the late 1970s and mid-1980s.

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