THE P.I.D.E. ECONOMETRIC MODEL OF PAKISTAN'S ECONOMY (1959-60 to 1978-79)

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THE OVERVIEW

Chapter 1

THE OVERVIEW

"Though this be madness, yet there is a method in it."
Shakespeare: *Hamlet*

The PIDE's Research Programme (1979–82) promised, among other things, to prepare an economy-wide econometric model that would provide a systematic analytical framework for studying the *structure* of Pakistan's economy and for assessing the relative strengths of the many forces that moulded this structure over time. This promise has now been fulfilled, though not entirely. The results of this exercise are presented in this report, which, in terms of what still remains to be done, may be treated as interim. While this ambitious undertaking may not exactly be an act of "madness", yet there is definitely "a method in it". For those who insist on a method and a methodology in all that is worthy of attention, we may have created something meriting their admiration. However, our main purpose in carrying out this project has been to help the policy-makers in making those 'earth-shaking' decisions that must be based on a *quantitative* knowledge of the highly complex relations that define the economic universe. As long as they actually use this model, even though reluctantly, we will not mind if they don't admire it.

A period of 20 years (1959-60 to 1978-79) was chosen to allow ourselves enough "degrees of freedom" for doing a 'significant' job. Also, this period saw important events which have left a lasting imprint on the structure of Pakistan's economy. These events must be assessed in quantitative terms to determine their 'weights'. To *simulate* as faithfully as possible the 'reality on the ground' in these eventful years, a simultaneous-equation econometric model of 53 behavioural and definitional equations was specified. The 36 behavioural equations have generated consistent estimates of the basic relations governing value added and the demand for inputs in agriculture, manufacturing, and other sectors; and they have also highlighted the essential relationships of the foreign trade, fiscal and monetary sectors. The

elasticity values obtained from the estimated equations spell out the policy implications of the model. No less important is the wealth of data that has now become available for the first time: see Data Appendix. Time-series data, winnowed through standard statistical procedures, have been constructed on a consistent basis for a number of key economic variables.

We are aware of the weaknesses of this model and of what more needs to be done to make it an effective tool for designing consistent economic policies. As additional relevant data become available, an attempt will be made to endogenize many of the variables which have been tentatively stamped with the exogeneity mark. This will entail adding new equations to the present model. Some of the existing equations in the model will need to be re-estimated by including additional or new exogenous variables. It will also be necessary to evolve a more adequate framework for policy evaluation than is adopted in this study. Simulation exercises will have to be performed and procedures evolved for reliable forecasting

While some more time could have been spent to achieve, at least tentatively, all the three purposes of econometric analysis, namely, structural analysis, forecasting, and policy evaluation, we could do no more than complete the 'structural' part. Even the structural part has holes in it because of our inability to construct, in time, a few more time series, e.g. of corporate saving. Hence we had to draw a line, if only to count our blessings for the time being. Also, a point has now been reached when at the present stage of macro-economic model-building, general debate and discussion of this model, both at home and abroad, can be fruitful. And by actual use in policy-making, the necessary feedback from reality should be helpful to induce a better specification of the model and lead to the search for better estimation procedures and more sophisticated tests of specifications.

Despite all the imperfections of the PIDE model, in terms of both specification and estimation, which we are the first to admit, most of the results of the model are statistically significant and have far-reaching policy implications. Even though no simulation exercise has yet been undertaken to chart out alternative development strategies, the values of the elasticities obtained from the estimated equations should help the policy-maker to predict *in quantitative terms* the consequences of government policies on key economic variables.[1] Then, there is the 'educative' purpose that this model has already achieved: to conduct a nation-wide hunt for existing information, published and unpublished, to locate exactly the information gaps and their nature. And, finally, the model attempts to construct a systematic framework wherein the existing and potential information can be fed for obtaining the best'

[1] This is on the assumption – a heroic one at the moment – that these elasticity values are stable over time.

possible results to help economic policy-making. The PIDE econometric model has created an information orbit of its own with a powerful gravitational pull for all relevant 'facts'. Also, since, contrary to folk wisdom, facts hardly speak for themselves spontaneously, an effective platform has now been provided to *make* them (particularly the 'shy' among them) speak – as far as possible only the truth.

In this introduction, we will highlight the essential characteristics of the PIDE model along with some of its achievements and failures to make the reader aware of what remains to be done. The discussion is divided into five sections: (i) Anatomy of the Model; (ii) The 'War' of Variables; (iii) The Model and the Reality; (iv) Policy Implications; and (v) The Road Ahead.

ANATOMY OF THE MODEL

Size of the Model

As is usual, the first question to settle before constructing the model was that about its size. The so-called "law of parsimony" would have dictated a small model of about six equations.[2] After all, there *are* some forecasting models of this type. However, our objective was basically to develop a model that could help us to understand the structure of Pakistan's economy with a view to providing a solid basis for policy evaluation. Since the basic intersectoral and intrasectoral relationships of Pakistan's economy had to be studied to gain an understanding of how it all hangs together, we could not make do with a small model. As such, it was necessary to have a large enough model to simulate the essential characteristics of the economy and also to allow enough elbow room for displaying the working of the various (exogenous) policy variables. Perhaps a somewhat bigger model than the present one should have been attempted but the non-availability of the relevant data put a damper on our ambitions. And then there was the time constraint: the Board of Governors of the PIDE had set 1982 as a 'policy variable', to which the endogenous model builders had to react positively and significantly! All these considerations led us to settle for a simultaneous-equation model of 53 equations.

As Table 1 shows, of the 53 equations, 36 are behavioural equations, which have been actually estimated and include 4 equations which, for want of relevant information, are treated as functions of time. The other 17 equations are definitional relations. The model is subdivided into 3 sub-models, each of which brings together those relationships (equations) which are most directly knit together within the

[2]The "law of parsimony" would dictate the strategy of minimizing the number of parameters for the given number of endogenous variables. However, this rule is hardly adequate for econometric analysis. See L. R. Klein [4].

jigsaw puzzle of simultaneous-equations framework. However, the entire model has been simultaneously estimated and not separately for each of the three sub-models. These sub-models are then classified into 6 blocks for expositional purposes only. (It should be noted that the PIDE model is *not* block recursive.) The 36 behavioural equations have been estimated by using the Two-Stage Least-Squares (2SLS) procedure to display the simultaneous determination of as many endogenous variables in response to changes in the values of the exogenous variables. Also, the 2SLS method allows us to establish a one-way link between the endogenous variables and the exogenous variables included in the model. As is well known, this estimation procedure yields consistent estimates of coefficients.

Table 1

The Size of the PIDE Econometric Model

Sectoral Classification	Number of Equations used		
	Behavioural	Definitional	Total
Production and Expenditure	21	9	30
Foreign Trade	7	6	13
Fiscal and Monetary	8	2	10
Total	*36*	*17*	*53*

Type of Equations

To see the nature of the specified equations clearly, we have classified the equations here by the type of endogenous variables whose coefficients have been simultaneously determined within the model.

As can be seen in Table 2, most of the equations specified and estimated in the PIDE model relate to value added, input demands in various productive sectors, investment, imports, exports and taxes. It should be immediately clear that the structure of the model is not predominantly Keynesian in motivation in so far as the binding constraint on value added is not so much the inadequacy of final demand as the insufficient supply of essential inputs. This is a reflection of the fact that in a developing economy the basic problem is to develop the production potential by various means rather than to try to use the existing potential more effectively by

Table 2

Type and Number of Equations in the PIDE Econometric Model

Endogenous Variables	Number of Equations used		
	Behavioural	Definitional	Total
Value added	8	2	10
Input Demands	7	1	8
GNP, GDP, Disposable Income Definition	–	3	3
Resource Gap, Trade Gap and Budget Deficit	–	3	3
Consumption	2	1	3
Investment	4	1	5
Current Account Deficit	–	1	1
Imports	5	2	7
Exports	2	2	4
Tax Revenue	6	1	7
Money Demand	1	–	1
Inflation	1	–	1
Total	*36*	*17*	*53*

increasing effective demand. This is not to deny that in this model effective demand does exercise an important influence on final output.[3] It may be noted that the seven demand equations in the model relate to the *derived* demand for inputs.

[3]Klein has briefly discussed the reasons why a Keynesian model – i.e. one which determines effective demand with a given set of prices – is not wholly suitable for developing countries. See [5]. However, as Malinvaud has pointed out, many of the econometric models in the developed countries also reflect characteristics of "supply" which have been found at least as important as those relating to "demand" [6, p. 1365].

Type of Variables

In accordance with the well-known rule, the number of endogenous variables (53) is equal to the number of the equations in the PIDE's simultaneous-equation model. However, there is no such restriction on the number of exogenous variables, which are in all 60 in number.

Table 3

List and Number of Variables Used in the PIDE Econometric Model

Endogenous Variables	Number	Exogenous Variables	Number
Value Added	8	Unirrigated Area	1
		Cropping Pattern	1
Income	3	Water Availability	1
		Agriculture Mechanization	1
Consumption	3	Wage Rates	2
		Prices	10
Investment Expenditure	6	Interest Rate	1
		Remittances and Foreign Capital	2
Capital Stock	1	Output	2
Inputs in Agriculture and Large-Scale Manufacturing	8	Effective Exchange Rate	3
		Production of Foodgrains	1
Resource Gap	1	Imports and Exports of Services	2
		GNP and Public Expenditure Trend	2
Imports	7	Lagged Money Demand	1
Exports	4	Money Stock	1
		Government Subsidies and Transfer Payments	1
Trade Gap	2	Lagged Rate of Change of GNP Price Index	2
Money Demand	1	Depreciation	1
Budget Deficit	1	Population	1
		Time Trend	1
Inflation	1	Dummy Variables	23
Taxes	7		
Total	*53*	*Total*	*60*

In an economy like Pakistan's,the inclusion of such a large number of exogenous variables should not be surprising. In part, this proliferation of exogenous variables is a reflection of the pervasive nature of government intervention, which, like the ghost of Hamlet's father, haunts the economy, assuming the form now of price controls and then of quantitative restrictions. For instance, in Pakistan, prices in the agriculture sector are regulated through price support schemes and a complex amalgam of subsidies on inputs. Similarly, foreign trade is regulated by quota restrictions and tariffs (subsidies) on imports and (exports). All such variables are treated as exogenous. The same is true of the fiscal and monetary sectors where the government uses such policies as changes in tax rates and interest rates to influence the economy. Indeed these are the policy variables whose effects on the economy we wish to trace.

However, the presence of many of the exogenous variables in the PIDE model reflects our failure to endogenize them. For instance, of the 10 relative prices used as exogenous in the model, a few could have been treated as endogenous variables, e.g. prices of tubewells, manufactured goods and investment goods. Also, variables like money supply, export and import of services, cropping pattern, production of foodgrains, etc., should also have been endogenized. However, once again the inadequacy of data was the main bottleneck. The need for keeping the size of the model (the number of equations) manageable has also been an important consideration. As more data, expertise and computational facilities become available, additional equations will be added to the model by permitting quite a few of the exogenous variables to cross over to the endogenous camp.

Policy Variables

An interesting aspect of the PIDE model is the large number of policy variables included in it: of the 60 exogenous variables in the model, 20 are policy variables. Indeed, if the 20 dummy variables representing discretionary tax changes are excluded from the list of non-policy exogenous variables, as they should be, then the ratio of policy exogenous variables to non-policy exogenous variables becomes much higher. Table 4 lists these variables to display the wide range of policy instruments which the government has employed from time to time to influence the growth of various sectors of the economy and the allocation of resources within as well as between sectors. It will be noted that the model includes in it a large number of prices used by the government to control the economy. In the agricultural sector, the government regulates nearly all the key prices of both inputs and outputs with a view to regulating agricultural production. Similarly, the size and composition of industrial output are controlled through a variety of policies, e.g. direct control of the price of investment goods, changes in interest rates, adjustment in effective exchange rates for imports, etc. The interesting finding of the present study is that *in*

Table 4

Policy Variables in the PIDE Econometric Model

1. **Prices***
   - (i) of agricultural goods
   - (ii) of fertilizer
   - (iii) of tubewells
   - (iv) of tractors
   - (v) of manufactured goods
   - (vi) of investment goods
   - (vii) of primary-goods exports
   - (viii) of manufactured-goods exports
   - (ix) of energy

2. **Wage Rates**
   - (i) in agriculture
   - (ii) in large-scale manufacturing

3. **Effective Exchange Rates for Imports**
   - (i) for consumer goods
   - (ii) for intermediate goods
   - (iii) for capital goods

4. **Monetary Policy Variables**
   - (i) Money stock
   - (ii) Interest rate

5. **Fiscal Policy Variables**
   - (i) Tax rates (20 dummy variables used to reflect tax changes)
   - (ii) Tax base

6. **Other Policy Variables**
   - (i) Water availability
   - (ii) Government subsidies and transfer payments

*The imported inflation variable (i.e. the difference between c & f import prices and domestic prices) is not included here as this is not a policy variable.

most cases the price variables are statistically significant. Even in the foreign-trade sector, the three effective exchange rates used in this model did show a significant effect on the imports of consumer goods, intermediate goods and capital goods. This is an important result because it modifies to some extent the notion that quantitative restrictions, being the dominant influence on import trade, render price controls (tariffs/subsidies) redundant in a large number of cases.[4] Future refinements of the model will attempt to specify quantitative control explicitly in the model to determine the relative strengths of price controls and quantitative restrictions in different sectors of the economy.

THE 'WAR' OF VARIABLES

An interlocking flow diagram has been constructed to give some idea of the complexity of the PIDE model. This displays clearly many interesting features of the model, of which only the main highlights are recounted here. First, it shows visually the nature of the 'infighting' between the key endogenous variables, which appear in 32 behavioural equations of the model.[5] Within the endogenous group, the 'arrows' fly in all directions. However, in relation to the exogenous variables, the endogenous variables are 'sitting ducks' because the arrows go only from the former to the latter. This is an indication of the fact that while the values of the endogenous variables are simultaneously determined within the system, those of the exogenous variables are not.

Secondly, the diagram shows that in the value-added group, only five sectors are operative, namely, agriculture, large-scale manufacturing, construction, wholesale and retail trade, and public administration. The remaining five sectors are there only to adorn the spectacle. Of these, three are simple functions of time while the other two are exogenously determined. In our model, these latter five sectors are not permitted to interact directly with the rest of the system, of course for no fault of theirs, but only through the courtesy of the Gross Domestic Product.

Thirdly, the flow diagram makes clear the nature of the interaction of exogenous variables with value added in different sectors. Changes in relative prices

[4]However, in this case this result is not that straightforward because the effective exchange rate is really a 'bastard price', born of the marriage of the price and non-price forces. Contrary to the general practice, the three effective exchange rates used in this model also reflect quantitative restrictions. This is particularly true in the case of consumer-goods imports (equation 38′).

[5]The four behavioural equations which are treated as functions of time do not appear in the flow diagram.

and interest rates influence value added in agriculture and large-scale manufacturing by modifying the demand for essential inputs of various types. While foreign-capital inflows 'reach' value added in the public administration and defence sector by impinging on public consumption, the changes in fiscal variables (viz. tax rates and tax base) 'arrive' in this sector by increasing (decreasing) tax yields and public consumption. By contrast, the inflow of migrant workers' remittances has a direct contact with value added in the construction sector as well as an indirect (legitimate) connection, through Gross National Product, with value added in wholesale and retail trades.

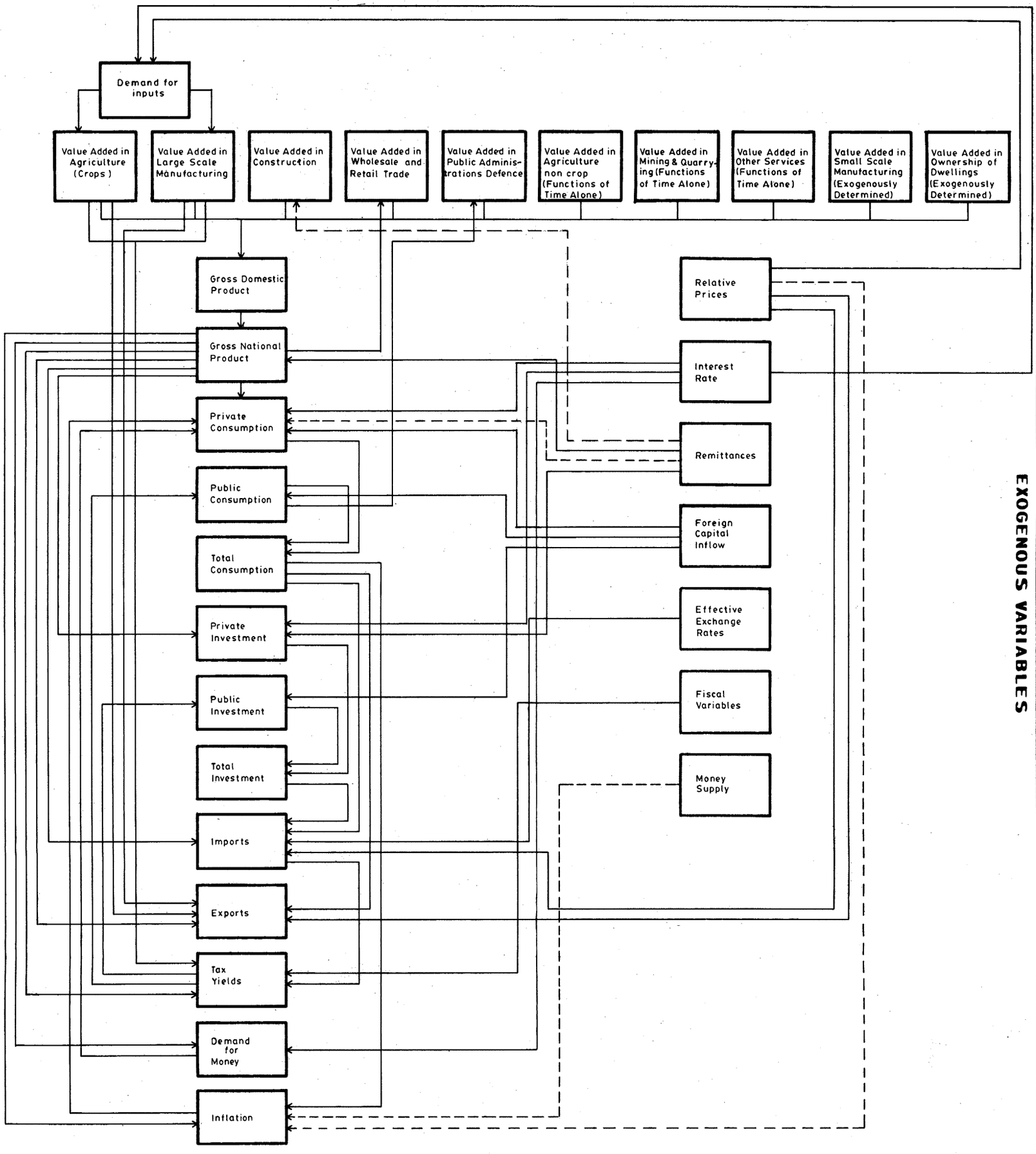
Fourthly, the induced changes in value added in the five 'operative' sectors are relayed directly and indirectly to the various endogenous variables, which accept these gifts 'accommodatingly'. The only exception to this rule is that of tax yields, which return to the public administration and defence sector what they receive from the manufacturing sector. Private consumption 'gains' from both the exogenous and the endogenous variables. Through total consumption, it also feeds imports, exports and inflation. However, the most important point to note is the lack of interaction of private consumption with value added in any of the five operative sectors! This illustrates the point already made: without being anti-Keynesian, the PIDE model does *not* view Pakistan's economy through Keynesian glasses.

MODEL AND THE REALITY

In constructing this model we sought to achieve, as all model-builders do, a reasonable balance between 'realism' and 'manageability'. The exact balancing point between these objectives has been determined, if only tentatively, by the availability of data. Within the binding data-constraints, the 53-equation model succeeded in approximating, to a reasonable extent, the reality 'on the ground'.[6] It encompasses all the basic intrasectoral and intersectoral relationships between the productive sectors – mainly agriculture and large-scale manufacturing –, the 'real'

[6]In addition to the traditional complaints about the inadequacy of data, the data position in Pakistan was really desperate when work was started on this project. Consistent time-series did not exist on most of the key variables used in this model for the entire 20-year period. The problem was compounded by the fact that in most cases – e.g. on money supply, public revenues, private and public consumption, etc. – separate data were not available for East Pakistan (now Bangladesh) and West Pakistan (now Pakistan). In other cases – e.g. agricultural inputs and their prices, and value added, capital stock and labour in the manufacturing sector – consistent time-series were constructed by collecting data from different sources both published and unpublished. The results of this vast exercise are reproduced in the Data Appendix. Such a comprehensive data set, carefully sifted and cleansed through standard statistical methods – viz. interpolation, extrapolation, splicing and smoothing – have become available for the first time in Pakistan. Work is in progress on the construction of a few more important time-series.

FLOW DIAGRAM OF THE PIDE ECONOMETRIC MODEL



NOTE: This diagram includes interaction among all the endogenous and Exogenous variables included in the 32 behavioural equations of the model. Those behavioural equations which are treated as functions of time are not included in this diagram. Needless to point out that the 17 definitional equations also do not show up in this diagram.

and the monetary sectors, and the domestic economy and the foreign- trade sector. The links between the fiscal activities of the government and the rest of the economy are also highlighted. The inclusion in the model of almost all the important policy variables used in Pakistan to regulate the economy has improved its 'marginal utility' for policy-makers.

A period of 20 years, from 1959-60 to 1978-79, that the PIDE model covers has permitted us a study of the nature and strength of the forces that have shaped Pakistan's economic structure. For instance, this is long enough period to determine the role of technological change in the growth of various sectors of the economy. This time-span is also interesting because Pakistan's economy underwent an extensive structural change in the decade of the Seventies: the economy experienced a deep recession in the main commodity-producing sector from 1969-70 to 1976-77; the secession of East Pakistan (now Bangladesh) occurred in 1971; there was large-scale nationalization in 1972; and then there has taken place a fairly large-scale out-migration of Pakistani workers, mainly to the Middle East, which has led to a sizeable inflow of remittances.

First, we tried to determine the role of technological progress – defined as an outward shift of the production function with unchanged factor inputs – as a contributory factor in the growth of various sectors of the economy. Equation (10′) clearly shows that technological progress has been prominent in influencing value added in large-scale manufacturing: it proceeded at an annual rate of 4.8 percent. However, the 't' (technological change) does not show up at all in input demand functions in this sector. In sharp contrast, the mysterious 't' appears to have completely forgotten to help the growth of value added in the agricultural sector; but it is there for all to see in the agricultural input demand functions for fertilizers, tubewells and tractors: Equations 6′, 7′ and 8′ show that the (derived) demand for these inputs grew at an autonomous rate of 8.7 percent, 9.3 percent and 15.7 percent respectively. The only exception to this rule was the demand for agricultural labour which *declined* at the annual rate of 12.4 percent, suggesting the effect of the gradual adoption of labour-displacing technology. This asymmetrical appearance of 't' in the production functions and the demand functions in the agricultural and large-scale manufacturing sectors *appears to suggest that, while technological change in large-scale manufacturing was of the 'disembodied' variety – it fell like "manna from the heaven" – in the agricultural sector, it got 'embodied' in the form of tractors, tubewells and fertilizers.*

Secondly, an attempt was made to assess the relative strengths of the various factors contributing to the visible let-up in the growth of value added in the large-scale manufacturing sector from 1969-70 to 1976-77. Conventional wisdom has

blamed this phenomenon mainly on the nationalization episode, while others suspect that the secession of East Pakistan may also have contributed to this recession. Equation (10′) does confirm the reality of recession during the 1969-70 – 1976-77 period: the relevant dummy variable (D_3) is statistically significant. However, without pinpointing exactly the villain of the piece, the two most eligible candidates for this role that folk wisdom advanced – the secession of East Pakistan in 1971 and large-scale nationalization of the industrial sector in 1972 – have been effectively excluded from the 'show' on the basis of the statistical significance of the two dummy variables, D_1 and D_2, brought in to plead their case – much to the chagrin of the interested spectators. To make these exclusions as objective as possible, the three dummy variables, D_1, D_2 and D_3, were used one at a time. In each of these exercises, the dummy variables, D_1 and D_2, turned out to be insignificant; only D_3 survived the contest. This suggests that while the *slow-down in the growth of large-scale manufacturing during the first half of the Seventies was a macabre reality, the phenomenon had nothing to do with either the secession of East Pakistan or the nationalization episode!*

We next attempted to try out both these dummies (D_1 and D_2) elsewhere in the economy. The secession of East Pakistan (D_1) was tried on investment demand and foreign trade. However, as equations 12′, 27′, 38′, 39′, 40′ and 41′ suggest, these dummies again proved to be insignificant. Indeed, dropping them improved the relevant equations considerably. The only exception to this rule was consumer-goods imports, equation (38′), where this dummy at last proved to be significant. The other candidate, nationalization (D_2), was also tried on investment demand, equation (12′). Again the dummy failed the test. All these attempts prove fairly convincingly that *nationalization and the secession of East Pakistan were not significant factors in explaining the behaviour of Pakistan's economy during this period.*

Thirdly, an attempt was made to determine the effect of migrant workers' remittances on various sectors of Pakistan's economy. Resource inflow from this source is now about 8 percent of the GNP. To capture this phenomenon, its effect on private investment was investigated in equations 26′, 27′ and 28′. These equations show that while workers' remittances have had a positive effect on private investment in agriculture, they exercised a *negative* effect on private investment in large-scale manufacturing. This is reasonable because although value added in large-scale manufacturing has been most adversely affected by the out-migration of skilled workers, the inflow of remittances does not appear to have made up this loss. At the same time, the agricultural sector appeared to have been the beneficiary.

POLICY IMPLICATIONS

The policy implications of this model are discussed at length in Chapter 6 where the elasticities of the basic endogenous variables with respect to key exogenous variables are brought together.[7] It may be interesting to recapitulate a few results which have a direct bearing on economic policy-making.

(1) As pointed out above, one of the notable results of the present exercise is the responsiveness of basic economic variables to policy-induced changes in different types of relative prices. The relevant information in Tables 1, 2, 6, 8 and 9[8] shows that the elasticity of the relevant dependent variables with respect to changes in relative prices is positive and significant in every case, except for the singular case of the price of tractors where the coefficient has a negative sign.[9] In most of the cases, the relevant elasticity is less than unity. However, the elasticities are greater than unity for the relevant endogenous variables with respect to the prices of investment goods (Tables 2 and 6), capital-goods imports (Table 8) and primary-goods exports (Table 9).

(2) Equally interesting is the finding that the elasticity of primary-goods exports is greater than unity with respect to agriculture output and less than minus one with respect to domestic consumption and relative prices. Even more striking, and somewhat unexpected, is the result that the elasticity of primary-goods exports with respect to all the relevant variables is higher than that of manufactured-goods exports (Table 9). A full, though tentative, explanation of this 'fact' is given in Chapter 6. Suffice it to state here that the higher elasticity of primary-goods exports may have been due to the more effective quality control on such exports and the practice of tariff cascading in most of the Western countries. The same holds for imports, the elasticities of which are positive and, in most cases, exceed unity. It is instructive to note that imports of all types are sensitive to changes in the effective exchange rates, which in this model reflect both price and non-price controls. This result contradicts the popular view that the size of the import bill is inflexible and does not respond significantly to government intervention, taking the form of both price controls and quantitative restrictions.

(3) The general impression that inflation in Pakistan is predominantly imported does not get much support from this model, even though it is not

[7] Since the equations of this model are in log-linear form, the values of the coefficients of the variables are also the values of elasticities.

[8] All the tables referred to in this section are those that appear in Chapter 6.

[9] Even though the negative sign of the tractor coefficient appears to be an implausible result, it casts doubt on the existing attitude of supine acceptance of the high and positive contribution of tractors – indeed, of agricultural mechanization – to agricultural production.

altogether dispelled (Table 13). The elasticity of the imported-inflation variable (i.e. the difference between the rates of change of the c&f prices of imports and the domestic price level) is negligible and statistically insignificant. Instead, the model shows that the two prime-movers of inflation in Pakistan may have been domestic recession and a sharply rising government expenditure. These findings suggest that *inflation in Pakistan may well have been mostly a domestic phenomenon:* "The fault, dear Brutus, is not in our stars, but in ourselves..." It cannot be blamed *entirely* on foreign factors. It follows that government policy can and should be used effectively to control inflation mainly by restraining government expenditure. In this connection, the information given in Table 12 is also very important. The long-run elasticity of demand for money with respect to changes in interest rate is −1.031 showing that an increase in average interest rate (on time deposits) can be used to choke off excess demand for money. *This finding is contrary to the popular notion that interest rate has been an ineffective anti-inflationary policy instrument.*

(4) Another interesting result, reported in Table 12, is that the elasticity of money demand with respect to the GNP (2.58) is substantially greater than unity. This allows considerable degree of freedom to the monetary authorities to expand money supply: in the long run, a one-percent increase in the GNP makes 'room' for a 2.58-percent increase in non-inflationary monetary expansion. The size of this elasticity is higher than expected. This may be explained in part by the fact that as the GNP has grown over time, the relevant coefficient may also have captured the effects of the additional demand for money emanating from the gradual monetization of the economy. Since the monetization process in Pakistan will continue for quite some time, the size of this elasticity should cheer up the policy- maker who worries too much about the inflationary consequences of monetary expansion. However, this should not make the monetary authorities 'trigger-happy'.

(5) The model shows that fiscal policy in Pakistan has remained somewhat ineffective because, except in the case of excise taxes, base elasticity is less than unity for most of the major taxes in Pakistan. This is particularly the case for customs duties and sales taxes for which the elasticities are very low, even though positive (Table 10). *This means that, except in the case of excise taxes, additional taxation is the only means of raising tax revenue.* This is not a satisfactory state of affairs because it makes the policy-maker overly dependent on changes in tax rates to mobilize non-inflationary financial resources. For instance, in the case of income and corporation taxes all the discretionary changes, except the one made in 1969-70, led to a contraction of the tax base. Such fiscal measures, by lowering the base elasticity of taxes, impair the effectiveness of discretionary changes in marginal rates as a means of raising revenue. Even though the model does not test these propositions, a steep rise in marginal rates of customs duties becomes protective; it is inflationary when applied to excise duties and sales taxes; and it impairs work effort and

investment incentives in the case of income and corporation taxes. As described in Chapter 5, of the 20 dummy variables introduced to capture the effect of as many attempts to raise marginal rates of various taxes, the majority failed to produce the expected results. This problem shows up most strikingly in the case of sales tax where all the four discretionary changes, introduced from time to time, proved to be counterproductive! Such results point to the need for expanding the tax *base* by withdrawing a large number of tax concessions, which have made a sieve of Pakistan's tax structure. The general fiscal rule that policy-makers must follow in this regard is: increase the tax base *and* reduce the tax rates.

THE ROAD AHEAD

The PIDE's Econometric Model is the first attempt of its kind ever made in Pakistan to provide a solid basis for consistent macro-economic policy-making. However, such an attempt cannot be a one-shot affair. Learning-by-doing is the crucial factor for an econometric model to attain its 'steady state', if ever such a thing can happen. The present report is a first effort – hopefully a successful one – to give a headstart to the evolutionary process of scientific thinking on economic matters. Needless to say, more work will have to be done to make this model an operational tool of economic policy-making.

For one thing, the model as presented in Parts II and III of this report will have to be modified and enlarged by endogenizing many of the variables which are at present sitting rather treacherously in the 'independent' exogenous camp. Harking them back to the 'accommodating' endogenous group will require making room for them by adding more behavioural equations to the existing model. Also, additional work will need to be done to specify and estimate more meaningfully those equations which the PIDE model, with step-motherly indifference, treats as functions of time (equations 17, 18, 19 and 51) or casts out as exogenously given (i.e. those relating to value added in ownership of dwellings and small-scale manufacturing, and imports and exports of services). As usual, the inadequacy of data has been the main factor dictating such seemingly 'cruel' decisions.

It will also be necessary to re-estimate some of the equations. As will be noted, in some of the behavioural equations the DW-statistic is in the unacceptable or inconclusive range, indicating serial correlation.[10] A treatment of this 'malady' is essential for forecasting purposes. It is expected that in the process of doing so, the

[10]It should be noted that the role of DW-statistic in simultaneous-equation system is not very clear (see footnote 2 of Part III of this report). However, it has been suggested that a modified 'd' statistic can be used to test serial correlations in simultaneous-equation models. See A.C. Harvey and G.D.A. Phillips [2].

size of the coefficients of the relevant equations, given in this report, may change to some extent and their explanatory power ($\bar{R}^2$) may also be affected. Furthermore, some of these equations may have to be re-specified. For example, to generate consistent estimates of coefficients for input demand functions and production functions in agriculture and large-scale manufacturing sectors, it may be preferable to estimate the production function simultaneously with the marginal productivity conditions. This procedure may be superior to the one adopted in this report where production function and input demand functions are specified separately, with no formal connection between the two.[11] The investment equations (26, 27, 28) should be re-estimated by taking into account such exogenous variables as investment credits, investment control and corporate profits. In the same vein, the import demand equations (38, 40, 41) should explicitly allow for the effects of quantitative restrictions on various types of imports and to assess their relative strengths *vis-à-vis* price control. Also, the money demand equation (52) may have to be re-specified by employing the term structure of interest rates instead of the average interest rate on time deposits used in this model. This should permit a more meaningful study of the effects of different maturity rates on the demand for money. Furthermore, the supply of money, treated as exogenously given in this model, should more properly be endogenously determined in terms of such exogenous variables as government borrowing, reserve requirement ratio, rediscount rates, etc.

Secondly, more computational effort will be needed to use the model for forecasting purposes. It is contemplated soon to test the forecasting power of the model in terms of investigating the out-of-sample stability of the estimates of coefficients. This is essential because one cannot be too optimistic of the stability of the estimates in the forecast period just because most of the estimated equations, as in this model, are fairly good in terms of their explanatory power (e.g. fairly high values of the $\bar{R}^2$ statistic).

Thirdly, a systematic framework will have to be developed for making the PIDE model an effective tool for policy evaluation.[12] In the present work, elasticity estimates have been used for this purpose. However, to evolve a meaningful policy package it will be essential to conduct simulation runs to determine the effects of alternative values of the policy variables and other exogenous variables on the endogenous variables of the system. It is planned to undertake such an exercise when adequate computational facilities become available.

[11] For details of this alternative estimation procedure, see M.D. Intrilligator [3, Ch. 8, p. 269, footnote 18].

[12] There are at least three alternative approaches to policy evaluation: instrument-target approach, the social-welfare function approach and the simulation approach. For a detailed discussion of these approaches, see M. D. Intrilligator [3, Ch. 16].

Fourthly, to bring the model nearer to reality, means must be found to capture the rising tide of the egalitarian sentiment sweeping through the developing countries like Pakistan – of course, within the 'feasibility constraint'.[13] Such an exercise is essential for a meaningful evaluation of alternative strategies of economic development to maximize social welfare, particularly of the least privileged in the society. These distributional considerations can be built into the model by specifying relationships (equations) to study the employment-generating potential of various commodity-producing sectors; the consumption behaviour of various income groups in terms of their calorie intake, the relative distribution of industrial income between wage-earners and the capitalists and of agricultural income between the cultivators and the landlords, the relative share in government expenditure of social sectors like education, health, etc. To rope the socio-political reality into the simulation 'chamber' will take considerable amount of data on the relevant variables. There are difficulties but in view of the rich dividends that it will yield the effort is worth the candle.[14]

And so on. It must be understood that, in a sense, the process of refinement of econometric model is a non-terminating process. As adequate data become available, more equations are added to simulate 'reality' better.[15] This is true anywhere, but particularly in a developing economy like Pakistan's, where the area of the unknown is quite large. Yet that should not dissuade us from pushing forward with scientific rigour. Notwithstanding the many shortcomings we have recounted of the present work, it already has made a valuable contribution to knowledge about how Pakistan's economy behaved during those 20 eventful years from 1959-60 to 1978-79. Even without doing any forecasting exercise, such a knowledge should be an invaluable guide for future policy-making; for when it comes to economic structure the future cannot be very different from the past.

It will take time, money, expertise and many heart-breaks – hopefully no heart failures – to make the present model a fully operational tool of economic policy-making in Pakistan. Yet that remains our hope. We are aware that the PIDE model is

[13] Some work has been done to study the distributional implications in terms of a formal model. For instance, see S. I. Cohen [1]. He has applied his model to India, Korea and Chile.

[14] Since the PIDE has just completed a fairly big (118 x 118) input-output table, it may be worthwhile to explore the possibility of combining the input-output tables and the econometric model into a more 'complete' model. The purpose is to determine endogenously the final demand, which is assumed as given in input-output models. However, as Klein [5] has pointed out, the data requirements for effecting such a 'docking operation' will be enormous. Hence, at least in the short run, we are not planning to embark on such a study.

[15] However, it would not be right for us to overplay the 'realism' aspect of the model, because it is not so much a question of the exact location of reality as of approximating it. Indeed, this process of approximating the 'truth' rather than locating it exactly is the heart of econometric research, which deals with stochastic phenomena.

coming out at a time when the dissatisfaction with macro-modelling exercises has been growing among both academic circles and policy-makers all over the world. This dissatisfaction has arisen mainly from the realization that econometric models have done a poor job of studying medium-range effects of various economic policies.[16] In the context of developing countries it is these effects that are important. However, much of this disenchantment is a reaction against the earlier misconceptions that econometric models are all-powerful and can eliminate without a trace sticky problems like stagflation.

The present study is essentially an essay in persuasion to discourage those who try to settle difficult questions of economic policy by means of over-simplified formulations. This modest attempt may already have hastened the demise of the "age of chivalry" in economic policy-making in Pakistan; and in the process, "the native hue of resolution" may have been "sicklied o'er with the pale cast of thought". Instead of battling endlessly with the windmills of unproven hypotheses derived from untutored intuition, we have followed a procedure of specifying testable propositions and establishing their validity through known scientific methods. Difficult questions have been answered, though not always definitively, and the answers, at times, are just as difficult as the corresponding questions. While economists and econometricians must remain modest and undogmatic about their advice, they should also not be too apologetic if it fails to produce the desired results. For even the scientific prognostications that fail do so with a "method" and a style. There goes out a signal to the researcher to persist a little longer to be able to offer alternative specifications through better procedures to test them and to come up with better estimation techniques. This is definitely better than falling back on the wild flights of an untutored imagination, which can take its helpless passenger just anywhere or nowhere at all. We can take comfort in the fact that through the present work the PIDE has finally joined the "research programme" initiated by Jan Tinbergen in 1939! We are the late-riders on the Tinbergen bandwagon; but then this has its own advantages. We have before us the works of such masters as Klein, Malinvaud, Theil and others to guide us in our search for the truth along what for Pakistan has been the "Road Not Taken". We have just begun our march on this "less travelled" road. Let us hope with Robert Frost, the American poet, that this will make "all the difference" for economic policy-making in Pakistan.[17]

[16] See E. Malinvaud [6].

[17] Taken from the last lines of the poem entitled "Road Not Taken", in Robert Frost's *The Road Not Taken,* New York: Holt, Rinehart and Winston. 1965.

> "Two Roads diverged in a wood; and
> I took the one less travelled by
> And that made all the difference."
>
> (P. 271)

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PART II

SPECIFICATION OF THE MODEL

Chapter 2

SPECIFICATION OF THE MODEL

For expositional purposes, the econometric model of Pakistan's economy is divided into three major sub-models, viz. the Production-Expenditure Sub-Model, the International Trade Sub-Model, and the Fiscal and Monetary Sub-Model. The model is estimated in log-linear form and in general involves very few dynamic relationships. Most of the endogenous variables depend solely on current values of other endogenous and exogenous variables. The model is predominantly supply-oriented, concentrating on the determinants of output in 10 productive sectors. For Agriculture (Crop) and Large-Scale Manufacturing sectors, production functions are estimated, while in the cases of sectors like Construction, Wholesale & Retail trade, and Public Administration & Defence, value added is determined in terms of demand factors. In other sectors, value added is taken either as exogenously determined or as a function of time.

PRODUCTION-EXPENDITURE SUB-MODEL

The Production-Expenditure Sub-Model is broadly subdivided into two 'blocks', viz. the Production Block and the Expenditure Block.[1] Within the Production Block, 10 major sectors are identified. These are: agriculture (crop); agriculture (non-crop); large-scale manufacturing; small-scale manufacturing; construction; mining and quarrying; wholesale and retail trade; public administration and defence; ownership of dwellings; and other services. To comprehend the various raltionships in this Block, 15 behavioural equations and 4 definitional equations and equilibrium conditions have been specified. Within the Expenditure Block, two major sectors are identified: (i) consumption and (ii) investment. The crucial relationships here are described in terms of 6 behavioural equations, 5 definitional equations and two exogenously given relations.

[1]It may be noted that the term 'block' here is used only as an expository device. It does not imply that this model is necessarily 'block-recursive' like, for instance, the Brookings Model.

Production Block

The following are the relationships used in the Production Block :

$$Y_d = Y_{ac} + Y_{an} + Y_{mq} + Y_{lm} + Y_{sm} + Y_{co} + Y_{wr} + Y_{od} + Y_{pd} + Y_{os} \quad .. \quad .. \quad (1)$$

$$Y = Y_d + R \quad .. \quad .. \quad (2)$$

where

Y_d = Gross Domestic Product;
Y_{ac} = Value added in agriculture (crop) sector;
Y_{an} = Value added in agriculture (non-crop) sector;
Y_{mq} = Value added in mining and quarrying;
Y_{lm} = Value added in large-scale manufacturing;
Y_{sm} = Value added in small-scale manufacturing;
Y_{co} = Value added in construction;
Y_{wr} = Value added in wholesale and retail trade;
Y_{od} = Value added in ownership of dwellings;
Y_{pd} = Value added in public administration and defence;
Y_{os} = Value added in other services;
Y = Gross National Product (GNP); and
R = Net factor income from abroad (i.e. remittances adjusted for net factor income outflow).

The production functions for agriculture and large-scale manufacturing are listed below, along with input demand equations.[2]

Agriculture (Crop) Sector

Production Function: $Y_{ac} = f(A_i, A_u, L_a, F, T, TR, Q, t)$ .. (3)

Input Functions :

Irrigated area: $A_i = f(U)$ .. .. (4)

Labour demand: $L_a = f(W_a/P_a, Y_{ac}, A, t)$ .. .. (5)

Fertilizer demand: $F = f(P_f/P_a, Y_{ac}, A, t)$ .. .. (6)

Tubewell demand: $T = f(P_t/P_a, Y_{ac}, A, t)$ .. .. (7)

Tractor demand: $TR = f(P_{tr}/P_a, Y_{ac}, A, t)$ .. .. (8)

[2]In the equation specified in the text, production functions for the Agriculture (Crop) Sector and for Large-Scale Manufacturing are directly estimated. An alternate formulation estimates output (and input demands) indirectly in terms of the prices of inputs (wage rates and the rate of interest).

where

Y_{ac} = Value added in Agriculture (Crop) Sector;
A_i = Irrigated area;
A_u = Unirrigated area;
A = Total cropped area;
L_a = Labour used in agriculture;
F = Fertilizer used in agriculture;
T = Tubewells used in agriculture;
TR = Tractors used in agriculture;
Q = Share of wheat in total cropped area (a proxy for the cropping pattern) treated as a shift parameter;
U = Surface water in million acre-feet;
P_a = Price of agricultural goods;
P_f = Price of fertilizers;
P_t = Price of tubewells;
P_{tr} = Price of tractors;
W_a = Wages in agriculture; and
t = Time trend.

Total cropped area is defined as :

$$A = A_i + A_u \quad \ldots \quad (9)$$

Large-Scale Manufacturing Sector

Production Function: $Y_{lm} = f(K_{lm}, L_{lm}, D_1, D_2, D_3, t)$ . . (10)

Labour Demand Function: $L_{lm} = f(W_{lm}/P_i, Y_{lm}, t)$ . . (11)

Investment Function:
(Private & Public) $I_{lm} = f(Y_{lm}, r, P_i/P_{lm}, R, D_1, D_2, D_3)$ . . (12)

The equation for capital stock is a definitional equation:

Capital Stock: $K_{lm} = I_{lm} + (1 - \delta) K_{lm-1}$ . . (13)

The variables defined in this set of equations are:

Y_{lm} = Value added in large-scale manufacturing;
K_{lm} = Capital in large-scale manufacturing;
L_{lm} = Labour in large-scale manufacturing;
I_{lm} = Investment in large-scale manufacturing;

W_{lm} = Wages in large-scale manufacturing;
P_{lm} = Price of manufactured goods in large-scale manufacturing;
P_i = Price of investment goods;
δ = Rate of depreciation;
r = Rate of interest;
R = Net factor income from abroad (i.e. remittances adjusted for net factor income outflow);
D_1 = Dummy variable for secession of East Pakistan in 1971;
D_2 = Dummy variable for nationalisation; and
D_3 = Dummy variable for stagnation during the 1969-70 to 1976-77 period.

Other Sectors

Construction: $Y_{co} = f(Y, R, I)$ . . . . (14)
Wholesale & Retail Trade: $Y_{wr} = f(Y)$ . . . . (15)
Public Administration and Defence: $Y_{pd} = f(C_g, t)$ . . . . (16)

where

Y = Gross National Product (GNP)
Y_{co} = Value added in construction;
Y_{wr} = Value added in wholesale and retail trade;
Y_{pd} = Value added in public administration and defence;
I = Total Investment;
C_g = Public consumption; and
R = Net factor income from abroad (i.e. remittances adjusted for net factor income outflow).

Finally, some other sectors are assumed to grow as functions of time. The following relationships are postulated for output in each of these sectors:

Agriculture (non-crop): $Y_{an} = f(t)$ . . . . (17)
Mining and Quarrying: $Y_{mq} = f(t)$ . . . . (18)
Other Services: $Y_{os} = f(t)$ . . . . (19)

where

Y_{an} = Value added in agriculture (non-crop) sector;
Y_{mq} = Value added in mining and quarrying;
Y_{os} = Value added in other services; and
t = Time trend.

The value added in the following sectors is exogenously given:

Ownership of Dwellings: $Y_{od} = \bar{Y}_{od}$
Small-Scale Manufacturing: $Y_{sm} = \bar{Y}_{sm}$

where

Y_{od} = Value added in Ownership of Dwellings; and
Y_{sm} = Value added in Small-Scale Manufacturing.

Expenditure Block

The Expenditure Block of this sub-model is composed of one definitional equation depicting the overall resource-gap (G_r):

$$G_r = C + I - Y \quad \ldots \quad (20)$$

where

C = Total consumption;
I = Total investment; and
Y = GNP.

The Expenditure Block, when further disaggregated into private and public spending, is defined as :

$$C = C_p + C_g \quad \ldots \quad (21)$$

The detailed specification of these two categories of consumption is as follows:

Private Consumption: $C_p = f(Y^D, F_k, R, \dot{P}_g, r, MO/P_g)$ . . (22)

Public Consumption: $C_g = f(Z, F_k)$ . . . . (23)

where

C = Total consumption;
C_p = Private consumption;
C_g = Public consumption;
Y^D = Disposable income;
F_k = Foreign capital inflow;

$\dot{P}_g$ = Rate of change in GNP price index;
r = Interest rate;
MO = Money stock;
R = Remittances; and
Z = Total public revenue.

Disposable income is defined as :

$$Y^D = Y - T \quad .. \quad .. \quad (24)$$

where T is direct taxes net of subsidies.

Similarly, total investment (I) is disaggregated into private investment (I_p) and public investment (I_g) as:

$$I = I_p + I_g \quad .. \quad .. \quad (25)$$

While only one behavioural equation is specified for public investment (I_g), private investment is disaggregated into three components; viz. private investment in agriculture (I_{pa}), private investment in manufacturing (I_{pm}), and other private investment (I_{po}). The following four equations are specified for these four investment categories :

Private Investment (agriculture): $I_{pa} = f(Y_{ac}, P_t/P_a, P_{tr}/P_a, R)$ .. (26)

Private Investment (large-scale manufacturing): $I_{pm} = f(Y_{lm}, P_i/P_{lm}, R, r, D_1, D_2, D_3)$ .. .. (27)

Private Investment (other sectors): $I_{po} = f(Y, P_i/P_{gdp}, R)$ .. (28)

Public Investment: $I_g = f(Z, F_k)$ .. .. (29)

where

Y = GNP;
Y_{lm} = Value added in large-scale manufacturing;
Y_{ac} = Value added in agriculture;

F_k = Foreign capital inflow;
R = Remittances:
Z = Total public revenue;
P_t = Price of tubewells;
P_{tr} = Price of Tractors;
P_a = Price of agricultural output;
P_i = Price of investment goods;
P_{gdp} = GDP price index;
P_g = GNP price index;
D_1 = Dummy variable for secession of East Pakistan in 1971;
D_2 = Dummy variable for nationalisation; and
D_3 = Dummy variable for stagnation during the 1969-70 to 1976-77 period.

Total private investment is defined as:

$$I_p = I_{pa} + I_{pm} + I_{po} \quad \ldots \quad \ldots \quad (30)$$

FOREIGN TRADE SUB-MODEL

This sub-model depicts the various foreign trade relationships in the economy. The sub-model is composed of 7 behavioural equations, 6 definitional equations and 2 exogenously given relations. It may be noted that the sub-model focuses on the current account only because capital inflows (the major component of the capital account) in Pakistan are largely given exogenously. The size of capital inflow is determined by various economic and non-economic considerations – e.g. the confidence that various aid-donor governments and agencies repose in the strength of Pakistan's economy – which are not amenable to control by public authorities. As such, capital inflows are taken as exogenously determined.[3] Also, the overall balance of payments, which in an *ex post* sense always balances, is not included in the list of equations. Instead, equilibrium condition (31) specifies a current account deficit variable (B) which defines a consistent 'closure' of the foreign trade account.

Total imports (exports) in this model are defined as the sum of imports (exports) of goods and services. Imports of goods are further disaggregated into the following categories: foodgrains (wheat), energy, consumer goods (except foodgrains), intermediate goods and capital goods. Exports of goods are likewise disaggregated into exports of primary goods and of manufactured goods. Imports and

[3]It is acknowledged that the demand for foreign capital is endogenously determined by factors like the planned rate of growth. However, the supply of foreign capital is not dependent upon such considerations. It is determined by foreign governments and aid-giving agencies. Since the supply of foreign capital is, in general, less than the demand for foreign capital, it is quite logical to take the supply of foreign capital as exogenously given.

exports of services are treated as exogenously given. The trade gap (G_T) is defined as the gap between total imports (M) and exports (X). Since in our model the trade gap is identically equal to the resource gap (G_r) as defined in equation (20), it follows that

$$G_T = M-X = G_r = C + I-Y \quad \ldots \quad (31)$$

The current account deficit (B) is derived when this trade balance is adjusted for net factor income from abroad.

$$B = G_T - R \quad \ldots \quad (32)$$

The rest of the definitional equations are stated below:

$$M = M_g + M_s \quad \ldots \quad (33)$$

$$M_g = M_f + M_e + M_c + M_i + M_k \quad \ldots \quad (34)$$

while

$$X = X_g + X_s \quad \ldots \quad (35)$$

$$X_g = X_p + X_m \quad \ldots \quad (36)$$

where

M_g = Import of goods;
M_s = Import of services;
X_g = Export of goods;
X_s = Export of services;
M_f = Import of foodgrains (wheat)
X_p = Export of primary goods;
X_m = Export of manufactured goods;
M_e = Import of energy;
M_c = Import of consumer goods (except foodgrains);
M_i = Import of intermediate goods; and
M_k = Import of capital goods.

Import Block

The detailed specification of the Import Block includes six import categories, accounting for all of Pakistan's imports. Behavioural equations are specified for the

imports of five types of goods while imports of services are assumed to be exogenously determined.

Import Categories

Foodgrains: $M_f = f(Y_f, N, Y^D/N)$ .. (37)

Consumer goods (except foodgrains): $M_c = f(C, E_{mc}, D_1)$ .. (38)

Energy: $M_e = f(Y, Y_{lm}, AM, P_e/P_g, D_1)$ .. (39)

Intermediate goods: $M_i = f(Y_{lm}, E_{mi}, D_1)$ .. (40)

Capital goods: $M_k = f(I, E_{mk}, D_1)$ .. (41)

Services: $M_s = \bar{M}_s$

In these equations the independent variables are as follows:

Y_f = Production of foodgrains;
N = Population;
Y^D = Disposable income;
Y = GNP;
Y_{lm} = Value added in large-scale manufacturing;
AM = Agriculture mechanization index;
C = Total consumption;
I = Total investment;
M = Total imports;
P_e = Price of energy;
D_1 = Dummy variable for secession of East Pakistan in 1971;
P_g = GNP Price Index;
E_{mc} = Real Effective Exchange Rate for imports of consumer goods;[4]
E_{mi} = Real Effective Exchange Rate for imports of intermediate goods; and
E_{mk} = Real Effective Exchange Rate for imports of capital goods.

[4]Changes in real effective exchange rates reflect changes in the relative domestic prices of imported goods, i.e. [official exchange rate $\cdot$ $(1+\eta)$ $\cdot$ P_m/P_g]. Here η is the nominal rate of protection and P_m refers to the price of imports.

Export Block

The following two behavioural equations are specified for the two categories of exports of goods, while exports of services are exogenously determined:

Export Categories

Primary goods: $X_p = f(Y_{ac}, P_{xp}/P_g, C, D_1)$ .. (42)

Manufactured goods: $X_m = f(Y_m, P_{xm}/P_g, C, D_1)$ .. (43)

Services: $X_s = \bar{X}_s$

where the independent variables are :

Y_{ac} = Value added in agriculture (crop) sector;
P_{xp} = Price of primary-goods exports;
P_{xm} = Price of manufactured-goods exports;
Y_m = Value added in manufacturing;
C = Total consumption;
P_g = GNP price index;
X = Total exports; and
D_1 = Dummy variable for secession of East Pakistan in 1971.

Note: In equations 38 to 41 and again in equations 42 and 43, the difference caused by the use of effective exchange rate in the former and of relative prices in the latter is more apparent than real. In both cases, it is the policy-induced changes in the relative price of imported and exported goods that really matter.

FISCAL AND MONETARY SUB-MODEL

This sub-model includes specifications for public revenues (public expenditure having been defined in the Production and Expenditure Sub-Model), the demand for and the supply of money and the determination of inflation. The sub-model, divided into two blocks – the Fiscal Block and the Monetary Block – encompasses 8 behavioural and 2 definitional equations.

Fiscal Block

The Fiscal Block contains two definitional equations, one for total public revenue and the other for budget deficit. In addition, there are 6 behavioural equations for the 6 sources of public revenue.

Budget deficit is defined as the difference between aggregate public spending (expenditure on goods and services and total transfer payments) and total public revenue, while total public revenue is just the sum of revenues from five categories of taxes and other revenue. Thus

$$D = C_g + I_g + S - Z \quad \ldots \quad (44)$$

$$Z = Z_t + Z_i + Z_e + Z_s + Z_1 + Z_o \quad \ldots \quad (45)$$

where

D = Government budget deficit;
C_g = Public consumption;
I_g = Public investment;
Z = Total public revenue;
Z_t = Total customs revenue;
Z_i = Income tax revenue;
Z_e = Excise tax revenue;
Z_s = Sales tax revenue;
Z_1 = Land revenue;
Z_o = Other revenues; and
S = Government subsidies and transfer payments.

Behavioural equations for these 6 revenue sources are defined as follows:

Customs Revenue: $Z_t = f(M_g, D_4, D_5, D_6, D_7, D_8, D_9)$ . . (46)

Excise Tax Revenue : $Z_e = f(Y_{lm}, D_{10}, D_{11}, D_{12}, D_{13})$ . . (47)

Sales Tax Revenue: $Z_s = f(M_g, Y_{lm}, D_{14}, D_{15}, D_{16}, D_{17})$ . . (48)

Income Tax Revenue: $Z_i = f[(Y-Y_a), D_{18}, D_{19}, D_{20}, D_{21}, D_{22}, D_{23}]$ . . (49)

Land Revenue $Z_1 = F(A)$ . . . . (50)

Other Revenues: $Z_o = f(t)$ . . . . (51)

where

$(Y-Y_a)$ = Non-agriculture income;
M_g = Imports of goods;
Y_{lm} = Value added in large-scale manufacturing;
A = Total cropped area; and
t = Time trend.

Here, D_i, i = 4, 5, ... 23 represent dummy variables to account for all discretionary changes made by the government from time to time. These variables are assumed to take the value of zero in the period preceding the discretionary change and of unity in all subsequent years, because each such change in any given year presumably has a lasting effect on the fiscal structure in all subsequent years.

Monetary Block

In this model, nominal money supply, $\bar{MO}$, is taken as exogenously given. On the demand side, it is assumed that the actual demand for money adjusts itself to the desired level with a one-year lag. Therefore, the following partial adjustment mechanism is postulated:

$$\text{Ln}\left[\frac{MO}{P_g}\right]_t - \text{Ln}\left[\frac{MO}{P_g}\right]_{t-1} = \lambda\left[\text{Ln}\left(\frac{MO^*}{P_g}\right)_t - \text{Ln}\left(\frac{MO}{P_g}\right)_{t-1}\right]$$

where

$$0 < \lambda < 1$$

and

$$\text{Ln}\left[\frac{MO^*}{P_g}\right] = \alpha + \beta\ \text{Ln}\,(Y)_t + \lambda\ \text{Ln}\,(r)_t + \delta\ \text{Ln}\,(\dot{P}^e_g)_t$$

These two equations yield the following relation for real money demand :

$$\text{Ln}\left[\frac{MO}{P_g}\right]_t = a_0 + a_1\ \text{Ln}\,(Y)_t + a_2\ \text{Ln}\,(r)_t + a_3\ \text{Ln}\,(\dot{P}^e_g)_t +$$

$$a_4\ \text{Ln}\left[\frac{MO}{P_g}\right]_{t-1} \qquad \ldots\ldots\ldots\ldots\ldots (52)$$

where

$$a_0 = \lambda\alpha,\ a_1 = \lambda\beta,\ a_2 = \lambda\gamma,\ a_3 = \lambda\delta,\ a_4 = (1-\lambda)$$

$\left[\frac{MO}{P_g}\right]_t$ = Money demand at time t in real terms;

$\left[\frac{MO^*}{P_g}\right]_t$ = Desired money demand at time t in real terms;

Y = GNP;

r = Average rate of interest of time deposits;

$(\dot{P}^e_g)_t$ = Expected change in GNP price index at time t; and

λ = Coefficient of adjustment.

It may be noted that the expected rate of price change is, in any period, derived from the rates of price change in the past two periods, and is expressed as

$$(\dot{P}^e_g)_t = \mu\,(\dot{P}_g)_{t-1} + (1-\mu)\,(\dot{P}_g)_{t-2}$$

where $\mu = 0.6$.

The relationship used to explore price changes in the economy allows for both monetary and real influences on inflation. It also makes it possible to test the hypothesis that inflation in Pakistan has largely been caused by rising import prices. Since the difference between the rates of change in import prices and domestic prices is expected to influence the rate of inflation, this variable is included in the list of explanatory variables to test the imported inflation hypothesis.

The following relationship is postulated for the factors responsible for inflation in the economy :

$$\dot{P}_g = f\left[\left\{(E_m \cdot P_m)^{\cdot} - \dot{P}_g\right\},\ Y/Y^T,\ E/E^T,\ MO\right] \qquad \ldots \quad (53)$$

where

$\dot{P}_g$ = Rate of change in GNP price index;

E_m = Effective exchange rate for imports;

P_m = Price of imports;

(Y/Y^T) = Ratio of actual GNP to its trend value;

(E/E^T) = Ratio of public expenditure to its trend value; and

MO = Money stock.

PART III

RESULTS OF ESTIMATION

INTRODUCTION TO PART III

Chapters 3 to 5 present the results of estimation of the specified equations which highlight the basic structure of Pakistan's economy during the 20-year period from 1959-60 to 1978-79.[1] The estimation has been done by employing the Two-Stage Least-Squares (2SLS) procedure. For this, the Time Series Processor (TSP) package programme has been used. In the cases of equations that are simple functions of time or in which only exogenous variables appear on the right-hand side, the Ordinary Least-Squares (OLS) procedure has been followed. The estimation of the various relations specified in the model has encountered problems of multicollinearity of regressors and serial correlation, both of which are common when time-series data are used for estimation. If the autoregressive scheme were known, the problem of serial correlation could be tackled by applying estimation method discussed in Sargan [3], Fair [1] and Hatanaka [2]. In the present work, however, this exercise has not been done. The problem of multicollinearity has been overcome, though not completely, by specifying equations which use alternatively level, rates of change, ratios to some suitable denominator, and the like. The results listed in Chapters 3–5 are limited to only one version of each of the estimated equations, while the alternative estimates for some of the equations are available in the Pakistan Institute of Development Economics (PIDE) Each estimated equation is followed by a brief discussion of the signs of each of the structural coefficients, and of the goodness of fit of the equation.[2]

[1] All the data relate to (West) Pakistan. Where the data for West Pakistan were not separately available, the combined series for the two wings of the country were divided into those relating to East Pakistan and those pertaining to West Pakistan. See the Data Appendix for a discussion of the methods used to construct a set of consistent time series.

[2] Even though we have reported $\bar{R}^2$, D.W. and F-Statistics for each of the equations, one should be cautious in drawing conclusions regarding goodness of fit and the serial correlation. It is quite well known that in Two-Stage Least Squares, R^2 does not range between zero and one. In particular, the role of D.W. statistic in a simultaneous-equation framework is not very clear. As such we have refrained from using the given values of D.W. statistic to evaluate the various equations in the model.

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Chapter 3

PRODUCTION-EXPENDITURE SUB-MODEL

For the sake of expositional clarity, the discussion of the Production-Expenditure Sub-Model has been subdivided into two Blocks, viz. the Production Block and the Expenditure Block.

Production Block

The major sectors discussed in detail in the Production Block are agriculture and large-scale manufacturing, where the discussion of value added equations is followed by that of the input demand equations.[1] The sectors where value added is determined by demand factors are presented next. Then there are sectors whose growth rates are assumed to be determined exogenously mainly because of the difficulties in obtaining sufficient data on the determinants of value added originating in these sectors. For two sectors, viz. ownership of dwellings and small-scale manufacturing, growth rates are not estimated since data are generated on the basis of assumed rates of growth.

i. Agriculture (Crop) Sector

In agriculture, the value added in the crop sector is influenced by irrigated and unirrigated area, fertilizer use, labour use, availability of tubewells, tractors and water, the cropping pattern and other factors. An attempt was also made to capture

[1]The numbering of equations in this and the following chapters is the same as in Chapter 2. However, a prime above the number of equations is used to signify that the equations thus marked are estimates of the correspondingly numbered equations in Chapter 2.

the effect of weather conditions on agricultural output by the use of a dummy variable, assigning it a value of unity for flood and drought years and of zero for normal years. However, as the coefficient of weather had incorrect sign, this attempt proved to be infructuous. Another set of problems, quite normal with time-series data (used throughout this study), arose because of the multicollinearity among various agricultural inputs. Since the estimated equation for value added in agriculture turned out with negative coefficients for labour, area, water, and tractor use, both the dependent and independent variables (except Q which has been used as a shift parameter) were expressed as a ratio to total labour employed in agriculture.

Agricultural Output Equation[2]

$$\begin{aligned} \text{Ln}\,(Y_{ac}/L_a) = {} & 0.600 + \underset{(5.47)}{0.614}\,\text{Ln}(A_i/L_a) + \underset{(2.15)}{0.240}\,\text{Ln}(A_u/L_a) + \underset{(4.84)}{0.127}\,\text{Ln}(F/L_a) \\ & + \underset{(4.68)}{0.189}\text{Ln}\,(T/L_a) - \underset{(3.48)}{0.140}\,\text{Ln}\,(TR/L_a) + \underset{(2.30)}{0.554}\text{Ln}(Q) \qquad .. \quad (3') \end{aligned}$$

$$\bar{R}^2 = 0.996, \quad \text{D.W.} = 2.00, \quad F = 755.6$$

where (Y_{ac}/L_a) = Value added in agriculture per agricultural labourer; (A_i/L_a) = Irrigated area per agricultural labourer; (A_u/L_a) = Unirrigated area per agricultural labourer; (F/L_a) = Fertilizer use per agricultural labourer; (T/L_a) = Tubewell use per agricultural labourer; (TR/L_a) = Tractor use per agricultural labourer; and (Q) = The share of wheat in total cropped area. Equation (3′) shows that the 6 independent variables specified in the equation explain 99.6 percent of the variation in agricultural output.[3] It is interesting to note that most of the contribution to the increase in agricultural output has come from changes in irrigated and unirrigated areas under the crop. The effect of fertilizers, tubewells and the cropping patterns on agricultural output is also significant. The share of wheat in total cropped area has been taken as a proxy for cropping pattern on the assumption that a move towards greater cultivation of wheat leads to better allocation of resources. This assumption, however, needs to be tested by studying the movements in cropping pattern. However, there is one puzzling result that needs further investigation. The

[2]It is acknowledged that separate production functions should be estimated for cash crops and for food crops (as the latter is used as an explanatory variable in equation 37). However, the lack of separate data on input use in the cash crop sector and the food crop sector rules out such estimation.

[3]We also estimated a relationship in which, in addition to these six variables, labour employed in agriculture was used as an explanatory variable. However, the value of coefficient was very low, i.e. 0.03 and statistically insignificant. Therefore, the variable was dropped from specification. Similarly, in another equation, we included time variable as well in the specification, but that made most of the other variables insignificant. Therefore, time variable was also dropped from the specification.

sign of the tractors/labour variable is negative.[4] This is an unexpected result because some of the studies on the subject point to the positive effects of tractorization on agricultural output. However, this result, while by itself not very acceptable, should be taken as a warning against the facile view that the introduction of tractors always increases agricultural production, even when not associated with suitable institutional reforms.

Agricultural Input Demand Functions

An increase in agricultural output creates a derived demand for essential inputs. Hence, to complement the information conveyed by the agricultural production function, it is essential that demand functions for the key agricultural inputs are estimated as well. Accordingly, input demand functions for the agricultural sector are estimated as follows:

Irrigated Area

$$\text{Ln}(A_i) = \underset{(241.3)}{7.124 + 0.543\ \text{Ln}(U)} \quad .. \quad (4')$$

$$\bar{R}^2 = 0.944,\ \text{D.W.} = 2.03,\ F = 58{,}225.7$$

where (A_i) = irrigated area and (U) = water availability in million acre-feet.

This equation reveals that variations in the irrigated area used are fairly well explained by the availability of water.

Labour Demand in Agriculture. The following equation estimates the derived demand for agricultural labour.

$$\text{Ln}(L_a) = \underset{}{-111.142} + \underset{(1.44)}{2.460\ \text{Ln}(Y_{ac})} + \underset{(2.19)}{10.476\ \text{Ln}(A)}$$

$$\underset{(0.98)}{-0.875\ \text{LN}(W_a/P_a)} - \underset{(1.77)}{0.147\ t} \quad .. \quad .. \quad .. \quad (5')$$

$$\bar{R}^2 = 0.151,\ \text{D.W.} = 2.67,\ F = 1.72$$

where (L_a) = labour used in agriculture (crop) sector; (Y_{ac}) = value added in agriculture (crop) sector; (A) = total cropped area; (W_a/P_a) = real wages in agriculture (crop) sector; and t = time-trend.

[4] See Moazam Mahmood and Nadeem-ul-Haque [5] who have also obtained a negative coefficient for tractor use on value added. For the opposite view, see Abdul Salam [7]. McInerny and Donaldson [6] in a World Bank study conclude that tractors do not affect agricultural productivity significantly.

It can be seen that the amount of labour used has responded positively to increases in agricultural output and area, and negatively to real wages. Furthermore, the negative coefficient of t in the equation shows that if Y_{ac}, A and (W_a/P_a) had remained unchanged, labour absorption in the agricultural sector would have declined over time. This may, in fact, be reflecting partly the effect of labour-displacing technology. However, this equation represents a poor fit as $\bar{R}^2$ is low and the equation is statistically insignificant.

Fertilizer Demand in Agriculture. The demand for fertilizer per acre is estimated to be a function of output, relative prices and a time trend. Thus

$$\underset{}{\text{Ln}(F/A)} = \underset{}{-3.149} + \underset{(22.16)}{2.812}\,\text{Ln}(Y_{ac}/A) - \underset{(2.10)}{0.182}\,\text{Ln}(P_f/P_a) + \underset{(20.42)}{0.087}\,t \quad .. \quad (6')$$

$$\bar{R}^2 = 0.994, \quad \text{D.W.} = 2.12, \quad F = 841.5$$

where (F/A) = fertilizer use per acre; (Y_{ac}/A) = agricultural output per acre; (P_f/P_a) = price of fertilizer/price of agricultural output; and t = time trend.

From this equation, the high positive correlation between fertilizer use and agricultural output per acre is clear. The relative-price variable has the correct sign, i.e. the demand for fertilizer is negatively related to changes in its relative price. The equation also reveals an autonomous annual growth of 8.7 percent in the fertilizer used per acre.

Tubewell Demand in Agriculture. The same explanatory variables (output, relative prices and time) are used to estimate demand for tubewells. The following fit is obtained:

$$\text{Ln}(T/A) = \underset{}{2.051} + \underset{(9.97)}{1.783}\,\text{Ln}(Y_{ac}/A) - \underset{(2.45)}{0.716}\,\text{Ln}\,(P_t/P_a) + \underset{(9.66)}{0.093}\,t \quad .. \quad (7')$$

$$\bar{R}^2 = 0.964, \quad \text{D.W.} = 0.70, \quad F = 274.83$$

where (T/A) = tubewell use per acre; (Y_{ac}/A) = output per acre; (P_t/P_a) = price of tubewells/Price of agricultural output; and t = time.

Equation (7′) shows that, as expected, the intensity of use of tubewells has responded positively to increases in agricultural output and negatively to relative prices. The autonomous annual growth rate of tubewell installation is 9.3 percent. High $\bar{R}^2$ and F values indicate that the equation explains satisfactorily the demand for tubewells.

Tractor Demand in Agriculture. The demand for tractors per acre is estimated as a function of value added per cropped acre, relative prices and time. (An alternate version in which separate elasticities are calculated for the price of output and the price of tractors is available in the PIDE.)

$$\underset{}{\text{Ln}(TR/A)} = \underset{}{-1.376} - \underset{(0.13)}{0.043\ \text{Ln}(Y_{ac}/A)} - \underset{(6.51)}{0.772\ \text{Ln}(P_{tr}/P_a)} + \underset{(11.97)}{0.157\ t} \quad .. \quad (8')$$

$$\bar{R}^2 = 0.980, \quad D.W. = 0.97, \quad F = 70.27$$

where (TR/A) = tractor use per acre; (Y_{ac}/A) = value added per cropped acre; (P_{tr}/P_a) = price of tractors/price of agricultural output; and t = time.

Tractor use has grown autonomously at a rate of 15.7 percent annually. Also, the demand for tractors has responded negatively to the relative price of tractors. The negative response of tractor use to output in agriculture is an unexpected result. However, the coefficient is not statistically significant.

ii. Large-Scale Manufacturing Sector

The second major component of the Production Block is the large-scale manufacturing sector. A production function was estimated for this sector by regressing value added on labour, capital and time trend. Furthermore, three dummy variables were introduced to capture the effects during the Seventies of the secession of East Pakistan in 1971 (D_1), nationalization of large-scale manufacturing in 1972-73 (D_2), and the observed recession in industrial production during 1969-70 to 1976-77 (D_3). Of the three dummy variables, only D_3 turned out to be significant. The resulting equation is:[5]

$$\underset{}{\text{Ln}(Y_{lm})} = \underset{}{-1.214} + \underset{(1.64)}{0.154\ \text{Ln}(L_{lm})} + \underset{(13.49)}{0.889\ \text{Ln}(K_{lm})} + \underset{(13.26)}{0.048\ t} - \underset{(4.98)}{0.0957\ D_3} \quad .. \quad .. \quad .. \quad .. \quad (10')$$

$$\bar{R}^2 = 0.943, \quad D.W. = 2.17, \quad F = 58.44$$

where (Y_{lm}) = value added in large-scale manufacturing; (L_{lm}) = labour in large-scale manufacturing; (K_{lm}) = capital in large-scale manufacturing; D_3 is

[5]It should be noted that for the large-scale manufacturing sector, the data for the last three years have been derived by extrapolation. Hence the equations of this sector will have to be re-estimated once firm estimates are available.

dummy variable taking the value of 1 for the period 1969-70 to 1976-77 and of zero otherwise; and t = time trend.

The equation shows that technical progress did take place at the rate of 4.8 percent per annum during the period from 1959–70 to 1978-79; and that changes in the labour and capital inputs contributed significantly to value added in large-scale manufacturing.[6] The equation also verifies the observed phenomenon of recession during the 1969-70 to 1976-77 period due to various reasons – e.g. world recession. *However, the equation rules out secession of East Pakistan and nationalization of the manufacturing sector as factors contributing to industrial recession.* The fact that D_1 and D_2 turned out to be statistically insignificant shows that Pakistan's economy absorbed both of these 'shocks' as if they never took place.[7]

Input Demand Functions in Large-Scale Manufacturing

The two crucial inputs into large-scale manufacturing are labour and captial. Demand functions for labour and investment have been estimated. The rate of investment, in turn, together with the rate of depreciation, determines the size of the capital stock.

Labour Demand Function. The demand for labour is estimated as a function of manufacturing output and relative prices.

$$\underset{}{\text{Ln}(L_{lm})} = \underset{}{5.00} + \underset{(31.84)}{1.185\ \text{Ln}(Y_{lm})} - \underset{(10.97)}{1.088\ \text{Ln}(W_{lm}/P_i)} \qquad \ldots(11')$$

$$\bar{R}^2 = 0.944, \quad \text{D.W.} = 1.05, \quad F = 85.91$$

where (L_{lm}) = labour in large-scale manufacturing; (Y_{lm}) = value added in large-scale manufacturing; and (W_{lm}/P_i) = Nominal wages/price of investment goods. The $\bar{R}^2$ and F values depict a fairly good fit. Labour use is related positively to an increase in output and negatively to a rise in wages relative to the price of investment goods.

Investment Demand Function. The investment demand function is estimated as a function of output, rate of interest, an appropriate relative price and a time

[6]However, one cannot determine the bias in technical change, because it is not possible to distinguish between neutral technical change and non-neutral technical change in a Cobb-Douglas production function, which is the function used in this study. Kemal [3], using a CES production function, showed that technical change in Pakistan has, in general, been neutral. Moreover, Kemal has also shown in [4] that the increase in productivity has largely been due to learning by doing.

[7]The three dummy variables D_1, D_2 and D_3 were introduced one at a time. This procedure yielded the result noted in the text – only D_3 was significant while D_1 and D_2 were insignificant.

trend. A dummy variable is also included to account for the effects of nationalization on manufacturing investment. However, because the dummy variable turned out to be insignificant and the coefficient of time was too high to be believed, both of them were dropped from the specification. The estimated equation is:

$$\underset{}{\text{Ln}(I_{lm})} = \underset{}{1.856} + \underset{(1.67)}{0.628\ \text{Ln}(Y_{lm})} - \underset{(2.06)}{0.928\ \text{Ln}\,(r)} - \underset{(2.846)}{2.095\ \text{Ln}(P_i/P_{lm})} \quad ..(12')$$

$$\bar{R}^2 = 0.436,\ \text{D.W.} = 0.80,\ F = 5.75$$

where (I_{lm}) = investment in large-scale manufacturing; (Y_{lm}) = value added in large-scale manufacturing sector; (r) = rate of interest; and (P_i/P_{lm}) = price of investment goods/price of manufactured goods.

As expected, the demand for investment goods has varied positively with changes in output and negatively with relative prices. Moreover, the interest rate variable has a statistically significant negative coefficient.[8]

iii. Other Sectors

In contrast with the treatment so far, it is more reasonable to postulate that demand considerations rather than the supply of inputs have been the primary determinants of value added in "other sectors" of the economy – e.g. the construction sector. Accordingly, value added in construction is regressed against GNP, net factor income from abroad and total investment. Value added in the wholesale and retail trade is regressed against GNP, while that in public administration and defence sector is regressed against public consumption and time. These estimates yield:

Construction Sector Output

$$\underset{}{\text{Ln}(Y_{co})} = \underset{}{-2.95} + \underset{(1.98)}{0.633\ \text{Ln}(Y)} + \underset{(1.26)}{0.09\ \text{Ln}\,(R)} + \underset{(1.67)}{0.36\ \text{Ln}\,(I)} \quad .. \quad (14')$$

$$\bar{R}^2 = 0.95,\ \text{D.W.} = 1.62,\ F = 116.69$$

where (Y_{co}) = value added in construction; (Y) = GNP; (R) = net factor income from abroad; and (I) = total investment.

[8]It may be noted that dropping the time trend and the dummy variable from the earlier specification (not reported here) led to a poorer overall fit. However, the explanatory power of the individual variables improved.

The equation explains 95 percent of the total variation in the output of the construction sector. It is interesting to note that GNP and total investment have significantly affected the output in this sector.

Wholesale & Retail Trade Output

$$\text{Ln}(Y_{wr}) = -2.036 + \underset{(103.86)}{1.018\ \text{Ln}(Y)} \quad .. \quad .. \quad .. \quad (15')$$

$$\bar{R}^2 = 0.983, \quad \text{D.W.} = 0.51, \quad F = 1078.9$$

where (Y_{wr}) = value added in wholesale and retail trade; and (Y) = GNP.

From this equation, it is seen that changes in GNP explain almost all of the variation in output in this sector.

Public Administration & Defence Output

$$\text{Ln}(Y_{pd}) = 4.545 + \underset{(2.06)}{0.303\ \text{Ln}(C_g)} + \underset{(8.06)}{0.064\ t} \quad .. \quad .. \quad (16')$$

$$\bar{R}^2 = 0.936, \quad \text{D.W.} = 0.86, \quad F = 132.35$$

where (Y_{pd}) = value added in public administration and defence; (C_g) = public consumption; and t = time. In this equation also, the $\bar{R}^2$ and F values indicate a good fit.

Public consumption is a major determinant of the value added in this sector. An autonomous annual growth rate of 6.4 percent explains the rapid increase in value added in this sector.

Value added in the following sectors is assumed to have grown at exogenously given historical rates. The estimated relationships are described below:

Agriculture (Non-Crop) Sector Output[9]

$$\text{Ln}\,(Y_{an}) = 7.955 + \underset{(23.14)}{0.022\ t} \quad .. \quad .. \quad ..(17')$$

$$\bar{R}^2 = 0.979, \quad F = 535.4$$

where (Y_{an}) = value added in agriculture (non-crop) sector; and t = time.

[9]In the case of equations that are simple functions of time, the D.W. statistic is not reported.

For the non-crop sector of agriculture, an exogenous growth rate is assumed because value added data on livestock farming are simply not available, while forestry and fisheries (for which the relevant departments collect data) are minor components of the non-crop sector. This sector has grown at just over 2 percent per annum. The $\bar{R}^2$ and the F-ratio reveal that this equation represents a fairly good fit.

Mining and Quarrying Output

$$\underset{(16.73)}{\text{Ln}(Y_{mq}) = 4.373 + 0.053\,t} \quad \ldots \quad \ldots \quad \ldots \quad (18')$$

$$\bar{R}^2 = 0.94, \quad F = 280.08$$

where (Y_{mq}) = value added in mining and quarrying; and t = time. This equation shows that value added in this sector has grown by 5.3 percent per year. Again, the equation indicates a good fit.

Other Services Output

$$\underset{(49.5)}{\text{Ln}(Y_{os}) = 7.789 + 0.069\,t} \quad \ldots \quad \ldots \quad (19')$$

$$\bar{R}^2 = 0.996, \quad F = 2450.1$$

where (Y_{os}) = value added in other services; and t = time.

Since the available data on value added originating in the small-scale manufacturing sector and ownership of dwellings sector have been generated on the basis of assumed growth rates, no attempt has been made to estimate the relationship for either of two sectors. Therefore, in order to determine the value added originating in these two sectors, we have assumed the following relationships on the basis of the growth rates used in National Accounts.

$$\text{Ln}(Y_{od})_t = \text{Ln}\,(Y_{od})_o + .03\,t$$

where t = 1 20

(Y_{od}) = Value added in Ownership of the Dwellings; and

$(Y_{od})_o$ = Value added in Ownership of Dwellings in 1959-60.

$$Ln(Y_{sm})_t = LN(Y_{sm})_o + .03t + .073\,t$$

where $t = 1, 2 \ldots\ldots\ldots 11$, and $t' = 12 \ldots\ldots\ldots 20$

(Y_{sm}) = Value added in Small-Scale Manufacturing; and

$(Y_{sm})_o$ = Value added in Small-Scale Manufacturing in 1959-60.

Expenditure Block

In this section the estimates of functions of private and public consumption as well as private and public investment are presented.

i. Consumption

Private Consumption

Private consumption has been regressed against disposable income, the rate of inflation, the rate of interest, remittances, foreign capital inflow and the real money stock. While the expected sign of the disposable income variable is unambiguously positive, the same cannot be said for other variables. An increase in the general price level ($\dot{P}_g$) erodes the value of savings. It thus reduces the incentive to save. However, a rise in the general price level ($\dot{P}_g$) also reduces the real value of cash balances. Behaving in a rational manner, consumers are expected to restore their real balances to the desired level. Likewise, an increase in the rate of interest by lowering individuals' time preferences tends to encourage savings. However, according to the Life Cycle Hypothesis, in the short run the opposite seems a more plausible proposition: a high rate of interest may tend to increase current consumption.[10] The problem has to be decided empirically. Similarly, remittances, already included in GNP, may exert an independent effect on consumption. The independent effect of remittances on consumption may well be negative. Foreign capital inflow may lead to higher savings by complementing domestic investment efforts. On the other hand, it may also lower savings as suggested by Griffin and Enos [2]. Once again the matter must be decided empirically.

[10]The Life Cycle Hypothesis is fairly well explained by numerous authors. One of the earliest statements of the theory is by Ando and Modigliani [1]. According to this hypothesis, a higher rate of interest helps increase the level of future income and wealth. Current consumption may increase as a result of this high rate of interest, the dissaving, if any, in the current period being financed by borrowing against future (expected) income.

Taking these apparently conflicting propositions into account, the following equation has been estimated:

$$\underset{}{\text{Ln}(C_p)} = \underset{}{4.153} + \underset{(6.13)}{0.89\ \text{Ln}(Y^d)} + \underset{(2.78)}{0.022\ \text{Ln}\ (\dot{P}_g)} + \underset{(3.30)}{0.429\ \text{Ln}(r)} - \underset{(1.25)}{0.114\ \text{Ln}(R)}$$

$$\underset{(2.43)}{-0.046\ \text{Ln}(F_k)} - \underset{(2.65)}{1.309\ \text{Ln}\ \left(\frac{MO}{P_g}\right)} \qquad .. \qquad ..(22')$$

$$\bar{R}^2 = 0.9503,\ \text{D.W.} = 2.65,\ F = 498.0$$

where (C_p) = private consumption; (Y^d) = disposable income; (r) = rate of interest; $(\dot{P}_g)$ = change in GNP price index; (R) = remittances; (F_k) = foreign capital inflow; and $(\frac{MO}{P_g})$ = real money stock.

The equation explains 95 percent of the variation in private consumption expenditure. The coefficient of the rate of price-change variable is positive, showing that inflation tends to increase consumption. The positive coefficient of the rate of interest variable appears to confirm the Life Cycle Hypothesis. As shown by their negative coefficients, private remittances and other foreign capital inflows appear to have complemented domestic savings rather than substituted for them. The negative coefficient of real money stock most probably reflects the gradual monetizing of the economy over the years.[11]

Public Consumption

Public consumption is directly related to the government's ability to raise resources. Two main components of public consumption are public revenues and foreign capital inflows. Accordingly, the following relationship is estimated:

$$\text{Ln}\ (C_g) = \underset{}{1.838} + \underset{(19.03)}{0.597\ \text{Ln}\ (Z)} + \underset{(3.70)}{0.159\ \text{Ln}\ (F_k)} \qquad ..(23')$$

$$\bar{R}^2 = 0.891,\ \text{D.W.} = 1.54,\ F = 73.63$$

where (C_g) = public consumption; (Z) = total public revenues; and (F_k) = foreign capital inflows.

Public consumption is largely explained by changes in public revenue and foreign capital inflow. Foreign capital tends to somewhat increase consumption in

[11] Thus any increase in money stock is held by individuals not for the purpose of financing added consumption out of the stock of wealth but to finance the increasing monetization of the economy.

the public sector, whereas it exerts a negative influence on private consumption. The responsiveness of public consumption to total public revenues is significant.

ii. Investment Function

Private Investment

Private investment is generally assumed to be determined by profitability considerations and the marginal cost of loanable funds. While GNP and the rate of interest capture the effects of these factors, the inflow of foreign capital and workers' remittances should also be taken into account since these have had a direct effect on the availability of loanable funds in almost all sectors of the economy.

Private investment functions have been estimated for agriculture and manufacturing sectors. Investments in all other sectors have been lumped together because of the non-availability of relevant data.[12]

(a) PRIVATE INVESTMENT IN AGRICULTURE

$$\underset{}{\text{Ln}(I_{pa})} = \underset{}{-1.535} + \underset{(3.39)}{0.757\ \text{Ln}(Y_{ac})} - \underset{(-4.83)}{0.973\ \text{Ln}(P_t/P_a)} + \underset{(0.02)}{0.003\ \text{Ln}(P_{tr}/P_a)}$$

$$+ \underset{(2.73)}{0.099\ \text{Ln}\ (R)} \qquad .. \qquad .. \qquad .. \qquad (26')$$

$$\bar{R}^2 = 0.58,\ \text{D.W.} = 1.082,\ F = 5.85$$

where (I_{pa}) = Private Investment in agriculture; (Y_{ac}) = value added in agriculture; (P_t/P_a) = price of tubewells/price of agricultural output; (P_{tr}/P_a) = price of tractors/price of agricultural output; and R = remittances.

In this equation the $\bar{R}^2$ is quite satisfactory. The signs of three of the variables are as expected while that of the relative price of tractors is wrong, though the coefficient is low and is also not statistically significant. The equation shows that investment in agriculture is positively affected by variations in agricultural output and negatively by the relative price of tubewells. It is interesting to note that

[12] Serious problems have been encountered in estimating a single equation for total private investment. This suggests that because of the various sectoral dissimilarities, the best approach is to estimte several equations for private investment for various sectors. Here we present three equations, estimated for private investment in agriculture, large-scale manufacturing and 'other' sectors.

remittances have exerted a positive, though relatively small, effect on private investment in agriculture.

(b) PRIVATE INVESTMENT IN LARGE-SCALE MANUFACTURING

$$\underset{}{\text{Ln}(I_{pm})} = \underset{}{5.14} + \underset{(1.40)}{0.456}\,\text{Ln}(Y_{lm}) - \underset{(3.96)}{0.393}\,\text{Ln}(R) - \underset{(2.47)}{1.192}\,\text{Ln}(P_i/P_{gdp}) \quad ..(27')$$

$$\bar{R}^2 = 0.782, \quad D.W. = 0.66, \quad F = 17.732$$

where (I_{pm}) = private investment in large-scale manufacturing; (Y_{lm}) = value added in large-scale manufacturing; (R) = remittances; and (P_i/P_{gdp}) = price of investment goods/GDP price index.

In this equation, the $\bar{R}^2$ and F values indicate a good fit; the equation explains 78 percent of the variation in private investment in large-scale manufacturing. Furthermore, while the sign of the output variable and that of the relative price variable are as expected, the sign of the remittances variable is negative and significant. This and the fact that inflows of remittances appear to have gone to other sectors of the economy suggest that an outflow of workers from large-scale manufacturing may have reduced private investment there. While this is an entirely plausible result, it appears to be more of an expression of the historically negative relationship between out-migration of workers and the output in large-scale manufacturing.[13] It is recommended that more work be done on this equation by including such variables as corporate saving (for which consistent time series do not yet exist), investment credit, etc.

(c) PRIVATE INVESTMENT IN OTHER SECTORS

$$\underset{}{\text{Ln}(I_{po})} = \underset{}{6.359} + \underset{(0.67)}{0.000015}\,\text{Ln}(Y) - \underset{(3.08)}{1.375}\,\text{Ln}(P_i/P_{gdp}) + \underset{(10.24)}{0.044}\,\text{Ln}(R) \quad ..(28')$$

$$\bar{R}^2 = 0.059, \quad D.W. = 1.37, \quad F = 1.289$$

where (I_{po}) = private investment in other sectors; (Y) = GNP; (P_i/P_{gdp}) = price of investment goods/GDP price index; and (R) = remittances.

[13] A recent study done at PIDE also revealed that the large-scale manufacturing sector is one of the hardest hit by out-migration of labour. However, this need not remain that way. For this reason the negative coefficient of R in (27') should not be used for prediction purposes. It may be noted, though, that the effect of remittances on investment in agriculture is positive and significant so that the loss of the manufacturing sector may have been a boon for the agricultural sector.

This equation is characterised by a very low $\bar{R}^2$ and F value (even the unadjusted R^2 is only 0.26). All the three coefficients carry the expected sign, though the size of the GNP coefficient (almost zero) is somewhat unexpected. However, the coefficients of GNP and remittances are not significant. More work needs to be done to explain this aspect of private investment behaviour. Most probably, a further disaggregation of "other sectors" into sub-sectors should help. (However, attempts to estimate an investment function for "ownership of dwellings" by regressing against income, remittances, and interest rates failed completely.)

Public Investment

Public investment is not directly affected by the cost of raising funds in the market; so the two explanatory variables, used in estimating the public investment equation, are total public revenues and foreign capital inflow. This yields:

$$\underset{}{\text{Ln}\,(I_g) = 1.261 + \underset{(7.37)}{0.511\,\text{Ln}\,(Z)} + \underset{(3.58)}{.283\,\text{Ln}\,(F_k)}} \quad \ldots (29')$$

$$\bar{R}^2 = 0.713, \quad \text{D.W.} = 1.109, \quad F = 15.41$$

where (I_g) = public investment; (Z) = total public revenues; and (F_k) = foreign capital.

This equation explains satisfactorily public investment behaviour during the 1959-60 to 1978-79 period. The $\bar{R}^2$ is quite high. The coefficients of both public revenue and foreign capital are positive and highly significant.

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Chapter 4

INTERNATIONAL TRADE SUB-MODEL

In this chapter, the two components of the trade balance, imports and exports of goods, have been explained in terms of the variables – e.g. relative prices, GDP, etc. – which may have been most relevant in determining their behaviour during the 1959-60 to 1978-79 period. (For want of relevant data to do a meaningful specification, foreign trade in services is assumed to be exogenously given.) The first section deals with imports and the second with the results of estimations of various export equations. In all the equations, dummy variables were used to account for the effects of wars and the secessation of East Pakistan on the foreign trade sector of the economy. As these variables turned out to be insignificant or had the wrong sign in all equations except one, the equations reported below are estimated without these variables. However, the equation for the import of consumer goods is estimated with a dummy variable since this is the only case in which the effect of the secession of East Pakistan is significant.[1]

Import Block

In the Import Block, there are in all five important categories of imports of goods, viz. foodgrains, energy, consumer goods, intermediate goods and capital goods. Estimates for each of these import categories are presented below. An important finding of the study is that changes in relative prices, along with the demand factors, are much more important as determinants of imports in Pakistan than is generally realised. This can be seen by the fact that the effective exchange rate for imports is significant in most of the estimated import equations. (Foodgrain imports are an exception to this rule.)

[1] In Mahmood's study [1] also the dummy variabe to account for the effect of the separation of East Pakistan on exports turned out to be insignificant.

Foodgrain Imports (Wheat)

The first equation relates to the import of wheat. It is expected that, at a given level of domestic production and income distribution pattern, an increase in per capita income should lead to higher import of wheat, particularly because of the low nutritional standards prevalent in Pakistan. The estimated equation relating to the changes in the demand for imported wheat is as follows:

$$\underset{}{\text{Ln}(M_f)} = 8.225 \underset{}{-} \underset{(1.84)}{3.67\ \text{Ln}(Y_f)} + \underset{(1.90)}{7.19\ \text{Ln}\ (N)} \quad .. \qquad .. \ (37')$$

$$\bar{R}^2 = 0.128, \quad \text{D.W.} = 2.23, \quad F = 2.26$$

where (M_f) = import of foodgrains (wheat); (Y_f) = production of wheat, and (N) = population.

The overall fit is not very good (the $\bar{R}^2$ being only .13). It may be noted that the import of wheat has responded strongly to population increase. There is also significant negative relation between imports of wheat and its production.[2]

Consumer Goods Imports

Imports of all consumer goods other than foodgrains are determined by domestic consumption and the effective exchange rate. Since import licensing has had a decisive effect on both the level and the composition of imports, its impact on these needs to be allowed for. These and other fiscal measures affecting imports have been taken into account in calculating the effective exchange rates, which are based on the official exchange rate, bonus rates and premia,[3] quotas, or the tariff equivalents of quotas, and relative prices. Thus, the estimated equation is:

$$\text{Ln}(M_c) = -3.606 + \underset{(5.97)}{1.208\ \text{Ln}(C)} \underset{}{-} \underset{(6.70)}{0.962\ \text{Ln}(E_{mc})} \underset{}{-} \underset{(7.23)}{0.520\ (D_1)} \quad .. \quad (38')$$

$$\bar{R}^2 = 0.489, \quad \text{D.W.} = 2.18, \quad F = 6.63$$

where (M_c) = imports of consumer goods; (C) = total consumption; (E_{mc}) = effective exchange rate for consumer goods imports; and (D_1) = the dummy for East Pakistan's separation.

[2]However, since a major part of wheat imports has been under the PL-480 Program, during most of the 19-year period 'covered' by this model, it is plausible to assume that imports of foodgrain cannot be adequately explained by domestic demand and supply factors in this period. This fact may also explain the poor fit of equation (37').

[3]The bonus rates and premia referred to in the text relate to the Export Bonus Scheme, which remained in operation from 1959 to 1972. For a detailed analysis of this scheme, see Naqvi [1].

The overall fit of this equation is satisfactory: the $\bar{R}^2$ is 0.49. The high coefficient of the consumption variable (C) shows that imports are very sensitive to total domestic consumption. Similarly, the relative price effect is strong here: the coefficient of the exchange rate variable (E_{mc}) is nearly unity. The dummy variable introduced to account for East Pakistan's secession is significant, implying that Pakistan's imports of consumer goods had to be restricted because of this 'event'.

Energy Imports

Imports of energy, which consist largely of petroleum products, are expected to be positively related to GNP and negatively to the relative price (P_e/P_g). Agricultural mechanization and value added in large-scale manufacturing may also have exercised an important influence on the demand for energy. The influence of these factors is captured, though not entirely, by the GNP variable (Y). The estimated equation is:

$$\underset{}{\text{Ln}(M_e) = -5.512 + \underset{(12.22)}{1.132\,\text{Ln}(Y)} - \underset{(1.97)}{0.099\,\text{Ln}(P_e/P_g)}} \qquad ..(39')$$

$$\bar{R}^2 = 0.464,\ \text{D.W.} = 0.84,\ F = 8.67$$

where (M_e) = imports of energy; (Y) = GNP; and (P_e/P_g) = the price of energy relative to price index for GNP.

The signs of the coefficients for both GNP and relative prices are as expected, and both the coefficients are significant, though the relative price coefficient is low.

Intermediate Goods Imports

The demand for imports of intermediate goods is a derived demand. As such, it is regressed against value added in manufacturing. Also, the effective exchange rate variable is included to capture the effects of changes in relative prices on this category of imports. The estimated equation is:

$$\underset{}{\text{Ln}(M_i) = -4.639 + \underset{(21.37)}{1.311\,\text{Ln}(Y_{lm})} + \underset{(1.86)}{0.833\,\text{LN}(E_{mi})}} \qquad ..(40')$$

$$\bar{R}^2 = 0.788,\ \text{D.W.} = 1.37,\ F = 34.11$$

where (M_i) = intermediate goods imports; (Y_{lm}) = value added in large-scale manufacturing; and (E_{mi}) = effective exchange rate for intermediate goods imports.

This equation shows that the imports of raw materials are very responsive to manufacturing output. Here, the positive sign of the effective exchange rate variable is not correct. (In an alternative formulation, the relative prices variable was dropped, but this did not much improve the resulting estimates.)

Capital Goods Imports

Imports of capital goods have been determined by the level of investment, changes in relative prices and the effective exchange rate for imports. The final equation is estimated.

$$\underset{}{\text{Ln}(M_k)} = \underset{}{3.543} + \underset{(13.71)}{0.768\ \text{Ln}(I)} - \underset{(8.23)}{1.221\ \text{Ln}(E_{mk})} \qquad \ldots (41')$$

$$\bar{R}^2 = 0.788,\ \text{D.W.} = 1.15,\ F = 34.11$$

where (M_k) = capital goods imports; (I) = total investment; and (E_{mk}) = effective exchange rate for capital goods imports.

This equation again underscores the important point that while capital goods imports are sensitive to demand factors, the role of relative prices cannot be overlooked. The coefficient of the relative price variable (E_{mk}) has the correct sign and is statistically significant.

Services Imports

Imports (exports) of services, besides transportation and insurance, include a host of other services. While transportation and insurance depend on the volume of international trade, freight rates, and ownership of shipping lines, imports (exports) of other services are determined by even more complex relationships. Since such data are not available at present, it was thought best to take both imports and exports of services as exogenously given.[4]

Export Block

The Export Block includes two types of exports: primary goods and manufactured goods. (The export of services is assumed to be exogenously given.) The major

[4] An attempt was made to relate imports (exports) of services to imports (exports) of goods but the results were not acceptable.

determinants of exports are relative prices in the world market and the domestic availability of an adequate volume of exportable surplus. In the estimated equations, a price ratio – i.e. the ratio of export prices of primary or manufactured goods to the GNP price index – has been used instead of an effective exchange rate, because the latter can influence exports only by altering relative prices. The availability of an adequate amount of domestic exportable surplus obviously depends on the differential between domestic production and consumption. It should also be clear that while the coefficients of relative prices and domestic consumption are expected to be negative, the coefficients of output variables should be positive. The absolute size of the coefficients of these export equations (and of some of the import equations discussed earlier) may be a bit too high to be acceptable. These estimates should be solely taken to indicate a high responsiveness of the dependent variable on the independent variable(s). An appropriate dummy variable introduced to capture the effect of the secession of East Pakistan turned out to be statistically insignificant. As such, it was dropped from the estimated equations. It shows that the secession of East Pakistan in 1971 did not have any significant effect on Pakistan's export trade, which was successfully diverted to international channels.

Exports of Primary Goods

The major determinants of primary goods exports are agricultural output, domestic consumption and relative prices. The following equation is estimated:

$$\underset{}{\text{Ln}(X_p)} = \underset{}{1.616} + \underset{(4.40)}{5.183\ \text{Ln}(Y_{ac})} - \underset{(4.60)}{4.278\ \text{Ln}\,(C)} - \underset{(3.31)}{3.075\ \text{Ln}(P_{xp}/P_g)} \;..\; (42')$$

$$\bar{R}^2 = 0.195,\quad \text{D.W.} = 3.07,\quad F = 2.37$$

where (X_p) = exports of primary goods; (Y_{ac}) = value added in agriculture (crop) sector; (C) = total consumption; and (P_{xp}/P_g) = price of primary goods exports relative to price index for GNP.

This equation is characterised by very low $\bar{R}^2$, but each of the coefficients is significant and has the expected sign.

Exports of Manufactured Goods

The same three explanatory variables as used above have been employed to explain the behaviour of exports of manufactures, with output in manufacturing

replacing agricultural output as the supply variable, and relative prices of manufactured goods replacing relative prices of primary goods. The estimated relationship is:

$$\underset{}{\text{Ln}}\,(X_m) = \underset{}{1.345} + \underset{(6.64)}{1.914}\,\text{Ln}\,(Y_m) - \underset{(7.84)}{0.893}\,\text{Ln}\,(P_{xm}/P_g) - \underset{(3.36)}{1.046}\,\text{Ln}\,(C) \quad \ldots\ (43')$$

$$\bar{R}^2 = 0.858, \quad \text{D.W.} = 1.34, \quad F = 36.67$$

where (X_m) = exports of manufactured goods; (Y_m) = value added in manufacturing; (C) = total consumption; and (P_{xm}/P_g) = price of manufactured exports relative to price index for GNP.

The equation is a good fit: the $\bar{R}^2$ is 0.86. As noted in the earlier equations, all the three explanatory variables have the correct sign and the coefficients are highly significant.

Exports of Services

Services exports are assumed to be exogenously given as $X_s = \bar{X}_s$ (see services imports).

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Chapter 5

PUBLIC REVENUE AND MONETARY SUB-MODEL

The major components of public expenditure have been analysed in the Expenditure Block of the Production-Expenditure Sub-Model. The only other important component of the fiscal sector left is public revenue. Public revenue is disaggregated into six sources of revenue, and the estimated equations are presented in the first section below. The equations for the monetary sector of the economy are discussed next.

Public Revenue Block

Public revenue is affected both by the growth of the economy and by discretionary changes made by the tax – levying authorities to change the relevant tax rate or the tax base or both. Dummy variables have been used to capture the influence of these policy changes in periods when the discretionary changes occurred as compared to the periods when no such changes occurred.

Customs Duties

One of the major sources of public revenue in Pakistan is the receipts from customs duties. These receipts depend both on the volume of imports and on changes in the rates of customs duties. It may be recalled that customs duties on the imports of machinery were increased twice, in 1965-66 and again in 1969-70, and on petroleum products in 1966-67. Following the 1972 devaluation, the rate structure of customs duties was adjusted in 1972-73 and there were further adjustments effected in the rates in 1973-74 and 1978-79. An attempt has been made to capture the effect of these discretionary changes in the rate structure by introducing

dummy variables into the specified equation for these six periods. The estimated equation is given below:

$$\begin{aligned} \text{Ln}(Z_t) = {} & 2.353 + \underset{(3.03)}{0.484\,\text{Ln}(M_g)} + \underset{(1.03)}{0.123\,D_1} + \underset{(0.38)}{0.060\,D_2} + \underset{(5.04)}{0.405\,D_3} \\ & + \underset{(2.97)}{0.44\,D_4} + \underset{(1.20)}{0.237\,D_5} - \underset{(0.85)}{0.144\,D_6} \quad \ldots \quad \ldots \quad \ldots \quad (46') \end{aligned}$$

$$\bar{R}^2 = 0.906, \quad \text{D.W.} = 2.65, \quad F = 38.72$$

where (Z_t) = revenue from customs duties; (M_g) = import of goods; and $D_1 \ldots D_6$ are the six dummy variables.

This equation gives a good fit and explains 91 percent of the variation in customs revenues. The coefficient of imports shows that customs revenue is not very responsive to changes in imports. All the discretionary changes, except the one in 1978-79, have positively affected revenue, though the coefficient is insignificant in four cases.

Excise Taxes

Revenue receipts from excise taxes are related directly to the size of the output of the large-scale manufacturing sector. Significant changes in the tax structure were made four times – in 1966-67, 1967-68, 1969-70, and 1970-71. Each of these changes is represented by dummy variables. The fitted equation is:

$$\begin{aligned} \text{Ln}(Z_e) = {} & -4.292 + \underset{(8.81)}{1.359\,\text{Ln}(Y_{lm})} + \underset{(1.93)}{0.303\,D_1} - \underset{(0.13)}{0.018\,D_2} \\ & + \underset{(1.96)}{0.173\,D_3} \underset{(4.16)}{-0.276\,D_4} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (47') \end{aligned}$$

$$\bar{R}^2 = 0.953, \quad \text{D.W.} = 1.86 \quad F = 71.69$$

where (Z_e) = excise tax revenue; (Y_{lm}) = value added in large-scale manufacturing; and $D_1 \ldots\ldots D_4$ are the relevant dummy variables.

This equation explains 95 percent of the variation in excise tax revenue. The coefficient of the output variable is greater than unity, and two of the dummy variables also have (significant) positive coefficients, suggesting that excise taxes have responded positively both to discretionary changes in the rates and to endogenous growth in the economy.

Sales Taxes

The third important tax in Pakistan is the sales tax, levied both on the imports of goods and on domestic output in manufacturing. There have been four major changes in the rate structure – in 1966-67, 1967-68, 1970-71, and 1973-74 – the effect of which is captured by introducing four dummy variables. The estimated equation is:

$$\begin{aligned} \text{Ln}(Z_s) = {} & -0.404 + \underset{(1.49)}{0.365\ \text{Ln}(Y_{lm})} + \underset{(2.20)}{0.455\ \text{Ln}(M_g)} - \underset{(0.42)}{0.080\ D_1} \\ & \underset{(2.42)}{-0.349\ D_2} + \underset{(0.13)}{0.020\ D_3} - \underset{(1.12)}{0.117\ D_4} \quad \ldots \quad \ldots \quad (48') \end{aligned}$$

$$\bar{R}^2 = 0.363, \quad \text{D.W.} = 2.032, \quad F = 2.59$$

where (Z_s) = sales tax revenue; (M_g) = imports of goods; (Y_{lm}) = value added in large-scale manufacturing; and $D_1 \ldots\ldots D_4$ are the four dummy variables.

This equation explains only 36 percent of the variation in sales tax revenue. Again, the (positive) coefficients of both the output and import variables are fairly low, indicating that revenue from sales taxes has not grown very fast. Moreover, discretionary changes have led to a decline in the revenue from sales taxes.

Income and Corporation Taxes

These taxes are levied only on non-agricultural income. Hence, the variable for the tax base used here is GNP minus total agricultural income. Six discretionary changes were made in 1966-67, 1969-70, 1970-71, 1973-74, 1974-75 and 1978-79. The influence of each of these changes is captured in the estimated equation by an appropriate dummy variable. The following fit is obtained.

$$\begin{aligned} \text{Ln}(Z_i) = {} & -2.059 + \underset{(5.42)}{0.881\ \text{Ln}(Y-Y_a)} - \underset{(0.784)}{0.0789\ D_1} + \underset{(3.13)}{0.216\ D_2} \\ & \underset{(0.32)}{-0.033\ D_3} - \underset{(3.72)}{0.425\ D_4} + \underset{(0.72)}{0.083\ D_5} - 0.018\ D_6 \quad \ldots \quad (49') \end{aligned}$$

$$\bar{R}^2 = 0.683, \quad \text{D.W.} = 2.47, \quad F = 6.29$$

where (Z_i) = income tax revenue; $(Y-Y_a)$ = non-agricultural income; and $D_1 \ldots\ldots D_6$ are the respective dummies.

The $\bar{R}^2$ in this equation is reasonable: 68 percent of changes in income tax revenue are explained by this equation. It is also interesting to note that the discretionary change in 1969-70 had both a significant and positive effect on revenues, while the positive coefficient for the 1974-75 dummy is statistically insignificant. All the rest of the discretionary changes led to a decline in public revenue. In some ways this is to be expected, because most of these discretionary changes have been associated with a contraction of the tax base (by raising the limit of non-taxable income, granting of tax holidays, etc.) that offset any gains from changes in the rate structure. The coefficient of the income variable is only 0.88, indicating that tax revenue did not increase in proportion to increases in non-agricultural income.

Land Revenue

Since land revenue in Pakistan has been levied mainly on cultivated (or cropped) acreage, it has not been responsive to changes in farm income or prices of agricultural goods. The observed fluctuations in land revenue collections reflect partly the occasional remissions given after bad harvests and partly the ad-hoc changes in the tax base. Indeed, as the rate of tax on land has increased less rapidly than the increase in the general prices, the revenue from this source has shown a secular decline. The following functional relation was estimated.[1]

$$\text{Ln}(Z_1) = 5.005 - \underset{(3.658)}{0.059\,t} \quad \ldots \quad \ldots \quad (50')$$

$$\bar{R}^2 = 0.442, \quad F = 13.38$$

where (Z_1) = revenue from land taxes; and t = time.

The $\bar{R}^2$ value is also fairly low, indicating that this equation does not explain more than half of the variation in land revenue receipts. More work needs to be done on this aspect of the tax structure.

Other Revenues

All the minor sources of revenue have been pooled together in this category. Revenue from these sources is assumed to grow exogenously over time. The estimated equation is:

$$\text{Ln}(Z_o) = 6.154 + \underset{(1.82)}{0.154\,t} \quad \ldots \quad \ldots \quad (51')$$

$$\bar{R}^2 = 0.968, \quad F = 405.51$$

where (Z_o) = revenue from 'other' sources; and t = time.

[1]Land revenue was also regressed against farm land (acreage cultivated), but the equation gave a very poor fit. See equation (50′) in Part II.

This equation yields a very good fit, explaining 97 percent of the variation in revenue from these minor sources. The receipts from these sources have been growing at the rate of over 15 percent per annum.

MONETARY BLOCK

Money Demand

The supply of nominal money ($\bar{M}O$) has been taken as exogenously given in this model. On the demand side, a partial-adjustment mechanism has been postulated. Money demand is assumed to depend on GNP, the rate of interest, the expected rate of inflation and lagged real money demand. The expected rate of inflation is expressed as an average of the rate of inflation in the preceding two years.[2] However, in the estimated equation the coefficient of the expected inflation variable was positive. Since it was contrary to expectation, this variable was dropped and the following fit obtained:

$$\begin{aligned} \text{Ln}\,(MO/P_g) &= -4.972 + \underset{(2.918)}{0.831}\,\text{Ln}\,(Y) - \underset{(1.743)}{0.332}\,\text{Ln}\,(r) \\ &\quad + 0.678\,\text{Ln}\,(MO/P_g)_{-1} \qquad \ldots \qquad \ldots \quad (52') \\ &\quad \bar{R}^2 = 0.957, \quad \text{D.W.} = 2.38, \quad F = 133.89. \end{aligned}$$

where (MO/P_g) = real money demand; (Y) = GNP; (r) = average rate of interest of time deposits; and $(MO/P_g)_{-1}$ = lagged real money demand.

The $\bar{R}^2$, and F-statistics all show that this equation provides a good fit, explaining 96 percent of the variation in real money demand. While the coefficient of the GNP variable is less than unity, implying short-run economies of scale in money demand, in the long run the elasticity of money demand to GNP is greater than unity, suggesting an increasing demand for money to match the secular monetization of Pakistan's economy. A somewhat unexpected result is that the expected inflation variable was found statistically insignificant. As such, it was dropped from the estimated equation. Normally the demand to hold cash balances decreases during periods of high inflation.[3]

[2] See Chapter 2 for a derivation of this equation.

[3] Pakistan experienced a long period of relative price stability up to 1970-71. However, the general price level started to rise sharply since 1973-74. Perhaps an appropriate procedure would have been for us to introduce in the equation a dummy variable to capture the effect of inflation on money demand during 1973–79.

Inflation

Inflation is a complex phenomenon that cannot be explained in terms of any one factor – e.g. the effect of import prices. Besides excessive monetary expansion and increasing import prices, a number of other factors, such as the growth of output, also influence changes in the general price level. *A priori* reasoning reveals only part of the picture. Indeed, there are grounds to believe that Pakistan is characterised by stagflation and not simply by inflation.[4] To test this hypothesis, it is necessary to examine the simple notion about inflation by positing an appropriate variable for each of these factors. First, the hypothesis that inflation is imported is tested by introducing, as an explanatory variable, the difference between the rate of change of import prices and that of domestic prices. Secondly, the monetarist hypothesis is tested by including money supply in the list of explanatory variables. In order to test the extent to which GNP influences inflation, the effect of a shortfall in GNP compared to its trend value is also studied. Thirdly, a variable representing the ratio of actual public expenditure to its trend value is included to study the effects on inflation of a lack of fiscal discipline with respect to public expenditure. All these conjectures are tested together by the following equation.

$$\begin{aligned} \text{Ln}(\dot{P}_g) = {} & -8.093 + \underset{(0.31)}{0.004}\ \text{Ln}\,[(E_m \cdot P_m)^{\cdot} - \dot{P}_g] - \underset{(2.33)}{8.293}\ \text{Ln}\,(Y/Y^T) \\ & + \underset{(3.05)}{4.883}\ \text{Ln}\,(E/E^T) + \underset{(0.77)}{1.036}\ \text{Ln}\,(MO) \quad \ldots \quad \ldots \quad \ldots \quad (53') \\ & \bar{R}^2 = 0.43, \quad \text{D.W.} = 2.58, \quad F = 4.28 \end{aligned}$$

where $(\dot{P}_g$ = change in GNP price index; $[(E_m \cdot P_m)^{\cdot} - \dot{P}_g]$ = differential between the rates of change of imported and domestic prices; (Y/Y^T) = ratio of GNP to its trend value; (E/E^T) = ratio of government expenditure to its trend value; and (MO) = nominal money supply.

In this equation the $\bar{R}^2$ value reveals that this equation explains only 43 percent of the variation in inflation. The imported inflation and money supply variables have positive coefficients, but these coefficients are insignificant in both cases. The most important point about this equation is that the rate of inflation in Pakistan is largely explained by real factors – mainly by a slower rate of growth of GNP and an expansion of the public sector at a higher-than-normal rate. The

[4] The stagflation hypothesis is being econometrically tested for the first time in this study. However, the applicability of the concept to Pakistan was first presented as a conjecture by Naqvi in [1] and then discussed at length by him in [2], where this theme recurs through various chapters, especially Chs. 1, 4 and 5.

equations suggest that a 10-percent decline in output below its trend value leads to a rise of over 82 percent in inflation while a 10-percent increase in public expenditure above its trend value raises inflation by almost 50 percent.

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PART IV

POLICY IMPLICATIONS

Chapter 6

ELASTICITY ESTIMATES AND IMPLICATIONS FOR POLICY-MAKING

One of the most important purposes of specifying an econometric model is to do a 'structural analysis' of Pakistan's economy – i.e. to obtain consistent estimates of various structural parameters. (The other two purposes are policy evaluation and forecasting.) Such information is indispensable for intelligent policy-making because it provides a quantitative description of the linkages between various sectors. However, the values of the coefficients of the major explanatory variables are also useful for evaluating various policy options. These coefficients denote the elasticity of the endogenous variables to changes in the explanatory variables. For instance, the number .614 attached to the Irrigated Area variable in equation (3′) says that if irrigated area is increased by, say, 10 percent, per capita agricultural output will increase by 6.14 percent. Such quantitative knowledge is vastly superior to the *a priori* expectation that agricultural output will tend to increase by an unspecified amount if irrigated area is increased by a specified amount. For policy-making it is essential to know not only the fact but also the magnitude of the supply response, even though approximately.[1]

PRODUCTION-EXPENDITURE SUB-MODEL

Production Block

i. Agriculture

The prices of agricultural inputs, such as fertilizers, tractors, tube-wells, water, pesticides, etc., are regulated by the government. Similarly, through price support policies and compulsory procurement by the government of various crops, the government affects the prices of agricultural output. Hence, a knowledge

[1] A systematic simulation exercise will be undertaken to provide a more solid basis for policy evaluation than is provided by elasticity estimates.

of the exact magnitude of the response of agricultural output to changes in the quantity and composition of various inputs and of input demand to changes in input and output prices is essential for predicting the effect, in quantitive terms, of government policies on agricultural output.

That the demand for all inputs – viz. labour, fertilizer, tubewells and tractors – is highly sensitive to their 'own' prices as well as to output prices can be readily verified by the information set out in Table 5, which also gives elasticity estimates for agricultural output with respect to changes in various inputs.

Table 5

Elasticities of Agricultural Output and Inputs

	Value of Elasticity
A. Elasticity of Agricultural Output per agricultural labour with respect to	
a. Irrigated Area	0.614
b. Unirrigated Area	0.240
c. Fertilizer Use	0.127
d. Tubewell Use	0.189
e. Tractor Use	–0.140
f. Cropping Pattern	0.554
B. Elasticity of Labour Use with respect to	
a. Output	2.460*
b. Total Area	10.476
c. Real Wages in Agriculture	–0.875*
C. Elasticity of Tubewell Use with respect to	
a. Output per acre	2.812
b. Relative price of fertilizer	–0.182
D. Elasticity of Tubewell Use with respect to	
a. Output per acre	1.783
b. Relative price of tubewells	–0.716
E. Elasticity of Tractor Use with respect to	
a. Output per acre	–0.043*
b. Relative price of tractors	–0.772

Note: The elasticities presented in Panels A,B,C,D & E are taken, respectively, from the estimated equation (3′), (5′), (6′), (7′) and (8′), given in Chapter 3.

*Denotes that the coefficient is statistically insignificant.

It may be noted from the elasticity estimates given in Panel A that agricultural output is most responsive to changes in cultivated area. Even though the importance of other inputs in increasing agricultural output cannot be minimised, their importance is appreciably less than is accepted in public discussions of the problem of increasing agricultural production. For instance, the responsiveness of agricultural output with respect to proportionate changes in fertilizer and tubewell use is appreciably less than unity, even though the response is clearly positive. These figures, even if taken as merely illustrative, establish that the success in inducing a significant increase in agricultural output rests overwhelmingly on the capacity to secure increases in cropped area, particularly the irrigated area.[2] The information given in Panels B to E highlights the important role of relative prices in determining the intensity of use of such key inputs as fertilizer, tubewells and tractors. The negative sign of the coefficients of the price variables simply confirms the expectation that the intensity of input use is inversely related to its own price.

These estimates make it clear that the *government can increase agricultural output by adopting appropriate policies – e.g. through subsidies on inputs and other measures that determine the prices of inputs and the price of agricultural output.* A corollary of this result is that any recommendation to withdraw, or even reduce, subsidies on agricultural inputs needs to be carefully studied before any final decision is taken on the matter. It may be noted that in view of the low elasticity of fertilizer use with respect to relative price (Panel C), the effect of price reductions on the demand for fertilizer is somewhat limited.

ii. Large-Scale Manufacturing

The response of manufacturing output to input use and of input demand to wages and relative prices is crucial in formulating sound economic policies for the future. The findings reported in Table 6 are of considerable significance for intelligent policy-making.

Panel A shows that the response of output to marginal changes in labour and capital is positive, though not very high. (It may be recalled from Chapter 3 that autonomous growth of output in this sector proceeded at an annual rate of 4.8 percent and was significant.) The values of the elasticities given under Panel B confirm the common-sense view that the intensity of labour use in manufacturing is positively related to changes in output and negatively to movements in real-wage rates. These estimated elasticities are greater than unity – i.e. a 10-percent rise in manufacturing output leads to a nearly 12-percent increase in the demand for labour, while a

[2]However, this observation is based on the idea that the relative cost of irrigated area is not too high.

Table 6

Elasticities for Output and Inputs in Large-Scale Manufacturing

	Value of Elasticity
A. Elasticity of Large-Scale Manufacturing Output with respect to	
a. Capital	0.889
b. Labour	0.154
B. Elasticity of Labour use with respect to	
a. Output	1.185
b. Real Wages	– 1.088
C. Elasticity of Investment with respect to	
a. Output	0.628
b. Rate of interest	–0.928
c. Relative Price of Investment Goods	–2.095

Note: The elasticities presented in Panels A, B, and C are taken, respectively, from equations (10′), (11′) and (12′), given in Chapter 3.

similar increase in real wages decreases the demand for labour by about 11 percent. This indicates a fairly high absorptive capacity for labour in the large-scale manufacturing sector. *Hence there is a need for adopting proper wage policies in this sector, for if real wages in the manufacturing sector are pushed too high, such a policy would lead to a reduction in labour absorption.* Panel C shows that the rate of investment is sensitive to changes in output – a 10-percent rise in output increases investment by 6.3 percent. Similarly, the price of investment goods relative to the prices of all manufactured goods and changes in interest rate are also of crucial significance for investment decisions. The composition and the rate of investment may have been largely determined by the size of corporate savings, particularly in the Sixties, by investment licensing practices and controls, and by fiscal incentives. More work has to be done to bring these factors explicitly into the analysis.

iii. Other Sectors

The very rapid growth of the construction sector during the Seventies has largely been attributed to the inflow of workers' remittances, but the exact magnitude of the effect of remittances on construction output is not as yet fully known. The present-study information in Table 7 (Panel A) shows that the elasticity of construction output with respect to remittances is positive though considerably less

than unity. The same holds with respect to domestic output and investment. Table 7 also shows the elasticities of construction, wholesale and retail trade, and public administration and defence output with respect to various explanatory variables.

Table 7

Elasticities for Other Sectors

	Value of Elasticity
A. Elasticity of Construction Output with respect to	
a. GNP	0.633
b. Total Investment	0.36
c. Remittances	0.09*
B. Elasticity of Wholesale and Retail Trade Output with respect to	
a. GNP	1.018
C. Elasticity of Public Administration and Defence Output with respect to	
a. Public Consumption	0.303

Note: The elasticities in Panels A, B and C are taken from equations (14′), (15′) and (16′) reported in Chapter 3.
*Denotes that the coefficient is statistically insignificant.

The elasticity of wholesale and retail trade with respect to GNP is approximately equal to unity. However, this may have been an under-estimate because changes in the nature of such trade over time resulting in higher trade margin are completely ignored in the computation of value added originating in this sector.

Expenditure Block

i. Consumption

(a) Private Cosumption

Consumption expenditure, which is the major component of the Expenditure Block, is composed of private consumption and public consumption. It can be seen from Table 8 that, as expected, the elasticity of private consumption with respect to disposable income is less than unity. Changes in the general price level,

real-money stock and interest rate have also had a significant effect on private consumption.

Table 8

Elasticities for Private Consumption

	Value of Elasticity
Elasticity of Private Consumption with respect to	
a. Disposable income	0.89
b. Rate of inflation	0.022
c. Rate of interest	0.429
d. Remittances	−0.114*
e. Foreign capital inflow	−0.046
f. Real-money stock	−1.309

Note: The information given above is taken from equation (22′) given in Chapter 3.
*Denotes that the coefficient is statistically insignificant.

Table 8 shows that the highest elasticity is that with respect to changes in the stock of real money – a 10-percent rise in real-money stock reduces consumption by over 13 percent. This result may have been due to the increasing demand for money coming from the gradual monetisation of the Pakistani economy. Workers' remittances from abroad do not exert an independent positive effect on private consumption, but rather make their effect felt through changes in GNP. Changes in the rate of interest and the rate of inflation exert a positive, though small, effect on consumption. However, it is interesting to note that foreign capital inflow has not encouraged greater private consumption.

(b) Public Consumption

Table 9 presents the relevant elasticity estimates for public consumption. Public consumption has tended to react positively, though not strongly, to changes in foreign capital inflow. Also, a respectable proportion of the increase in public revenue has tended to raise public consumption.

Both these findings have important policy implications for the efforts being made by the government to increase private and public savings. While a part of the increments in total public resources secured through foreign capital and rising public revenue is bound to leak into higher public consumption, an increasing proportion must be reflected in higher public saving and investment.

Table 9

Elasticities for Public Consumption

	Value of Elasticity
Elasticity of Public Consumption with respect to	
a. Total Public Revenue	0.597
b. Foreign Capital	0.159

Note: The elasticities given above are taken from equation (23′), given in Chapter 3.

ii. Investment

(a) Private Investment

Three equations were estimated for three important components of private investment in agriculture, large-scale manufacturing and "other" sectors. The remittance variable (R) is included in all the three sectors on the presumption, which the findings in Table 10 confirm, that resource inflow from this source has had an all-pervasive effect on Pakistan's economy.

As is clear from the information set out in Panel A of this table, agricultural investment is positively affected by variations in agricultural output and negatively by the prices of agricultural machinery. Remittances also have exerted a positive though small effect on agricultural investment. Thus, a policy of increasing prices of agricultural inputs will have an adverse effect on investment in this sector. It follows that the focus of government's policies should be on encouraging private investment in agriculture through favourable input and output prices. The same holds for private investment in the manufacturing sector. (For an interpretation of the negative sign of the remittances variable, see Chapter 3.)

(b) Public Investment

The flow of public investment is determined largely by the availability of real resources to the government. Both total public revenue and foreign capital affect investment in the public sector positively (Table 11). It is interesting to note that changes in public revenue have been more important than those in foreign capital for increasing public investment. *It follows that borrowing from abroad should not be over-emphasized in government's efforts to increase domestic investment.* This is consistent with the earlier result that foreign capital has partly financed public consumption.

Table 10

Elasticities for Various Categories of Private Investment

	Value of Elasticity
A. Elasticity of Private Investment in Agriculture with respect to	
a. Agricultural output	0.757
b. Relative price of Tubewells	− 0.973
c. Relative price of Tractors	0.003*
d. Remittances	0.099
B. Elasticity of Private Investment in Manufacturing with respect to	
a. Manufacturing output	0.456*
b. Remittances	− 0.393
c. Relative Price of Investment Goods	− 0.192
C. Elasticity of Private Investment in Other Sectors with respect to	
a. GNP	0.000015*
b. Relative price of Investment Goods	− 1.375
c. Remittances	0.044

Note: The elasticities given in Panels A, B and C above are taken from estimated equations (26′), (27′) and (28′) in Chapter 3.
*Denotes that the coefficient is statistically insignificant.

Table 11

Elasticities for Public Investment

	Value of Elasticity
Elasticity of Public Investment with respect to	
a. Total Public Revenue	0.511
b. Foreign Capital	0.283

Note: The elasticities in this table are taken from the estimated equation (29′) given in Chap. 3.

INTERNATIONAL TRADE SUB-MODEL

Import Block

In Pakistan, import licensing and other quantitative restrictions have been used to determine the level and composition of imports, while tariffs have played a relatively subservient role, mainly as a means of raising revenue. The 'revealed preference' of the policy-makers for non-price import restrictions has been based on the belief that the level of imports is, by and large, insensitive to changes in tariffs, which seek to choke off the excess demand for imports by raising their domestic prices. However, the estimated equations (37′), (38′), (39′) (40′) and (41′) show clearly that such elasticity pessimism is misplaced, particularly in the case of consumer-goods imports, which have been the worst 'victims' of quantitative restrictions. As Panel A of Table 12 shows, the elasticity of consumer-goods imports with respect to relative prices is close to unity – a 10-percent rise in the domestic price of consumer-goods imports (caused by a rise in the effective exchange rate) cuts down such imports by 9.6 percent. The same holds for capital-goods imports (see Panel E). Here, the elasticity with respect to relative price exceeds unity. The only two categories of imports not significantly affected by relative prices are those of intermediate goods and foodgrains. This is so because the demand for intermediate-goods imports is in the nature of a derived demand, while the demand for foodgrain imports is governed by factors like population growth, the availability of food aid under the PL-480 Program, etc. which are not always amenable to discretionary control. Besides relative prices, real variables, such as GNP, domestic consumption and investment, play a crucial role in determining the level of imports in Pakistan.

Table 12 reports estimates of the elasticities of imports of consumer goods, foodgrains, energy, intermediate goods, and capital goods with respect to such factors. Changes in total domestic consumption and effective exchange rates both have a significant impact on consumer-goods imports (Panel A). Manufacturing output is decisive for intermediate-goods imports (Panel D). Variations in total investment are crucial in determining the level of capital-goods imports (Panel E). It should, therefore, be clear that there is ample room for the policy-makers to influence imports (especially of consumer goods and capital goods) by changing their relative prices – e.g. by manipulating the rates of tariff/subsidy. These are important findings in that they broaden considerably the policy options available to the policy-makers in their efforts to regulate the country's balance of payments. It should be noted, however, that the sign of the relative price variable in the intermediate-goods imports equation (Panel D) is 'wrong'.

Table 12

Elasticities for Imports

	Value of Elasticity
A. Elasticity of Consumer-Goods Imports with respect to	
a. Total domestic consumption	1.208
b. Effective exchange rate for consumer-goods imports	– 0.962
B. Elasticity of Foodgrains Imports with respect to	
a. Production of wheat	– 3.67
b. Population	7.19
C. Elasticity of Energy Imports with respect to	
a. GNP	1.132
b. Relative price of energy	– 0.099
D. Elasticity of Intermediate-Goods Imports with respect to	
a. Manufacturing output	1.311
b. Effective Exchange Rate for intermediate-goods imports	0.833
E. Elasticity of Capital-Goods Imports with respect to	
a. Total investment	0.768
b. Effective Exchange Rate for capital-goods imports	– 1.221

Note: The elasticities given in Panels A, B, C, D and E are taken from equations (37′), (38′), (39′), (40′) and (41′) reported in Chap. 4.

Export Block

Equations (42′) and (43′), reported in Chapter 4, have important policy implications in that they highlight, among other things, the importance of relative prices in the growth of both primary exports and manufactured exports from Pakistan. It has often been argued that since Pakistan is a small country facing a large world market, it is, by and large, a 'price-taker', i.e. it cannot influence the prices obtainable for its exports. If this indeed were the case, it would be pointless to give any export subsidies because such a policy would only enhance the exporters' rents without in any way helping export expansion. Indeed, in such circumstances, with the so-called small-country assumption, Pakistan could export as much as it wanted to without giving any incentive to exporters – assuming appropriate supply

Table 13

Elasticities for Exports

	Value of Elasticity
A. Elasticity of primary-goods exports with respect to	
a. Agricultural output	5.183
b. Domestic Consumption	– 4.278
c. Relative Price for primary-goods exports	– 3.075
B. Elasticity of manufactured-goods exports with respect to	
a. Large-scale manufacturing output	1.914
b. Domestic consumption	– 1.046
c. Relative price for manufactured-goods exports	– 0.893

Note: The elasticities above are from equations (42′) and (43′) reported in Chap. 4.

elasticities.[3] However, as equations (42′) and (43′) in Chapter 4 show, the exports of both primary and manufactured goods are sensitive to changes in relative prices. The relatively higher price-elasticity of primary-goods exports than that of manufactured goods appears at first sight to be improbable – all the more so because the effective exchange rates for manufactured-goods exports have been consistently higher than those for primary-goods exports. However, there are plausible reasons for the differential response of the two types of exports to price incentives. First, the deterioration in the quality of Pakistan's manufactured-goods exports may have more than compensated any positive effects emanating from a favourable effective exchange rate. By the same token, the high quality of agricultural goods exports – e.g. rice – may have more than offset a relatively adverse effective exchange rate. Secondly, some of the manufactured-goods exports have faced more discriminatory treatment in the importing countries than the primary-goods imports – resulting from the policy of cascading of their tariff structure. Thirdly, the low export elasticities of manufactured goods may also be explained by reference to the fact that cotton yarn, which is 25 percent of Pakistan's manufactured exports, forms a substantial proportion of world supply.

[3]Subsidies will be required in this case, if the cost disadvantages and/or the level of domestic prices are such that a product cannot be exported at all at the existing exchange rate.

It should be clear that price incentives must have encouraged exports. This is good news. The implication is that any policies designed to create a more efficient production structure should also give appropriate weight to export-promotion 'activities'.

PUBLIC REVENUE AND MONETARY SUB-MODEL

Public Revenue Block

The tax revenue equations (46′), (47′), (48′), (49′), (50′) and (51′), reported in Chapter 5, confirm the widely-held belief that Pakistan's tax structure is by and large inelastic with respect to changes in the tax base. It can be seen from Table 14 that the elasticity of all taxes (except excise taxes) to changes in the base has been less than unity.

Table 14

Elasticities for Various Taxes

	Value of Elasticity
A. Elasticity of Customs Duties with respect to	
a. Total imports	0.484
B. Elasticity of Excise Tax Revenue with respect to	
a. Output in large-scale manufacturing	1.359
C. Elasticity of Sales Tax Revenue with respect to	
a. Output in large-scale manufacturing	0.365*
b. Total imports	0.455
D. Elasticity of Income Tax Revenue with respect to	
a. Non-agricultural income	0.881

Note: The elasticities in Panels A, B, C and D are taken from equations (46′), (47′), (48′) and (49′), reported in Chapter 5.
*Denotes that the coefficient is statistically insignificant.

These figures have far-reaching implications for policy-making: they *show that the secular growth of public-sector expenditure, which is an integral part of the development process in a country like Pakistan, will have to be increasingly financed*

from non-revenue sources if the tax structure is not made more elastic by discretionary changes in the rate structure. These discretionary changes are necessitated by the fact that tax revenue has not grown very fast in response to changes in the tax base. Further, the tax base will have to be expanded so that marginal increments in GNP are recaptured, even at unchanged rates of taxes.

Monetary Block

i. Money Demand

In the estimated equation (52′), reported in Chapter 5, a lag in adjustment between the actual and the desired levels of money demand is postulated. It shows that only one-third of the adjustment to the desired level takes place during the same period, as can be seen from the fact that the coefficient of the lagged money demand variable is 0.678. The results of this equation are reported in Table 15.

Table 15

Short-Run Elasticities for Money Demand

	Value of Elasticity
Elasticity of Money Demand with repsect to	
a. GNP	0.831
b. Rate of interest	− 0.332
c. Lagged Money Demand	0.678

Note: The elasticities in this table are taken from equation (52′), reported in Chapter 5.

It can be seen that the short-run elasticity of money demand with respect to GNP is less than unity. As expected, the interest elasticity of money demand is negative, though very small. In the short run, it is noted that there are economies of scale in money-holding. The low coefficient of interest rate is a reasonable result for a developing country like Pakistan where the money markets are not developed, implying that it may not have been possible to control the growth rate of money demand by pushing up the average rate of interest. Although interest rate has not been used as a policy instrument, the equation does suggest that interest rate can be an effective policy instrument in controlling the demand for money.

In view of the dynamic character of the postulated relationship, it is essential that long-run elasticities are also estimated. The long-run elasticities of money demand with respect to GNP and the rate of interest are reported in Table 16. (These elasticities have been calculated from equation (52′), reported in Chapter 5.)

Table 16

Long-run Elasticities for Money Demand

	Value of Elasticity
Elasticity of Money Demand with respect to	
a. GNP	2.581
b. Rate of interest	– 1.031

It is clear that the behavioural pattern of the two variables is different in the long run from that at any given point of time: the demand for money is highly responsive to GNP in that, say, a 5-percent increase in GNP increases the demand for money by a little over 12 percent. This gives to the monetary authorities a greater degree of freedom to expand money supply on a non-inflationary basis. It may be noted that the value of the elasticity is a little higher than is expected. This may be due to the fact that since GNP series are time-trended, the coefficient may have captured the effect of the growing monetization of the economy on the demand for money. Similarly, the long-run elasticity of money demand with respect to interest rate is unity: a 5-percent increase in interest rates reduces long-run money demand by about 5 percent. This shows that interest rate policy can effectively check excess money demand.

ii. The Phenomenon of Inflation in Pakistan

In Pakistan, the overwhelming belief is that inflation is largely imported, while some others believe that monetary factors are mainly to blame in this regard. Equation (53′), reported in Chapter 5, lends support, though only a weak one, to both the imported-inflation and the monetarist hypotheses. However, the results reported in Chapter 5 make it clear that the factors most responsible for inflation in Pakistan have been: (i) the decline in GNP in relation to its trend, and (ii) the increase in public expenditure over its trend value. Table 17 shows that a 10-percent fall in GNP relative to its trend leads to an 82-percent rise in the price level, while a 10-percent increase in government expenditure relative to its trend leads to a 49-percent increase in prices. It is important to note that the *direct effects of the rise in the difference between the rates of changes of price of imports and the domestic prices level, and of money supply on the rate of inflation are statistically insignificant.*

What are the policy implications of these results? In particular, what can be concluded from them about the Imported Inflation Hypothesis in Pakistan? As

Table 17

Elasticities for the Rate of Inflation

	Value of Elasticity
Elasticity of the Rate of Inflation with respect to	
a. Difference betwen the rates of change of foreign prices of imports and domestic price level	0.004*
b. Ratio of GNP to its trend	− 8.293
c. Ratio of government expenditure to its trend	4.883
d. Nominal money supply	1.036*

Note: The elasticities in this table are taken from equation (53′), reported in Chapter 5.
*Denotes that the coefficient is statistically insignificant.

shown in Chapter 5, it is safe to infer from this evidence that *Pakistan is characterised by stagflation, and not simply by inflation.* Hence, any policy that curbs *only* effective demand will worsen stagflation in the economy. A more comprehensive policy package should, therefore, be devised to increase the aggregate flow of goods and services while keeping public expenditure as close to its trend as possible. As for the Imported Inflation Hypothesis, it should be clear that the direct price effects are, by and large, insignificant. However, imported inflation can also operate by enhancing the overall level of liquidity in the economy, as well as by inducing production declines through a higher price level for imported inputs. This is particularly the case in those industries whose dependence on imported inputs is high. However, it should be kept in mind that because of the oligopolistic market structure in Pakistan, the profit maximizing behaviour of the oligopolist would lead him to pass on the marginal increments in costs to the consumer, by raising the relative prices of his products, at an unchanged level of output. To argue that such increases in relative prices can induce a persistent and substantial rise in the general price level (which is how inflation is defined) is, at best, a hazardous conjecture. Alternatively, the oligopolist may settle for a lower level of production, while keeping the prices unchanged. In this case, inflation may be imported through lower production levels, depending upon the 'weight' of such products in total output. It can, therefore, be safely stated that while the Imported Inflation Hypothesis may not have been altogether rejected by the above estimates of equation (53′), its importance for policy formulation should not be exaggerated.

PART V

CHAPTER-WISE SUMMARIES OF THE MAIN RESULTS

SUMMARY OF CHAPTER 2

This chapter specifies the details of the structure of the econometric model. For expositional purposes the model has been subdivided into three sub-models, viz. the Production-Expenditure Sub-Model, the International Trade Sub-Model, and the Public Revenue and Monetary Sub-Model. Each of these sub-models brings together sectors of Pakistan's economy where the intersectoral relationships are the most pronounced. The Production-Expenditure Sub-Model specifies the most crucial production and expenditure relations. For agriculture and large-scale manufacturing sectors, production functions have been specified. In these formulations, the supply of output is postulated to be a function of input use, while the derived demand for inputs is dependent on the level of output, relative prices, etc. The exogenous influences on both the supply of output and the demand for inputs work through the system by changing the relevant relative price. Since for three sectors, viz. construction, wholesale and retail trade, and public administration and defence, the data on input use are not available, their value added is assumed to be determined mainly by demand factors. For three sectors – viz. agriculture (non-crop), mining and quarrying, and other services – simple time trends are estimated in the absence of adequate information on the determinants of value added in these sectors. Value added in small-scale manufacturing and ownership of dwellings has been taken as exogenously given because National Accounts data have been extrapolated on the basis of historical growth rates.

Total expenditure is divided into consumption and investment spending, each of which is subdivided into private and public components. In general, demand factors like GNP, disposable income, home remittances and foreign capital are expected to be the main factors influencing private consumption expenditure directly. In addition, relative prices, the rate of interest and public revenue are also

expected to be important determinants of private and public investment. The domestic resource gap is defined as the difference between aggregate expenditure and GNP.

The International Trade Sub-Model defines the basic relationships in the foreign trade sector. In this sub-model, six import- and three export-categories are distinguished. Relative prices, effective exchange rates, production and domestic consumption are assumed to be the major factors influencing both imports and exports. Trade balance is defined as the difference between imports and exports of goods and services. The current account balance is derived by adjusting the trade gap for home remittances and other net factor incomes from abroad. Capital inflows into Pakistan, which are generally autonomous, are not included in the list of endogenously-determined variables of this model.

The Public Revenue and Monetary Sub-Model specifies equations for the crucial fiscal and monetary variables in the economy. Here the budget deficit is defined as the difference between government expenditure and tax revenue. While six sources of revenue are accounted for, government spending is assumed to be in the form of consumption or investment spending or transfer payments. Changes in tax revenue are assumed to depend on the tax base and discretionary tax changes. An equation for money demand is specified. A partial adjustment model is used to derive a function linking money demand to GNP, the interest rate, expected rate of inflation and money stock lagged by one year. Inflation is assumed to be determined by monetary as well as real variables. The explanatory variables in this equation are: the difference between the rates of change of import and domestic prices, the ratios of GNP and government expenditures to their trend values and nominal money supply.

SUMMARY OF CHAPTER 3

This chapter presents the results of the Production-Expenditure Sub-Model specified in Part II. The estimated equations described in this chapter provide important information on the supply of output and input use in 10 sectors and on the determinants of aggregate expenditures. Due to its simultaneous nature, the entire model has been estimated by using Two-Stage Least-Squares with the exception of some equations where simple time trends have been estimated,using OLS.

In the Production Block, fairly good results have been obtained for most of the equations. A large fraction of the variation in output in agriculture and large-scale manufacturing is explained in terms of intensity of input use. Of importance for

policy-making is the finding that *changes in relative prices have exercised a significant influence on input use in agriculture and manufacturing sectors.* Variation in the rate of interest has also been a major determinant of the demand for investment in the large-scale manufacturing sector. The time trends estimated for three production sectors, viz. agriculture (non-crop) sector, mining and quarrying, and other services, adequately explain the growth of value added in each case. However, some equations in the agricultural sector will need more work. Also, in view of the 7.3-percent annual growth of the small-scale manufacturing sector during the Seventies without any significant government support, it should be instructive to do further research on input use and the determinants of output growth in this vital sector of the economy. It is also expected to yield important recommendations regarding how the policy-makers can encourage faster growth in this sector.

In the Expenditure Block, various hypotheses about the determinants of consumption and investment spending have been tested. Changes in the level of consumption are most significantly influenced by such factors as disposable income, the rate of inflation, home remittances and foreign capital inflow. It is interesting to note that remittances and foreign capital do not increase private consumption; on the other hand, increasing inflows of foreign capital have tended to increase public consumption. Thus, while foreign capital has complemented domestic savings in the private sector, it has generally been used as a substitute for domestic savings in the public sector. Private investment in agriculture, large-scale manufacturing and other sectors is significantly affected by relative prices and the availability of funds reflected in remittances and the foreign capital inflow. Public investment is determined by the availability of funds alone.

The most important result obtained in this sub-model is the simultaneity between output levels and input use in the two major sectors – viz. agriculture and large-scale manufactuing. While the role of input use in determining the level of output in these sectors is positive and significant, changes in the level of output have been relatively more important in determining input demand. Again, variations in relative prices are significant both in all input equations and in explanation variations in output.

SUMMARY OF CHAPTER 4

The International Trade Sub-Model describes the behaviour of Pakistan's foreign trade sector in terms of six import- and three export-categories. Two definitional equations have been included to derive the values of total imports and exports. Also, two more definitional equations are included, one for the trade gap and the other for the balance on current account.

In the Import Block, most of the equations have high explanatory power in that they account for a large fraction of the variations in the respective imports. The equation for foodgrain imports perhaps constitutes an exception because PL-480 imports have been a dominant influence dwarfing both the supply and demand factors. Imports of consumer goods, capital goods, and intermediate goods have depended on domestic demand and real effective exchange rates for imports. However, in the case of energy imports, the relative price variable (price of energy/ GNP price index) does not have a tangible effect. For the imports of consumer goods, energy, intermediate goods, and capital goods, the relevant domestic demand variables are respectively total consumption, GNP, value added in large-scale manufacturing and total investment. The coefficients of all these demand variables are highly significant, indicating that along with relative prices they have been the major determinants of Pakistan's imports. The real effective exchange rate variable reflects the effects of relative prices, tariffs, quantitative restrictions on imports and changes in the official exchange rate.

In the Export Block, three categories of exports, viz. primary goods, manufactured goods, and services exports, are distinguished. The determinants of exports are relative prices and exportable surplus, the latter depending on the level of domestic output and demand. The estimated equations for manufactured-goods and primary-goods exports are good. In the case of both primary and manufactured goods, an increase in domestic output, represented by agricultural and manufacturing output respectively, leads to a significant increase in exports, while a rise in domestic demand (for which domestic consumption is used as a proxy) reduces exports. Relative prices have exercised significant influence on exports, as verified by high and significant coefficients for relative price variables.

The results of this sub-model contain an element of surprise. For instance, with the exception of consumer-goods imports, the separation of East Pakistan in 1971 did not have any significant effect on the level of Pakistan's imports and exports. Furthermore, the importance of the relative price variable in both the import and export equations undercuts much of the philosophy that gave birth to quantitative restrictions as the main policy instrument regulating the foreign trade sector. These results show that indirect taxes, both by raising additional revenues and by controlling imports, can be used effectively to correct balance-of-payments disequilibria. However, this is not to say that quantitative restrictions did not, or will not, play a significant part in the foreign trade sector; these are reflected in the effective exchange rate calculations. Only there is no reason why the policy-makers should be fatalistically dependent on quantitative restrictions for regulating the behaviour of the foreign trade sector.

SUMMARY OF CHAPTER 5

This chapter has discussed the results of estimation of the Public Revenue and Monetary Sub-Model, which brings together the determinants of public revenue, money demand and inflation. The Public Revenue Block consists of five major categories of revenues, viz. tariff duties, excise taxes, sales taxes, income and corporation taxes, and land revenue. The remaining revenue and non-revenue components of public sector income have been aggregated into the omnibus category, 'Other Revenues'. The Monetary Block takes the supply of money as exogenously given, and there is one equation for the determinants of money demand. Finally, an equation for the determinants of inflation in the economy has been estimated.

In the Public Revenue Block, tax revenue has grown both due to the growth of the economy and due to discretionary changes in tax rates and the tax base. To isolate the effect of the growth of the economy on public revenue, dummy variables have been introduced for the years when such discretionary changes were made by the authorities. Improvements in tariff revenue are explained by higher imports of goods and by discretionary changes that occurred in six years during the 1959-60 to 1978-79 time-period. However, the effect of changes in the level of imports on tariff revenue has been fairly low, so that most of the growth in revenue from this source has come from discretionary changes in the tax rates. On the other hand, excise taxes, levied on the output originating in the manufacturing sector, have responded fairly strongly to changes in output in this sector. Two of the discretionary changes in tax rates also have had a significant positive effect on revenue from this source. Sales taxes have depended on manufacturing output and the level of imports. Revenue from this source has not grown fast enough, as can be seen from the fact that the coefficients of manufacturing output and imports are fairly low. Worse still, the discretionary changes also did not have any significant positive effect on tax revenue from this source. Six discretionary changes were introduced in income and corporation taxes during the 1959-60 – 1978-79 period.

Most of the discretionary changes have not increased revenue from this source significantly. Land revenue has not displayed a stable time-trend because of changes in the tax base and partly due to the remissions granted after poor harvests. Indeed, the revenue from this source has declined over time. "Other revenues", on the other hand, have grown at over 15 percent during the time-period analysed. This fact should be noted by analysts and policy-makers.

In the Monetary Block, the demand for real money is explained in terms of GNP, the rate of interest, and lagged real money demand. The coefficients of both the GNP and the interest rate variables are significant. The fact that the coefficient

of the lagged money demand variable is fairly high and significant means that only about one-third of the adjustment between actual money holdings and the desired demand for money is accomplished during the same year. The equation for inflation tests the Imported Inflation Hypothesis, making due allowance for both the real and the monetary influences on inflation. The coefficient of the imported inflation variable is low and insignificant. The effect of monetary factors on inflation is also statistically insignificant. These results show that 'real' factors, including the growth of GNP relative to its trend and the growth of public expenditure relative to its trend value, have been the primary determinants of the rate of inflation in Pakistan. The results of this study do not strongly support the Imported Inflation Hypothesis, though it is acknowledged that inflation may have been imported through real factors, e.g. by inducing a decline in production. The 'stagflation' hypothesis, in contrast, receives overwhelming support.

SUMMARY OF CHAPTER 6

In this chapter, the linkages between various sectors of the economy have been highlighted by spelling out the mechanism and the magnitude of the response of endogenous variables to changes in various explanatory variables. Such knowledge is of considerable importance for policy-making. Given the fact that many of the exogenous variables included in this model can be controlled by government policy, the reaction of the relevant endogenous variables can be predicted by making adequate adjustments in the policy-controlled variables. In this study, it has been observed that the authorities can significantly control almost all sectors of the economy by manipulating the relevant relative price. The response of production, imports and exports to relative prices has been found to be significant. However, this finding need not preclude the use of quantitative controls to supplement the price controls.

In the Production-Expenditure Sub-Model, the main variables that the policy-makers can control are relative prices for agricultural and manufacturing output. Since the effects of relative prices on input use and on output bear the expected sign, the growth of output can be controlled by manipulating relative prices. As input demand can be influenced by changes in the prices of fertilizer, tractors and tubewells, the growth of output can be facilitated by policies that encourage a greater use of inputs, with the possible exception of tractors.

Among the components of total expenditure, private consumption and investment depend on foreign capital inflows and the rate of interest. Thus, to the extent that the effect of these variables on expenditure is significant, changes in the overall

level of private spending can be effected by manipulating these policy variables. By contrast, total public revenue and foreign capital inflows are the main determinants of both consumption and investment in the public sector. While the level of total public revenue is endogenously determined in this model, this level can be easily controlled by changing the tax rate and the tax base. Similarly, the magnitude of foreign capital inflows can be regulated by varying the size of foreign borrowings. Thus the policy-maker can control the level of public sector demand and thereby influence overall aggregate demand. To this end, it is important that the 'leakages' into public consumption of additional resources secured by the government through foreign capital inflows and larger public revenue are held down to a minimum. It is essential that public savings increase over time.

In the International Trade Sub-Model, imports and exports have responded significantly to such variables as GNP, consumption, investment, relative prices, etc. Domestic supply has also been a crucial variable in the export equations. While the domestic demand for and the supply of exportable goods are endogenously determined in this model, relative prices are mostly influenced by government policy. Thus the effective exchange rate and relative export prices are major tools that can be used to control the country's balance of payments. One important result of this sub-model is the insight it provides into the higher supply response of primary exports as compared to that of the manufactured exports.

It should be noted that while the economy is responsive to changes in relative prices, the main policy instrument to effect such changes, viz. fiscal policy, is not at present very effective. As shown above in the Public Revenue Block, the tax revenue is not very elastic with respect to changes in the tax base. As such, discretionary changes are needed for the continued growth of public revenue. This points to the need for increasing the responsiveness of various taxes both with respect to changes in the tax base and in the marginal tax rates. Unless the fiscal structure is modified along these lines, even discretionary changes in tax rates will not be fruitful.

In the Monetary Block, the only exogenous variable that can be used to control the demand for money is the interest rate. However, it is interesting to note that there has been much more room for non-inflationary monetary expansion than is generally expected. A one-percent increase in GNP allowed the government to expand money supply by more than twice as much to meet the increasing demand for money. In part, the high value of this elasticity may have reflected a growing monetization of the economy. The rate of inflation is dependent upon the difference between import prices and domestic prices, money supply, the growth of GNP and the increase of public expenditures over their trend values. Of these four variables, the first is purely exogenous and is not subject to policy control. Also, the

effect of the money supply on inflation is not significant. The growth of GNP relative to its trend can be indirectly manipulated; and the rate of inflaltion can be slowed down by encouraging a higher level of production. Another significant avenue for the government to control inflation in Pakistan is to keep a strict check on public expenditure which should not be allowed to depart too far from its trend value. *The main lesson to be learnt is that inflation cannot always be blamed on outside factors.* Hence, no fatalism is warranted on this account. This, however, does not mean that controlling of inflation is going to be easy.

PART VI

DATA APPENDIX

List of Tables

Table I

Agriculture: Crop Sector

Years	Value added at Constant Factor Cost of 1959-60 (Million Rs.)	Cropped Area (Thousand Hectares)			Labour Force (000 Nos.)	Fertilizer Consumption (Thousand N/Tons)	No. of Tubewells	No. of Tractors	Water Availability (Million Acre feet)	Price Indices				Annual Wages (Rs.)
		Irrigated	Un-irrigated	Total						Fertilizer	Tubewells	Tractors	Crops	
(1)	(2)	(3)	(4)	(3)+(4)=(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1959-60	4,775	10,540	4,150	14,690	4,890	19.4	5,624	3,642	48.17	100.0	100.0	100.0	100.0	498
1960-61	4,709	10,400	4,460	14,860	4,971	31.4	13,056	4,192	50.28	100.0	102.0	100.0	106.4	510
1961-62	5,127	10,750	4,500	15,250	5,239	37.5	18,928	6,495	52.39	100.0	100.0	98.9	97.3	587
1962-63	5,486	11,010	4,450	15,460	5,473	40.2	26,608	8,943	52.88	98.6	102.1	99.2	95.2	610
1963-64	5,638	11,030	4,110	15,140	5,632	68.7	33,824	11,180	59.66	96.4	106.7	99.8	108.3	666
1964-65	6,018	11,440	4,800	16,240	5,858	87.2	40,424	12,593	61.49	92.5	109.0	103.6	117.4	731
1965-66	5,993	11,470	4,070	15,540	5,954	70.5	49,583	13,990	63.87	90.5	118.0	105.7	118.8	801
1966-67	6,421	12,030	4,380	16,410	6,195	111.8	61,831	17,753	67.54	95.5	126.1	107.7	133.1	876
1967-68	7,484	12,490	4,450	16.940	6,617	190.4	76,995	18,991	68.54	113.3	132.6	105.1	126.8	849
1968-69	7,924	13,070	3,170	16,240	6,860	244.6	93,013	22,420	72.79	131.1	139.7	99.4	115.8	1028
1969-70	8,916	12,780	3,990	16,770	7,207	307.7	104,287	26,485	75.50	131.0	147.6	122.9	124.5	1114
1970-71	8,463	12,950	3,670	16,620	7,215	283.2	115,265	28,535	69.95	140.2	149.0	131.5	130.9	1207
1971-72	8,843	12,990	3,610	16,600	7,458	381.9	125,383	30,277	71.10	162.9	152.2	146.0	141.1	1308
1972-73	8,951	13,060	3,870	16,930	7,649	436.5	139,077	29,879	81.17	183.3	170.7	197.1	169.6	1417
1973-74	9,429	13,640	4,640	18,280	7,966	402.7	150,794	33,173	80.06	284.8	230.1	311.2	202.7	2469
1974-75	9,134	13,340	4,030	17,370	7,686	425.5	176,659	37,877	77.02	387.9	367.2	421.9	254.8	3384
1975-76	9,672	13,630	4,390	18,020	8,024	553.8	184,097	46,032	86.01	378.5	398.6	505.0	275.0	3233
1976-77	9,864	13,830	4,380	18,210	8,225	631.3	197,390	58,047	86.90	347.1	435.6	519.0	298.5	3302
1977-78	10,076	14,260	4,230	18,490	8,443	717.4	207.645	65,759	92.14	347.1	455.5	555.8	342.6	3898
1978-79	10,545	14,360	4,800	19,160	8,736	879.8	213,088	76,209	90.09	331.4	494.0	584.1	371.5	4208

Sources: For Col. 2: [17].
For Cols. 3, 4 & 5: [19]
For Col. 6: [4], which gives estimates of agricultural labour force based on labour force surveys up to 1973. These available estimates were extrapolated to 1978-79 using the "Trends in Labour Employed in Agriculture" as reported in the World Bank Report of 1979-80.
For Col. 7: [17] and [19].
For Col. 8: A fairly reliable estimate of the number of private tubewells in use in the country upto 1968-69 has been made by Jerry Eckert [2]. The data for the number of public tubewells installed were obtained from a report of the Central Monitoring Organization of WAPDA. For the rest of the years, the number of tubewells in the country was obtained from [17].
For Col. 9: [17] The data on number of tractors in the country were obtained by making adjustments for depreciation of the number of tractors imported in the country. The underlying assumption was that one-third of the tractors depreciate after eight years, another one-third after nine years and the rest after ten years.
For Col. 10: [17] and [19].
For Col. 11: [15] and [19].
For Col. 12: Since a reliable price index for tubewells was not available from any source, one was constructed by using a weighted average of the prices of inputs required to instal tubewells.
For Col. 13: Unpublished data obtained from the Agricultural Development Bank of Pakistan.
For Col. 14: The price index of the agricultural crops is the implicit GDP deflator in the crop sector. The relevant data were generated in the Pakistan Institute of Development Economics.
For Col. 15: [3].

Table II

Manufacturing Sector: Large-Scale

Years	Value added at Constant Factor Cost of 1959-60 (Million Rs.)	Labour (in thousand)	Capital Estimate I: At constant Prices of 1959-60 (Non-linear Depreciation) (Million Rs.)	Capital Estimate II: At constant Prices of 1959-60 (Straight-Line Depreciation) (Million Rs.)	Gross Investment at Constant Prices of 1959-60 (Million Rs.)	Depreciation at Constant Prices of 1959-60: Estimate I (Million Rs.)	Depreciation at Constant Prices of 1959-60: Estimate II (Million Rs.)	Annual Real Wages (Rs.)	Investment Price Index	Manufacture Price Index	Nominal Rate of Interest	GNP at Constant Factor Cost of 1959-60 (Million Rs.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1959-60	1,159	342	3,418	3,091	730	156	265	1,231	100.0	100.00	2.39	16,803
1960-61	1,394	344	4,137	3,671	736	176	270	1,251	100.1	99.21	3.63	17,624
1961-62	1,671	368	4,763	4,237	742	203	295	1,271	100.0	101.02	3.74	18,683
1962-63	1,934	451	5,272	4,654	712	237	335	1,291	100.2	105.64	3.10	20,008
1963-64	2,233	493	6,035	5,319	1,000	288	390	1,613	106.0	107.03	3.31	21,322
1964-65	2,523	581	6,831	6,013	1,084	338	450	1,631	111.9	107.17	4.70	23,299
1965-66	2,796	583	7,437	6,507	944	401	499	1,557	118.6	112.70	5.12	25,079
1966-67	2,982	600	7,917	6,889	881	346	556	1,525	122.3	117.04	5.57	25,853
1967-68	3,209	710	8,460	7,222	889	579	600	1,506	123.2	121.69	6.71	27,636
1968-69	3,548	732	8,687	7,428	806	520	647	1,650	130.6	129.76	5.65	29,425
1969-70	4,042	722	9,108	7,722	941	590	773	1,854	134.0	134.27	5.37	32,338
1970-71	4,090	762	9,465	7,896	947	601	639	1,872	141.5	142.35	6.40	32,362
1971-72	3,813	688	9,640	8,033	776	622	755	1,937	143.7	151.51	5.57	32,883
1972-73	4,265	717	9,584	7,844	566	699	758	2,136	150.7	170.74	5.68	35,360
1973-74	4,585	872	9,238	7,439	353	700	767	2,182	221.1	209.01	8.48	38,085
1974-75	4,009	849	8,887	7,021	349	719	748	1,967	320.8	284.85	10.63	39,651
1975-76	4,486	1,094	8,522	6,627	354	734	749	1,982	403.7	321.85	9.15	41,410
1976-77	4,385	1,030	8,172	6,262	384	722	738	2,094	442.2	355.78	10.03	43,022
1977-78	4,823	955	7,819	5,893	369	648	729	2,237	475.1	369.94	11.20	47,480
1978-79	5,003	1,037	7,529	5,522	358	670	721	2,237	517.2	389.25	8.99	49,953

Continued –

Table II –*Continued*

Sources: For Col. 2: [17].

For Col. 3: Labour employed in the manufacturing sector has been estimated by multiplying labour per unit of value added with the value added in large scale manufacturing sector. The ratios of labour to value added in different years has been taken from Census of Manufacturing Industries [13] relating to different years. The years in which Censuses were not taken, they were interpolated or extrapolated. Data on value added were obtained from [17].

For Col. 4: These estimates have been obtained on the basis of the assumption that 25% of the capital stock depreciates during the first half of the plant's life while 65% depreciates in the second half. The remaining 10% is the scrap. Using these depreciation rates, the investment indices for the period upto 1962-63 and investment from 1963-64 to 1978-79, estimates of capital stocks are obtained. For the details of methodology, see [8] and [9].

For Col. 5: Essentially the same as for column (4) with the exception that straight line depreciation rate is assumed.

For Col. 6: Data are obtained from [8] and [9] for the period up to 1969-70 and from [17] for the period from 1970-71 to 1978-79.

For Cols. 7&8: Depreciation estimates are obtained on the basis of data reported in Columns 4, 5 and 6.

For Col. 9: Wages for the period up to 1971 are taken from Irfan [7] which in turn are based on the CMI data. Using the growth rates of wages in Punjab, the wages are estimated for the period up to 1977-78. It may be noted that wage rates, so estimated for 1975-76, are very close to those reported in the CMI for 1975-76 which reports wages for Pakistan as well. The wages for the year 1978-79 are extrapolated.

For Col. 10: Investment price index has been computed as a weighted average of the prices of capital equipment and the prices of construction materials. The prices of capital goods and prices of construction material are taken from [17].

For Col. 11: Estimated as value added in large scale manufacturing sector at current factor cost/value added in large scale manufacturing sector at constant factor cost.

For Col. 12: The interest rate is the call money rate. For a few years, data were not available in published form and as such unpublished data from Research Department of the State Bank of Pakistan were obtained. Published data were taken from [24].

For Col. 13: [17].

Table III

Construction Sector

(Million Rupees)

Years	Value added at Constant Factor Cost of 1959-60	Gross Domestic Product at Constant Factor Cost of 1959-60	Investment in Fixed Assets at Constant Factor Cost of 1959-60
(1)	(2)	(3)	(4)
1959-60	427	16,826	1,880
1960-61	612	17,469	2,563
1961-62	596	18,710	2,965
1962-63	700	20,056	3,797
1963-64	897	21,356	4,270
1964-65	1,029	23,360	4,469
1965-66	1,079	25,126	4,296
1966-67	1,039	25,901	4,441
1967-68	1,037	27,659	5,027
1968-69	1,317	29,454	4,835
1969-70	1,357	32,336	4,953
1970-71	1,390	32,434	4,980
1971-72	1,163	32,812	4,741
1972-73	1,346	35,179	5,074
1973-74	1,490	37,901	4,802
1974-75	1,754	39,393	5,056
1975-76	2,094	40,699	5,729
1976-77	2,076	41,727	5,975
1977-78	2,248	44,630	6,152
1978-79	2,452	47,262	6,277

Sources: For Cols. 2 & 3: [17].
For Col. 4: [4], Table 13, Col. 4. These estimates in turn are based on data obtained from [17] and [15].

Table IV

Wholesale and Retail Trade

(Million Rupees)

Years	Value added at Constant Factor Cost of 1959-60	GNP at Constant Factor Cost of 1959-60	Imports of Consumer Goods at Constant Factor Cost of 1959-60
(1)	(2)	(3)	(4)
1959-60	2,105	16,803	702
1960-61	2,251	17,624	714
1961-62	2,427	18,683	686
1962-63	2,665	20,008	662
1963-64	2,935	21,322	749
1964-65	3,166	23,299	1,324
1965-66	3,440	25,079	652
1966-67	3,621	25,853	1,049
1967-68	3,754	27,636	1,006
1968-69	4,020	29,425	610
1969-70	4,457	32,338	588
1970-71	4,469	32,362	481
1971-72	4,447	32,883	466
1972-73	4,743	35,360	799
1973-74	5,449	38,085	706
1974-75	5,622	39,651	663
1975-76	5,724	41,410	686
1976-77	5,660	43,022	576
1977-78	6,121	47,480	823
1978-79	6,518	49,953	1,107

Sources: For Cols. 2 & 3: [17].
For Col. 4: [11]. The values of imports in turn are based on data obtained from [14].

Table V

Public Administration and Defence

(Million Rupees)

Years	Value added at Constant Factor Cost of 1959-60	Public Consumption at Constant Factor Cost of 1959-60
(1)	(2)	(3)
1959-60	1,048	1,933
1960-61	1,062	1,848
1961-62	1,103	2,025
1962-63	1,134	2,227
1963-64	1,244	2,589
1964-65	1,465	2,741
1965-66	2,293	3,976
1966-67	1,962	3,201
1967-68	1,912	3,142
1968-69	2,008	3,377
1969-70	2,080	3,639
1970-71	2,133	3,738
1971-72	2,278	4,324
1972-73	2,599	4,458
1973-74	2,983	4,012
1974-75	3,972	4,479
1975-76	3,854	4,773
1976-77	4,135	4,820
1977-78	4,593	5,040
1978-79	4,934	5,179

Sources: For Col. 2: [17].
For Col. 3: [4], Table 11, Col. 5. Public consumption in [4] has been estimated as non-development expenditures adjusted for the subsidies. Data relating to the years from 1959-60 to 1969-70 for West Pakistan was obtained by splitting the Pakistani data relating to various heads into those for West Pakistan and those for East Pakistan. For details of the ratios and rationale for the choice of the particular values of ratios, see Fatima [4].

Table VI

Agriculture: Non-Crop Sector

(Million Rupees)

Years	Value Added at Constant Factor Cost of 1959-60
(1)	(2)
1959-60	2,936
1960-61	2,986
1961-62	3,044
1962-63	3,111
1963-64	3,175
1964-65	3,258
1965-66	3,625
1966-67	3,408
1967-68	3,498
1968-69	3,554
1969-70	3,658
1970-71	3,725
1971-72	3,768
1972-73	3,870
1973-74	3,928
1974-75	3,940
1975-76	3,987
1976-77	4,134
1977-78	4,272
1978-79	4,403

Source: [17].

Table VII

Mining and Quarrying

(Million Rupees)

Years	Value Added at Constant Factor Cost of 1959-60
(1)	(2)
1959-60	70
1960-61	81
1961-62	86
1962-63	96
1963-64	113
1964-65	122
1965-66	133
1966-67	133
1967-68	137
1968-69	141
1969-70	157
1970-71	156
1971-72	159
1972-73	161
1973-74	180
1974-75	181
1975-76	175
1976-77	205
1977-78	210
1978-79	217

Source: [17].

Table VIII

Ownership of Dwellings

(Million Rupees)

Years	Value Added at Constant Factor Cost of 1959-60
(1)	(2)
1959-60	837
1960-61	858
1961-62	888
1962-63	916
1963-64	943
1964-65	976
1965-66	1,006
1966-67	1,039
1967-68	1,067
1968-69	1,099
1969-70	1,112
1970-71	1,149
1971-72	1,188
1972-73	1,231
1973-74	1,275
1974-75	1,321
1975-76	1,349
1976-77	1,418
1977-78	1,469
1978-79	1,522

Source: [17].

Table IX

Small-Scale Manufacturing

(Million Rupees)

Years	Value Added at Constant Factor Cost of 1959-60
(1)	(2)
1959-60	859
1960-61	884
1961-62	910
1962-63	936
1963-64	963
1964-65	991
1965-66	1,020
1966-67	1,050
1967-68	1,080
1968-69	1,111
1969-70	1,144
1970-71	1,228
1971-72	1,317
1972-73	1,413
1973-74	1,516
1974-75	1,627
1975-76	1,745
1976-77	1,873
1977-78	2,010
1978-79	2,157

Source: [17].

Table X

Other Services

(Million Rupees)

Years	Value Added at Constant Factor Cost of 1959-60
(1)	(2)
1959-60	2,610
1960-61	2,812
1961-62	2,858
1962-63	3,078
1963-64	3,215
1964-65	3,862
1965-66	4,401
1966-67	4,246
1967-68	4,481
1968-69	4,732
1969-70	5,413
1970-71	5,631
1971-72	5,836
1972-73	5,959
1973-74	7,066
1974-75	7,333
1975-76	7,593
1976-77	7,976
1977-78	8,808
1978-79	9,871

Source: [17].

Table XI

Private Consumption

Years	Private Consumption at Market Prices of 1959-60 (Million Rs.)	Disposable Income at Constant Prices of 1959-60	Rate of Inflation	Real Money Stock (Million Rs.)	Remittances (Million Rs.)	Foreign Capital Inflow at Constant Price of 1959-60	Average Interest Rate on Time Deposits	Call Money Rate or Rate of Interest
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1959-60	14,575	16,496	–	5,275	31	977	2.67	2.39
1960-61	15,823	17,316	3.97	5,261	29	1,449	3.01	3.63
1961-62	16,477	18,311	−1.62	5,744	35	1,439	3.21	3.74
1962-63	17,034	19,591	−0.13	5,588	36	2,477	3.20	3.10
1963-64	17,935	20,894	5.17	7,476	103	2,652	3.20	3.31
1964-65	20,148	22,816	4.40	8,315	115	2,673	3.52	4.70
1965-66	19,818	24,584	2.78	9,389	186	2,788	3.96	5.12
1966-67	21,894	25,374	9.25	9,500	161	3,203	4.15	5.57
1967-68	22,808	27,147	2.03	10,085	230	2,807	4.59	6.71
1968-69	24,508	28,864	0.36	11,184	389	2,646	5.09	5.65
1969-70	27,329	31,638	3.95	11,839	379	2,786	5.26	5.37
1970-71	27,471	31,655	5.12	12,382	233	2,514	5.32	6.40
1971-72	27,178	32,058	6.34	16,464	306	3,591	5.57	5.57
1972-73	28,942	34,711	15.33	16,308	894	3,943	6.21	5.68
1973-74	32,863	37,527	22.81	14,815	703	4,657	7.36	8.48
1974-75	34,528	39,133	25.16	13,426	1,004	7,012	8.44	10.63
1975-76	34,918	40,686	12.31	15,384	1,164	6,596	8.96	9.15
1976-77	36,255	42,254	9.05	17,463	1,783	5,361	9.28	10.03
1977-78	39,559	46,675	7.88	19,028	3,404	2,610	9.54	11.20
1978-79	42,034	49,084	7.16	21,285	3,891	3,016	9.65	8.99

Continued –

Table XI – *Continued*

Sources: For Col. 2: [4], Table 11, Col 4.
For Col. 3: Disposable income = GNP less direct taxes net of subsidies [17].
For Col. 4: Rate of inflation is the rate of change in the GNP deflator. GNP deflator has been obtained as GNP at current factor cost divided by GNP at constant factor cost. GNP estimates are taken from [17].
For Col. 5: Estimates of money supply, taken from [10], have been deflated by GDP deflator.
For Col. 6: [24] and [25].
For Col. 7: [16]. For the years 1959-60 to 1971-72, the data have been adjusted for East and West Pakistan on a 70: 30 ratio.
For Col. 8: [24] and [25].
For Col. 9: Unpublished data, Research Department of State Bank of Pakistan for a few years and for other years [24].

Table XII

Public Consumption

(Million Rupees)

Years	Public Consumption at Market Prices of 1959-60	Total Revenue Receipts at Market Prices of 1959-60	Foreign Capital Inflow at Constant Prices of 1959-60
(1)	(2)	(3)	(4)
1959-60	1,933	2,139	977
1960-61	1,848	2,206	1,449
1961-62	2,025	2,621	1,439
1962-63	2,227	2,646	2,477
1963-64	2,589	3,068	2,652
1964-65	2,741	3,474	2,673
1965-66	3,976	3,767	2,788
1966-67	3,201	3,808	3,203
1967-68	3,142	3,891	2,807
1968-69	3,377	5,029	2,646
1969-70	3,639	5,358	2,786
1970-71	3,738	5,301	2,514
1971-72	4,324	5,339	3,591
1972-73	4,458	5,649	3,943
1973-74	4,012	6,672	4,657
1974-75	4,479	6,560	7,012
1975-76	4,773	7,115	6,596
1976-77	4,820	7,470	5,361
1977-78	5,040	8,674	2,610
1978-79	5,179	9,637	3,016

Sources: For Col. 2: [4], Table 11, Col. 5.
For Col. 3: [4], Table 15. Col. 14, deflated by GDP Deflator. The estimates reported in [4] are taken from the CBR unpublished reports for a few years and Fiscal Statistics of Pakistan [18].
For Col. 4: [16]. For the years 1959-60 to 1971-72 the data has been adjusted for East Pakistan and West Pakistan on a 70 : 30 ratio.

Table XIII

Private Investment

(Million Rupees)

Years	Private Investment (Total)	Private Investment in Agriculture	Private Investment in Manufacturing	Value added in Agriculture (Crop Sector)	Value added in Large Scale Manufacturing	Remittances	Price Index of Tubewells	Price Index of Tractors	Price Index of Agri-culture (Crops)	Investment Price Index	GDP Implicit Deflator
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1959-60	800.00	–	730.00	4,775	1,159	31	100.0	100.0	100.0	100.0	100.00
1960-61	1474.68	–	736.00	4,709	1,394	29	102.0	100.0	106.4	100.1	103.97
1961-62	1385.28	–	742.00	5,127	1,671	35	100.0	98.9	97.3	100.0	102.29
1962-63	1377.25	–	712.00	5,486	1,934	36	–102.1	99.2	95.2	100.2	102.16
1963-64	1665.09	–	985.00	6,638	2,233	103	106.7	99.8	108.3	106.0	107.45
1964-65	1811.62	319.03	1061.75	6,018	2,523	115	109.0	103.6	117.4	111.9	112.22
1965-66	2549.75	266.19	914.00	5,993	2,796	186	118.0	105.7	118.8	118.6	115.31
1966-67	2575.63	271.95	826.82	6,421	2,982	161	126.1	107.7	133.1	122.3	125.99
1967-68	2573.05	256.82	852.92	7,484	3,209	230	132.6	105.1	126.8	123.2	128.52
1968-69	2328.89	254.25	768.11	7,924	3,548	389	139.7	99.4	115.8	130.6	128.99
1969-70	2531.19	344.98	875.44	8,916	4,042	379	147.6	122.9	124.5	134.0	134.05
1970-71	2495.69	327.49	865.02	8,463	4,090	233	149.0	131.5	130.9	141.5	140.97
1971-72	2467.57	372.44	707.24	8,843	3,813	306	152.2	146.0	141.1	143.7	149.83
1972-73	2472.66	406.17	506.37	8,951	4,265	894	170.7	197.1	169.6	150.7	173.24
1973-74	1736.77	333.74	315.38	9,429	4,585	703	230.1	311.2	202.7	221.1	212.83
1974-75	1623.38	263.62	308.73	9,134	4,009	1,004	367.2	421.9	254.8	320.8	266.80
1975-76	1606.12	334.04	324.25	9,672	4,486	1,164	398.6	505.0	275.0	403.7	300.45
1976-77	1759.32	361.83	345.16	9,864	4,385	1,783	435.6	519.0	298.5	442.2	328.13
1977-78	1844.58	409.72	323.95	10,076	4,823	3,404	455.5	555.8	342.6	475.1	356.62
1978-79	1847.26	399.03	303.33	10,454	5,003	3,891	494.0	584.1	371.5	517.2	380.85

Sources: For Cols. 2, 3 & 4: [20] and [21].
For Cols. 5,6: [17], Col. 7: [24] and [25].
For Col. 8: A price index for tubewells has been constructed using a weighted average of the prices of inputs required to install tubewells.
For Col. 9: Unpublished data obtained from the Agricultural Development Bank of Pakistan.
For Col. 10: The price index for agricultural crops is the implicit GDP deflator for the crop sector. The relevant data were generated at PIDE.
For Col. 11: The Investment price index has been computed as a weighted average of the prices of capital equipment and the prices of construction materials. The prices of capital goods and of construction material were taken from [17].
For Col. 12: This series is the ratio of GDP at current factor cost to GDP at constant factor cost.

Table XIV

Public Investment

(Million Rupees)

Years	Public Investment at 1959-60 Prices	Total Public Revenues Deflated by GNP Deflator	Foreign Capital Inflow at Constant Prices of 1959-60
(1)	(2)	(3)	(4)
1959-60	1,080	2,139	977
1960-61	1,079	2,206	1,449
1961-62	1,580	2,621	1,439
1962-63	2,420	2,646	2,477
1963-64	2,605	3,068	2,652
1964-65	2,748	3,474	2,673
1965-66	1,746	3,767	2,788
1966-67	1,864	3,808	3,203
1967-68	2,454	3,891	2,807
1968-69	2,507	5,029	2,646
1969-70	2,420	5,358	2,786
1970-71	2,484	5,301	2,514
1971-72	2,273	5,339	3,591
1972-73	2,601	5,649	3,943
1973-74	3,064	6,672	4,657
1974-75	3,432	6,560	7,012
1975-76	4,034	7,115	6,596
1976-77	4,216	7,470	5,361
1977-78	4,280	8,674	2,610
1978-79	4,418	9,637	3,016

Sources: For Col. 2: [4, Table 13, Col. 3]. Estimates in [4] are obtained from [15] and [17].

For Col. 3: [4, Table 15, Col. 14, deflated by the GNP Deflator]. Estimates in [4] are taken from the CBR unpublished reports for a few years and Fiscal Statistics of Pakistan [8].

For Col. 4: [16]. For the years 1959-60 to 1971-72, the data have been adjusted for East Pakistan and West Pakistan on a 70: 30 ratio.

Table XV

Imports: Foodgrains

Years	Value of Import at Constant Prices of 1959-60 (Million Rupees)	Production (000 Tons)	Population (Millions)	Per Capita Disposable Income
(1)	(2)	(3)	(4)	(5)
1959-60	311	3,909	45.03	386
1960-61	412	3,814	46.20	398
1961-62	262	4,026	47.53	411
1962-63	385	4,170	48.90	429
1963-64	333	4,162	40.13	447
1964-65	597	4,591	51.76	475
1965-66	294	3,916	53.26	497
1966-67	511	4,335	54.79	504
1967-68	549	6,418	56.37	518
1968-69	9	6,618	58.00	541
1969-70	98	7,294	59.70	583
1970-71	107	6,476	61.49	568
1971-72	300	6,890	63.34	556
1972-73	527	7,442	65.24	585
1973-74	406	7,629	67.20	621
1974-75	622	7,673	69.21	611
1975-76	402	8,691	71.29	624
1976-77	133	9,144	73.43	638
1977-78	404	8,367	75.63	686
1978-79	751	9,994	77.90	695

Sources: For Col. 2: [11]. These in turn are obtained from [14].
For Cols. 3 & 4: [14] and [17].
For Col. 5: Per capita disposable income: GNP less direct taxes net of subsidies divided by Col. 4.

Table XVI

Imports: Consumer Goods

(Million Rupees)

Years	Value of Imports at Constant Prices of 1959-60	Total Consumption at Constant Prices of 1959-60	Value added in Manufacturing at Constant Factor Cost of 1959-60	Foreign Exchange Reserves	Foreign Capital inflow at Constant Prices of 1959-60	Real EER_C Rupee per Dollar
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1959-60	335	16,508	2,018	1170	977	10.14
1960-61	347	17,671	2,278	1178	1,449	9.93
1961-62	380	18,492	2,581	1103	1,439	10.71
1962-63	369	19,261	2,870	1406	2,477	12.24
1963-64	540	20,524	3,196	1150	2,652	9.52
1964-65	489	22,899	3,514	848	2,673	8.29
1965-66	566	23,798	3,816	1096	2,788	12.74
1966-67	559	25,103	4,032	630	3,203	10.57
1967-68	556	25,954	4,289	673	2,807	13.54
1968-69	628	27,892	4,659	1103	2,646	15.18
1969-70	593	30,968	5,186	1020	2,786	13.95
1970-71	428	31,222	5,318	673	2,514	15.20
1971-72	303	31,498	5,130	2094	3,591	15.34
1972-73	514	33,482	5,678	2652	3,943	13.16

Continued –

Table XVI – *Continued*

1973-74	432	36,978	6,101	1877	4,657	13.98
1974-75	430	39,179	6,136	1812	7,012	14.40
1975-76	548	39,973	6,231	2040	6,596	11.06
1976-77	564	41,448	6,258	1312	5,361	10.15
1977-78	749	45,340	6,833	2851	2,610	10.87
1978-79	624	47,834	7,160	2385	3,016	11.39

Sources: For Col. 2: [11]. The estimates in [11] are based on data obtained from [14].
For Col. 3: [4], Table 8, Col. 4 and [4], Table 11, Cols. 4 & 5.
For Col. 4: [17].
For Col. 5: [17].
For Col. 6: [16]. For the year 1959-60 to 1971-72 the data have been adjusted for East Pakistan & West Pakistan on a 70: 30 ratio.
For Col. 7: Real effective exchange rates were obtained in two stages. First, nominal effective exchange rates were estimated by taking into consideration the tariff rates, tariff equivalents of tariffs, the rate of bonus and premium on bonus vouchers. Second, the nominal exchange rates are multiplied by a ratio of the unit value index to implicit GNP deflator.

Table XVII

Imports: Energy

Years	Value of Imports at Constant Prices of 1959-60 (Million Rs.)	Total Consumption at Constant Prices of 1959-60 (Million Rs.)	Value added in Large-Scale Manufacturing Sector at Constant Factor Cost of 1959-60 (Million Rs.)	Agriculture Mechanisation Index	Index of Relative Prices
(1)	(2)	(3)	(4)	(5)	(6)
1959-60	198	16,508	1159	100.0	100.0
1960-61	227	17,671	1394	173.5	93.1
1961-62	199	18,492	1671	257.5	94.6
1962-63	176	19,261	1934	359.0	94.8
1963-64	173	20,524	2233	454.0	90.1
1964-65	87	22,899	2523	532.5	79.5
1965-66	101	23,798	2796	633.0	71.4
1966-67	217	25,703	2982	793.0	64.0
1967-68	309	25,954	3209	945.0	60.7
1968-69	337	27,909	3548	1135.0	58.4
1969-70	303	30,968	4042	1290.5	54.1
1970-71	337	31,223	4090	1416.0	58.4
1971-72	311	31,498	3813	1530.0	63.0
1972-73	277	33,482	4265	1646.5	142.3
1973-74	309	36,977	4585	1796.0	237.8
1974-75	317	39,179	4509	1860.5	405.3
1975-76	329	39,973	4486	2268.5	385.8
1976-77	344	41,448	4385	2552.0	370.9
1977-78	378	45,340	4823	2749.0	375.5
1978-79	401	47,834	5003	2940.5	353.8

Sources: For Col. 2: [11]. The estimates in [11] are based on data obtained from [14].
For Col. 3: [4] Table 8, Col. 4. and [4], Table 11, Cols. 4 & 5.
For Col. 4: [17].
For Col. 5: Agriculture mechanisation index was obtained as weighted average of the indices of tractors and tubewells.
For Col. 6: Price index of energy relative to implicit GNP deflator.

Table XVIII

Imports: Intermediate Goods

(Million Rupees)

Years	Value of Imports at Constant Prices of 1959-60	Value Added in the Manufacturing Sector at Constant Factor Cost of 1959-60	Foreign Exchange Reserves at Constant Prices of 1959-60	Real EER_G Price per dollar	Foreign Capital Inflow at Constant Prices of 1959-60
(1)	(2)	(3)	(4)	(5)	(6)
1959-60	427	2018	1170	8.50	977
1960-61	548	2278	1178	8.29	1,449
1961-62	538	2581	1103	10.03	1,439
1962-63	643	2870	1406	9.92	2,477
1963-64	813	3196	1150	8.70	2,652
1964-65	1050	3514	848	7.98	2,673
1965-66	699	3816	1096	10.21	2,788
1966-67	1140	4032	630	8.31	3,203
1967-68	943	4289	673	7.52	2,807
1968-69	953	4639	1103	8.80	2,646
1969-70	1297	5186	1020	7.70	2,786
1970-71	1153	5318	673	8.18	2,514
1971-72	807	5130	2094	7.53	3,591
1972-73	1294	5678	2652	8.74	3,943

Continued –

Table XVIII – *Continued*

Years	Value of Imports at Constant Prices of 1959-60	Value Added in the Manufacturing Sector at Constant Factor Cost of 1959-60	Foreign Exchange Reserves at Constant Prices of 1959-60	Real EER_G Price per dollar	Foreign Capital Inflow at Constant Prices of 1959-60
(1)	(2)	(3)	(4)	(5)	(6)
1973-74	1709	6101	1877	9.66	4,657
1974-75	1684	6136	1812	9.71	7,012
1975-76	1473	6231	2040	7.67	6,596
1976-77	2133	6258	1312	6.41	5,361
1977-78	2598	6833	2851	6.31	2,610
1978-79	3352	7160	2385	7.31	3,016

Sources: For Col. 2: [11]. The estimates in [11] are based on data obtained from [14].
For Col. 3: [17].
For Col. 4: Based on data reported in [17].
For Col. 5: Real effective exchange rates were obtained in two stages. First, nominal effective exchange rates were estimated by taking into consideration the tariff rates, tariff equivalents of tariffs, the rate of bonus and premium on bonus vouchers. Second, the nominal exchange rates are multiplied by a ratio of the unit value index to implicit GNP deflator.
For Col. 6: For the years 1959-60 to 1971-72, the data have been adjusted for East Pakistan and West Pakistan on a 70:30 ratio.

Table XIX

Imports: Capital Goods

(Million Rupees)

Years	Value of Imports at Constant Prices of 1959-60	Total Investment at Constant Prices of 1959-60	Foreign Exchange Reserves at Constant Prices of 1959-60	Foreign Capital Inflow at Constant Prices of 1959-60	Real EER_K Rupees per dollar
(1)	(2)	(3)	(4)	(5)	(6)
1959-60	678	2,416	1,170	977	9.34
1960-61	830	2,769	1,178	1,449	9.55
1961-62	1,064	3,191	1,103	1,439	10.24
1962-63	1,451	4,051	1,406	2,477	10.55
1963-64	1,377	4,415	1,150	2,652	10.25
1964-65	2,176	4,783	848	2,673	6.87
1965-66	1,535	4,625	1,096	2,788	9.60
1966-67	1,804	5,140	630	3,203	7.78
1967-68	1,704	5,296	673	2,807	8.42
1968-69	1,902	5,270	1,103	2,646	8.33
1969-70	1,929	5,464	1,020	2,786	8.29
1970-71	1,668	5,579	673	2,514	10.26
1971-72	882	5,333	2,094	3,591	11.97
1972-73	776	5,737	2,652	3,943	13.68
1973-74	876	5,254	1,877	4,657	15.41
1974-75	1,314	5,679	1,812	7,012	11.96
1975-76	1,722	5,640	2,040	6,596	9.64
1976-77	1,903	6,201	1,312	5,361	10.32
1977-78	1,841	6,362	2,851	2,610	10.52
1978-79	2,197	6,615	2,385	3,016	9.50

Sources. For Col. 2: [11]. The estimates in [11] are based on data obtained from [14].
For Col. 3: [4, Table 13, Col. 5]. Estimates in [4] are obtained from [15] and [17].
For Col. 4: [17].
For Col. 5: [16]. For the years 1959-60 to 1971-72, the data have been adjusted for East Pakistan and West Pakistan on a 70 : 30 ratio.
For Col. 6: Real effective exchange rates were obtained in two stages. First, nominal effective exchange rates were estimated by taking into consideration the tariff rates, tariff equivalents of tariffs, the rate of bonus and premium on bonus vouchers. Second, the nominal exchange, rates are multiplied by a ratio of the unit value index to implicit GNP deflator.

Table XX

Imports: Services

(Million Rupees)

Years	Value of Imports of Service at Constant Prices of 1959-60	Value of Imports of Goods at Constant Prices of 1959-60	GNP at Constant Factor Cost of 1959-60
(1)	(2)	(3)	(4)
1959-60	307	1,806	16,803
1960-61	341	2,100	17,624
1961-62	455	2,209	18,683
1962-63	415	2,770	20,008
1963-64	471	2,958	21,322
1964-65	920	4,372	23,299
1965-66	540	2,712	25,079
1966-67	752	3,637	25,853
1967-68	632	3,377	27,636
1968-69	789	3,099	29,425
1969-70	677	3,027	32,338
1970-71	621	2,773	32,362
1971-72	728	2,066	32,883
1972-73	388	2,713	35,360
1973-74	361	2,821	38,085
1974-75	314	3,137	39,651
1975-76	537	3,236	41,410
1976-77	587	3,622	43,022
1977-78	702	4,080	47,480
1978-79	860	5,970	49,953

Sources: For Cols. 2 and 3: [4, Table 2, Cols. 2&4, deflated by the Import Price Index].
For Col. 4: [17].

Table XXI

Deflators for Imports

Years	Foodgrains	Energy	Raw Material for Consumer Goods	Raw Material for Capital Goods	Raw Materials	Capital Goods
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1959-60	100.0	100.0	100.0	100.0	100.0	100.0
1960-61	80.3	96.8	103.9	100.8	102.7	106.8
1961-62	100.2	96.8	109.6	99.6	106.5	100.3
1962-63	51.5	96.8	108.8	105.3	107.8	104.3
1963-64	97.1	96.8	105.0	94.5	100.6	108.3
1964-65	100.2	89.2	100.7	87.7	95.3	80.1
1965-66	81.0	82.3	119.8	113.6	117.9	103.4
1966-67	106.4	80.6	103.1	84.1	95.5	91.3
1967-68	89.4	78.0	99.0	81.6	92.7	96.1
1968-69	85.9	75.3	108.8	91.7	102.5	83.7
1969-70	72.8	72.5	93.4	83.7	90.5	86.0
1970-71	75.0	83.0	102.6	93.9	99.7	113.0
1971-72	99.9	94.4	117.6	115.8	117.1	168.0
1972-73	212.7	246.2	218.3	202.9	214.0	322.1
1973-74	383.4	504.7	293.0	268.0	288.5	453.9
1974-75	356.0	1076.7	436.2	376.8	420.7	469.2
1975-76	446.3	1151.1	383.7	345.9	375.4	418.0
1976-77	498.5	1206.0	334.2	315.3	330.5	460.2
1977-78	331.7	1317.3	333.1	330.5	332.6	505.7
1978-79	466.8	1329.9	397.3	362.3	391.6	499.3

Source: Based on data obtained from [15], [17] and [24].

Table XXII

Exports: Primary Goods

Years	Value of Exports at Constant Prices of 1959-60 (Million Rs.)	Index of Relative Prices of Primary Goods Exports to Imported Goods	Index of Relative Prices of Primary Goods Export adj. for Devaluation to GDP Deflator	Nominal Effective Exchange Rate	Real EER I	Real EER II	Value Added in Agriculture at Constant Factor Cost of 1959-60 (Million Rs.)	World Exports (Billion Rs.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1959-60	609	100.0	100.0	5.14	5.14	5.14	7,711	121.6
1960-61	547	103.3	102.8	5.01	5.17	5.15	7,695	129.2
1961-62	589	109.6	108.5	5.07	5.56	5.50	8,171	135.9
1962-63	936	113.3	112.1	5.12	5.80	5.74	8,597	136.9
1963-64	861	109.6	102.9	5.36	5.87	5.52	8,813	140.5
1964-65	791	128.2	96.0	5.39	6.91	5.17	9,276	151.2
1965-66	908	109.1	100.4	5.39	5.88	5.41	9,618	161.1
1966-67	924	119.7	94.6	4.64	5.55	4.39	9,829	170.9
1967-68	1022	128.3	98.4	4.69	6.02	4.61	10,982	187.7
1968-69	882	128.5	98.0	4.69	6.03	4.60	11,478	210.2

Continued –

Table XXII – *Continued*

1969-70	1010	116.8	94.6	5.16	6.03	4.88	12,574	230.5
1970-71	910	101.4	93.5	5.66	5.74	5.29	12,188	247.7
1971-72	1275	92.4	85.6	5.89	5.44	5.04	12,611	266.9
1972-73	842	87.7	70.3	6.23	5.46	4.38	12,821	300.0
1973-74	891	95.8	97.2	5.87	5.62	5.71	13,357	329.5
1974-75	1155	64.7	78.1	5.93	3.84	4.63	13,074	330.2
1975-76	1308	67.5	68.1	5.35	3.61	3.68	13,659	341.5
1976-77	1208	70.9	66.6	6.94	4.92	4.62	13,998	368.4
1977-78	1121	70.7	66.0	9.57	6.77	6.32	14,348	386.8
1978-79	1149	82.1	74.8	8.40	6.90	6.28	14,948	406.8

Sources: For Cols. 2,3 & 4: [15] and [17]. These figures are adjusted for the inter-wing trade for the the period upto 1970-71.
For Col. 5: The official exchange rate is adjusted for various subsidies and export duties applicable to various products to obtain effective exchange rate for teach product. Weighted average of these effective exchange rates gives the nominal EER.
For Col. 6: Nominal EER is multiplied by a ratio of export prices to GNP deflator.
For Col. 7: Nominal EER is multiplied by a ratio of export prices to world market prices.

Table XXIII

Exports: Manufactured Goods

Years	Value of Exports at Constant Prices of 1959-60 (Million Rs.)	Index of Relative Prices of Manufactured Goods Exports to the Imported Goods	Index of Relative Prices of Manufacturing Goods to GDP Deflator Adjusted for Development	Nominal Effective Exchange Rate	Real EER I	Real EER II	Value Added in the Manufacturing Sector of 1959-60 (Million Rs.)	World Exports (Billion Rs.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1959-60	456	100.0	100.0	6.74	6.74	6.74	2,018	121.6
1960-61	609	81.7	81.3	6.62	5.41	5.38	2,278	129.2
1961-62	615	88.3	87.4	6.66	5.88	5.82	2,581	135.9
1962-63	684	72.2	71.5	6.68	4.82	4.78	2,870	136.9
1963-64	849	88.0	82.6	7.05	6.20	5.82	3,196	140.5
1964-65	1,102	95.8	71.8	7.13	6.83	5.12	3,514	151.2
1965-66	666	124.1	114.3	7.13	8.85	8.15	3,816	161.1
1966-67	1,145	95.9	75.7	7.16	6.87	5.42	4,032	170.9
1967-68	1,334	86.8	66.5	8.14	7.07	5.41	4,289	187.7
1968-69	1,395	85.0	64.8	8.20	6.97	5.31	4,659	210.2
1969-70	1,664	80.3	65.0	7.96	6.39	5.17	5,186	230.5

Continued –

Table XXIII –*Continued*

1970-71	1,721	74.3	68.5	8.44	6.27	5.78	5,318	247.7
1971-72	1,465	74.1	68.6	8.89	6.59	6.10	5,130	266.9
1972-73	1,808	88.9	72.0	9.54	8.48	6.87	5,678	300.0
1973-74	1,366	94.9	96.3	8.51	8.08	8.20	6,101	329.5
1974-75	1,374	57.9	69.9	9.68	5.60	6.77	6,136	330.2
1975-76	1,338	67.2	68.3	9.95	6.67	6.80	6,231	341.5
1976-77	1,124	82.0	77.0	10.01	8.21	7.71	6,258	368.4
1977-78	1,370	80.8	75.5	10.68	8.63	8.06	6,833	386.8
1978-79	1,849	77.5	70.6	10.68	8.28	7.54	7,160	406.8

Sources: For Cols. 2,3 & 4: [15] and [17]. These figures are adjusted for the inter-wing trade for the period up to 1970-71.
For Col. 5: The official exchange rate is adjusted for various subsidies and export duties applicable to various products to obtain effective exchange rate for each product. Weighted average of these effective exchange rates gives the nominal EER.
For Col. 6: Nominal EER is multiplied by a ratio of export prices to GNP deflator.
For Col. 7: Nominal EER is multiplied by a ratio of export prices to world inflation rate.
For Col. 8: [17].
For Col. 9: [6].

Table XXIV

Exports: Services

(Million Rupees)

Years	Export of Services at Constant Prices of 1959-60	Export of Goods at Constant Prices of 1959-60
(1)	(2)	(3)
1959-60	91.30	363.10
1960-61	99.13	522.48
1961-62	158.67	514.59
1962-63	199.41	943.74
1963-64	194.62	1050.31
1964-65	241.46	1092.25
1965-66	187.19	1075.98
1966-67	242.33	1187.67
1967-68	324.64	1494.05
1968-69	235.35	1497.84
1969-70	358.56	1385.17
1970-71	416.70	1609.79
1971-72	367.92	2248.79
1972-73	445.33	2701.20
1973-74	352.83	1993.13
1974-75	569.09	2161.94
1975-76	550.89	2358.80
1976-77	475.53	1990.71
1977-78	617.86	2198.13
1978-79	717.82	2644.57

Source: For Cols. 2 & 3: [4, Table 2, Cols. 6 and 8, deflated by the Export Price Index].

Table XXV

Deflators for Exports

Years	Primary Goods	Manufactured Goods
(1)	(2)	(3)
1959-60	100	100
1960-61	106.9	84.5
1961-62	111.0	89.4
1962-63	114.5	73.0
1963-64	110.5	88.7
1964-65	107.7	80.5
1965-66	115.8	131.8
1966-67	119.1	95.4
1967-68	126.4	85.5
1968-69	126.3	83.6
1969-70	126.8	87.2
1970-71	131.7	96.5
1971-72	156.3	125.3
1972-73	271.5	275.1
1973-74	428.9	425.1
1974-75	431.6	385.9
1975-76	526.7	423.8
1976-77	450.4	520.9
1977-78	481.8	551.0
1978-79	584.9	551.9

Source: Based on data obtained from [15], [17] and [24].

Table XXVI

Customs Duties

(Million Rupees)

Years	At Current Prices	At Constant Prices of 1959-60
(1)	(2)	(3)
1959-60	357	357
1960-61	418	402
1961-62	527	515
1962-63	543	531
1963-64	482	449
1964-65	709	632
1965-66	705	612
1966-67	811	644
1967-68	780	607
1968-69	1,149	891
1969-70	1,240	925
1070-71	1,737	1,233
1971-72	1,312	876
1972-73	2,644	1,530
1973-74	4,169	1,964
1974-75	4,917	1,851
1975-76	5,164	1,731
1976-77	5,696	1,752
1977-78	8,390	2,392
1978-79	10,000	2,660

Sources: For Col. 2: [4] Table 15, Col. 2. This in turn is obtained from the CBR unpublished reports for a few years and Fiscal Statistics of Pakistan [18] for the remaining years.

For Col. 3: Derived by deflating the figures in Col. 2 by the GNP deflator.

Table XXVII

Excise Taxes

(Million Rupees)

Years	At Current Prices	At Constant Prices of 1959-60
(1)	(2)	(3)
1959-60	248	248
1960-61	288	277
1961-62	297	290
1962-63	387	379
1963-64	559	520
1964-65	636	567
1965-66	787	683
1966-67	1,187	942
1967-68	1,384	1,077
1968-69	1,522	1,180
1969-70	1,890	1,410
1970-71	2,548	1,808
1971-72	2,154	1,437
1972-73	2,298	1,330
1973-74	2,795	1,317
1974-75	3,534	1,330
1975-76	4,408	1,478
1976-77	4,974	1,530
1977-78	6,323	1,802
1978-79	6,827	1,816

Sources: For Col. 2: [4, Table 15, Col. 3]. This in turn is taken from the CBR unpublished reports for a few years and Fiscal Statistics of Pakistan [18] for the remaining years.

For Col. 3: Derived by deflating the figures in Col. 2 by the GNP deflator.

Table XXVIII

Sales Taxes

(Million Rupees)

Years	At Current Prices	At Constant Prices of 1959 60
(1)	(2)	(3)
1959-60	270	270
1960-61	362	348
1961-62	378	371
1962-63	399	391
1963-64	491	457
1964-65	513	457
1965-66	614	533
1966-67	684	543
1967-68	401	312
1968-69	494	383
1969-70	522	389
1970-71	750	532
1971-72	481	321
1972-73	460	266
1973-74	692	326
1974-75	1,074	404
1975-76	1,200	402
1976-77	1,430	440
1977-78	1,590	453
1978-79	1,846	411

Sources: For Col. 2 : [4, Table 15, Col. 4]. This in turn is obtained from the CBR unpublished reports for a few years and Fiscal Statistics of Pakistan [18] for the remaining years.

For Col. 3 : Derived by deflating the figures in Col. 2 by the GNP deflator.

Table XXIX

Income and Corporation Taxes

(Million Rupees)

Years	At Current Prices	At Constant Prices of 1959-60
(1)	(2)	(3)
1959-60	307	307
1960-61	320	308
1961-62	381	372
1962-63	426	417
1963-64	460	428
1964-65	542	483
1965-66	571	495
1966-67	603	479
1967-68	628	489
1968-69	724	561
1969-70	938	700
1970-71	996	707
1971-72	1,236	825
1972-73	1,121	649
1973-74	1,188	558
1974-75	1,376	518
1975-76	2,160	724
1976-77	2,496	768
1977-78	2,823	805
1978-79	3,266	869

Sources: For Col. 2: [4, Table 15, Col. 5]. This in turn is obtained from the CBR unpublished reports for a few years and Fiscal Statistics of Pakistan [18] for the remaining years.

For Col. 3: Derived by deflating the figures in Col. 2 by the GNP deflator.

Table XXX

Land Revenue

(Million Rupees)

Years	At Current Prices	At Constant Prices of 1959-60
(1)	(2)	(3)
1959-60	138.6	138.6
1960-61	132.4	127.3
1961-62	–13.4	–13.1
1962-63	144.9	141.8
1963-64	114.1	106.2
1964-65	73.0	65.1
1965-66	113.9	98.8
1966-67	150.8	119.7
1967-68	163.2	127.0
1968-69	166.8	129.3
1969-70	167.6	125.0
1970-71	206.6	146.6
1971-72	152.3	101.6
1972-73	167.4	96.9
1973-74	187.4	88.3
1974-75	189.1	71.2
1975-76	188.0	63.0
1976-77	136.3	41.9
1977-78	115.1	32.8
1978-79	224.7	59.8

Sources: For Col. 2: (i) [15] for the period up to 1971-72.
(ii) [1], [12], [19], [22] and [23] for later years.
For Col. 3: Derived by deflating the figures in Col. 2 by the GNP deflator.

Table XXXI

Other Revenues

(Million Rupees)

Years	At Current Prices	At Constant Prices of 1959-60
(1)	(2)	(3)
1959-60	817	817
1960-61	773	743
1961-62	1,112	1,087
1962-63	804	787
1963-64	1,191	1,109
1964-65	1,425	1,270
1965-66	1,553	1,347
1966-67	1,362	1,081
1967-68	1,644	1,279
1968-69	2,431	1,885
1969-70	2,425	1,809
1970-71	2,557	1,815
1971-72	2,664	1,778
1972-73	3,072	1,778
1973-74	5,135	2,419
1974-75	6,337	2,386
1975-76	8,105	2,717
1976-77	9,554	2,938
1977-78	11,187	3,189
1978-79	14,062	3,741

Note: Col. 2: Other revenues include revenues other than principal heads of revenue under both the direct and indirect taxes.

Col. 3: Figures reported in Col. 2 are deflated by the GNP deflator.

Table XXXII

Demand for Money

Years	Real Money (Million Rs.)	Interest Rate	GNP at Factor Cost (Million Rs.)
(1)	(2)	(3)	(4)
1959-60	5275	2.39	16803
1960-61	5261	3.63	17624
1961-62	5744	3.74	18684
1962-63	5588	3.10	20008
1963-64	7476	3.31	21323
1964-65	8315	4.70	23311
1965-66	9389	5.12	25083
1966-67	9500	5.57	25863
1967-68	10085	6.71	27641
1968-69	11184	5.65	29431
1969-70	11839	5.37	32338
1970-71	12382	6.40	32376
1971-72	16464	5.57	32878
1972-73	16308	5.68	35447
1973-74	14815	8.48	38192
1974-75	13426	10.50	39825
1975-76	15384	9.15	41720
1976-77	17463	10.03	43412
1977-78	19028	11.20	48090
1978-79	21285	8.99	50996

Sources: For Column 2: Estimates of M_2 definition of money are taken from [10] and deflated by GDP prices deflation.
For Column 3: [24] and [25].
For Column 4: [17].

Table XXXIII

Aggregate Price Deflators

Years	GNP Implicit Deflator	GDP Implicit Deflator
(1)	(2)	(3)
1959-60	100.00	100.00
1960-61	100.07	103.97
1961-62	99.98	102.29
1962-63	100.20	102.16
1963-64	105.96	107.45
1964-65	111.88	112.22
1965-66	118.61	115.31
1966-67	122.25	125.99
1967-68	123.19	128.52
1968-69	130.62	128.99
1969-70	138.01	134.05
1970-71	141.46	140.97
1971-72	143.70	149.83
1972-73	150.72	173.24
1973-74	221.05	212.83
1974-75	320.77	266.80
1975-76	403.74	300.45
1976-77	442.19	328.13
1977-78	475.13	356.62
1978-79	517.32	380.85

For Cols. 2 & 3 : The two columns have been obtained as ratios of GNP and GDP at current factor cost to GNP and GDP at constant factor cost.

Table XXXIV

Inflation

Years	Excess of Imported Prices Over Domestic Prices	Nominal Money Supply M_2 definition	Ratio of GNP to Trend	Ratio of Govt. Expenditure to Trend
(1)	(2)	(3)	(4)	(5)
1959-60	–	5275	.9434	.93
1960-61	0.98	5469	.9365	.83
1961-62	11.24	5875	.9423	.86
1962-63	2.27	6731	.9603	.90
1963-64	–10.54	8033	.9761	1.09
1964-65	22.63	9331	1.0200	1.10
1965-66	36.86	10827	1.0510	1.46
1966-67	–10.15	11969	1.0400	1.12
1967-68	3.06	12961	1.0680	1.11
1968-69	11.84	14368	1.0960	1.12
1969-70	4.60	15870	1.1590	1.20
1970-71	12.18	17455	1.1200	1.14
1971-72	2.14	24668	1.0990	1.33
1972-73	8.96	28252	1.1440	1.48
1973-74	20.70	31532	1.1930	1.60
1974-75	13.15	35821	1.2040	1.73
1975-76	–16.93	46223	1.2200	1.70
1976-77	–3.18	57301	1.2310	1.57
1977-78	2.49	67857	1.3160	1.63
1978-79	–2.99	81066	1.3610	1.83

Note: Column 2: Computed on the basis of data reported in tables XVII to XX.
Column 3: Estimate of M_2 definition of money are taken from [10].
Column 4: Computed as a ratio of actual GNP to its trend value. Trend value has been obtained by fitting exponential curve.
Column 5: Computed as a ratio of actual public expenditure to its trend value. The trend value has been obtained by fitting exponential curve.

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