GROWTH PROSPECTS OF A DEVELOPING ECONOMY: PAKISTAN

GROWTH PROSPECTS OF A DEVELOPING ECONOMY: A MACROECONOMETRIC STUDY OF PAKISTAN

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To the memory of Uncle Gilani. He would have been so pleased for me.

ABSTRACT

This study analyses the growth prospects of Pakistan over the period 1978 to 1990. The framework used for the analysis is a macroeconometric model of the economy which is constructed and estimated based on data for the period 1956 to 1978. The predictive ability of the model is evaluated in terms of its ability to forecast values of the endogenous variables in an historic simulation context. The model is then used initially to forecast values of major endogenous variables over the period 1978 to 1990, based on a benchmark set of assumptions about growth in the exogenous variables. The results of the benchmark forecast are compared with results of six other forecasts in which the assumptions about the future course of key domestic and international factors are varied.

The macroeconometric model consists of a system of nonlinear dynamic simultaneous equations. An input-output block composed of ten production sectors is incorporated. The final demand side is disaggregated into private and public expenditures, including exports and imports by economic categories. The revenue structure and role of the government in the development of the economy are treated as endogenously determined. The influence of bank credit on capital formation and the effect of government deficits on the money supply are explicitly incorporated.

The results of the initial benchmark forecast with the model

are compared with targets set by the Pakistan Planning Commission in the context of the Fifth Five-Year Plan (1978-83). It is found that the plan was consistent but was not feasible with regard to the amount of non-inflationary resources required to carry it out. For these reasons, the plan was aborted in 1981.

In the other experiments it is found that a higher international growth rate, though raising the growth path of the Pakistan economy, does not translate into an equivalent increase in growth in the domestic economy. The economy's growth path is found to be very sensitive to the course of agricultural development. A harvest failure in one year would permanently lower the growth path for subsequent years. The economy is found to be flexible enough to withstand a surge in imports in one year without its long-run growth path being affected. Finally, on the basis of the last experiment, a feasible course of action for government policy is suggested. This would require development expenditures to increase by half the amount suggested in the plan. Under this policy, gross domestic product and related aggregates would have annual real growth of 4.1 percent in the long-run accompanied by yearly increases in employment of 3.3 percent. Government and balance of payments deficits would be cut to manageable size, resulting in reduced inflationary tendencies in the economy.

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The responsibility for any errors or omissions in this study, is of course mine.

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INTRODUCTION

1.1 Introductory Remarks

Since the end of the Second World War, a large number of countries in Asia, Africa and Latin America, have been referred to variously as "poor", "backward", "under-developed", "less developed", and by the optimistic term now in vogue, "developing countries". The features or characteristics of underdevelopment have in recent years, come to be widely publicised and, with occasional reservations, agreed upon. The many publications of the United Nations and its specialised agencies have gone a long way in calling them to world-wide attention. Every textbook on economic development invariably devotes the first chapter to defining the multi-faceted term "development", outlining characteristics and using various indices, such as per capita income, energy consumption, fertility, literacy and mortality rates, quality of diet, steel consumption, number of vehicles, etc., to compare the developed and developing countries.[1]

The lack of development in the "developing" countries has been in evidence for a very long time, though among the inhabitants of the developed countries, widespread public interest in economic development of the less developed countries is a relatively recent phenomenon. World poverty was "discovered" by the wealthier countries

only shortly after World War II. As evidence, in 1960 the United Nations initiated its Decade of Development. The first modern comprehensive textbook about economic development was written in 1959. Since then considerable effort has gone into tackling the problems facing the less developed countries. A lot has been learned from these efforts and development economies has become a field in its own right.

The literature on economic development has been growing rapidly but there is still no central body of doctrine that can be generally acclaimed as the theory of economic development. This is to be expected since it is impossible to isolate factors that led to a whole series of events culminating in some countries developing faster than others. No two developed countries would have the same factors centrally responsible for their rapid development, politically, socially or economically.

Development is a very broad term and in its totality deals with changes in the human condition. The phenomenon of development is extremely complex, encompassing political, social, historic and cultural factors, all of which interact to produce growth and change, Economic development is, of course, a particular form of development which focusses largely on materially oriented issues (output, employment, incomes, the composition of production and so on). To refer to a region as underdeveloped or less developed generally implies poverty, illiteracy, poor health and a primarily rural society. Economic underdevelopment usually means an economy in which there is low output, low productivity and thus low income.

In order to escape from the conditions of "underdevelopment", a country must "develop". Literally speaking, this implies that it must grow, increase its resources, expand, open out, and assume definite character. In some ways it may seem that every country should be progressing, since every succeeding generation possesses a larger inventory of knowledge, accumulated from the failures and achievements of preceding generations. However, there might exist social, religious and economic barriers that inhibit such progress. A less developed country can progress or grow only if visible and invisible barriers are removed. This is the ultimate task of development scientists, be they in sociology, political science or economics.

> On a moral basis, the long-term goal of development efforts should be the successive relaxation of constraints of the human potential of its members. The goals of economic development are to provide the material basis for achieving these objectives and to establish the economic conditions for relaxing the other barriers to self realization (access to education, work satisfaction, status, security, self expression and power). [2]

The central question in any development study is how the forces that will advance the economy can be released. In determining a country's development potential, one has to consider the kinds, extents and value of its natural resources, availability of skilled labour, social over-head facilities such as transportation, energy, health conditions and so on. The level of employment, the rate of unemployment and the methods by which more productive work can be provided, must be analysed. At the international level, one has to consider the goods and services in which a country has a comparative advantage, and then analyse potential markets for them. In the final analysis,

each country's path to development is unique. The individual economic and political characteristics of each country will determine the kind of strategy its leaders will adopt.

What has been learned in studying the development problems of the less developed countries is that there is no single best strategy of economic development. All countries cannot be categorized into various stages of the development process, from which it is presumed that they will move to a higher stage as certain conditions are fulfilled, nor are the developing countries mere images of the developed countries as they were a century or two ago.[3]

The optimism of the sixties, when it was thought that cheap atomic energy would provide the answer, and that the emerging nations would soon pull even with the West, has been replaced with the realisation that economic development is a time consuming and complex process. One of these realities simply involves some historical perspective on the development process. The United States of America, with abundant natural resources, a small population relative to land area and an early start in industrialisation, required three quarters of a century to become a large-scale manufacturer. The Soviet Union, which was able to acquire the most advanced machine technology from the rest of the world, needed forty years to become an industrial power. Bluntly speaking, many countries in the world simply lack sufficient natural resources and size to become important industrial nations. Given the best possible circumstances, much more than a decade or two is required for any significant progress in development to be made in most nations. Another grim reality is that economic

underdevelopment is a relative term, relative to the circumstances of some more developed area. That area is not going to stand still. Merely maintaining the existing gap is difficult enough, let alone trying to close it. As developed countries continue to grow, relative underdevelopment is going to be a good deal worse.

There are several reasons why economists should devote a considerable amount of attention to the issues associated with economic development. First, the problem is still very much there and a majority of the world's population lives in less than ideal conditions. There is an atmosphere of growing impatience, dissatisfaction and increasing resentment of poverty which already threatens world stability. Secondly, though a lot has been written on the subject, and much has been learned, a real breakthrough is lacking. It will only come gradually as research effort is intensified in areas defying analysis and measurement. Finally, if economics is to evolve into an area of enquiry with claims of universal validity of principles and applications, the problems of the developing countries have to be analysed rigorously and brought into the domain where theory is applicable. Failing to tackle these multitudinous problems will only increase the vulnerability of economic theory to charges laid against it in the way it is taught in the developed countries, that it is applicable only to very special cases.[4] With increased emphasis in the area of development, the growth of comparative economics should lead to the creation of a more general framework into which the special cases of developed and less developed countries can be included.

1.2 Objectives and Organisation of the Study

This study concerns itself with analysing the growth possibilities of a developing country, Pakistan. A disaggregated macroeconometric model of the Pakistan economy is constructed to depict its structural and institutional characteristics. The production side consists of an input-output block which is fully integrated with a macro-model of final demand and income determination. That means that neither the macro-model of final demand and national income generation nor the input-output production system for generating sectoral production flows can be solved alone: the two must be solved together.

This combination contains a number of analytical possibilities, since the econometric model is complemented by the inter-industry flows and the input-output model by the stochastic macroeconometric relationships. A wide range of possible policy actions can be chosen and simulated in such a framework. Questions concerning the ways in which the structure of the economy could be altered, or which sectors should be emphasised in order to promote and to achieve rapid growth can be analysed with such a model, with resulting prescriptions for policy.

Although the model relates to the Pakistan economy, that should not limit its generality, and it is hoped that model builders for other countries can draw upon some of its features and adapt it to the specific conditions of the countries they are studying.

Every empirical study has a theoretical basis, in light of which various relationships are formulated and issues examined. This link between theory and model formulation might be tenuous at times,

but if it is not kept in mind the whole exercise soon degenerates into a "search for the best fit" leading to conclusions with no theoretical content or rigorous validation.[5] It has been suggested that the received doctrine which underlies most empirical work done in the developed countries might not be applicable to developing countries. It is suggested also that the reliance on a market system may not promote an efficient allocation of resources in the peculiar setting of developing countries, and that models which assume such a system may be inappropriate. Chapter 2 is concerned with examining the issues involved.

Chapter 3 summarises some of the models that have been used in the context of developing countries. Chapter 4 provides a description of the Pakistan economy as it has evolved since 1956. The nature of the economy, and the development of its political, social and economic institutions, form part of this chapter. A brief review of development policies including five year plans, fiscal, monetary, export and import policies is also provided. The purpose of chapter 4 is to provide an appropriate perspective for the formulation of theoretical concepts and consequently of the model to follow.

Chapters 5 and 6 are concerned with the formulation and estimation of the composite model, having regard for relevant theory building on Chapter 3 in light of Pakistan's specific characteristics.

Chapter 7 is concerned with the historical tracking ability of the complete model and also with tracing the possible growth path of the economy over the period 1978 to 1990. Some forecasting experiments are carried out to see the effect on the growth path of inter-

national and domestic factors.

Chapter 8, the final chapter, summarises the main findings of the study and offers suggestions for improvement and directions in which the model might be extended.

FOOTNOTES TO CHAPTER 1

1. For example; Singer and Ansari (1977), Kindleberger and Herrick (1977) and Thirlwall (1978) represent some recent texts in the area.

2. Adelman (1975), P. 306.

3. This historical approach in terms of stages was first propounded by Rostow (1960). For a critique, see Kuznets (1971).

4. Seers (1967).

5. "Observations taken by themselves - do not have much sense. Observations get a meaning only if they are interpreted by an underlying theory. Therefore, theory, and sometimes very abstract theory, there must be. And no kind of mathematical analysis in economics should be rejected just because it might be difficult and refined mathematics. But at the same time I have insisted that econometrics must have relevance for concrete realities - otherwise it degenerates into something which is not worthy of the name econometrics, but ought rather to be called playo-metrics", Ragnar Frisch (1970), P. 163.

CHAPTER 2

ECONOMIC THEORY, PLANNING, AND DEVELOPING COUNTRIES

2.1 Introduction

Is development economics no more than an application of economic theory in a setting which is different from what the developed world is accustomed to? Theory, after all, is a logical file of our factual knowledge pertaining to a certain phenomenological domain. To each theory there must correspond a specific domain of reality. Therefore,

> Can an economic theory which successfully describes the capitalistic system for instance, be used to analyse successfully another economic system?[1]

Recasting the question,

> Is Western industrial civilization itself some sort of freak mutation, a chance outgrowth from seedling irradiated accidentally in history's laboratory? Or is Western civilization the logical outcome of a universal modernising process - the whole world's future happening now, so to speak?[2]

These questions are significant and have to be faced before one can attempt to begin to model any phenomenon or characteristic of the developing countries, drawing upon the economic theory that has its origins mainly in developed countries.

2.2 Economic Theory and Developing Countries

Following Myint (1967a), one can distinguish criticism

against the applicability of economic theory as proceeding along two main lines. The first attack is on its realism. It is argued that the axiomatic bases of both conventional and Marxist theories represent the most characteristic traits of the capitalist system and thus might not be realistic for another economic system like an agrarian economy or a mixed economy in which part or all of the capitalist institutions are absent.[3]

The second attack is on the relevance of economic theory to under-developed countries. Conventional economic theory, it is argued, is geared to the preoccupations of the advanced countries, in which sustained growth is an accomplished fact, and is concerned with the optimum allocation of resources, the maintenance of full employment without inflation and the prevention of secular stagnation, instead of focussing on the economic implications of land reforms, nationalisation, capital levies and raising the educational level of the adult labour force. Furthermore, in the industrial advanced world the institutions are relatively fixed while in the developing countries the question is precisely what institutions to change and how? It is therefore contended that any analyses based on conventional economic theory is out of focus and largely irrelevant for the central problem of the developing countries, which is to initiate and sustain development.

Looking at the question of realism in applying existing economic theory to the developing countries, one should be clear about what existing economic theory includes. The whole body of Western economic theory contains a large array of theoretical models ranging

from those of the earlier economists such as Adam Smith, Thomas Malthus, David Ricardo, Robert Owen, Saint-Simon, J. S. Mill, Karl Marx, and Leon Walras to Alfred Marshall, T. Veblen and John Maynard Keynes, and finally to the highly complex and abstract models of contemporary economic theory. One of the important reasons for lack of realism arises from the wrong choice of theoretical models being applied to the developing countries. Economic aggregates which have relevance in the context of a developed country are sometimes indiscriminately used in a setting where such magnitudes have a quite different connotation.

New theories about the development process, which were advanced during the fifties, for example, the vicious circle, the take-off, and the big push, suffer from the same malady and have not stood up to the test of realism any better.[4] The vicious circle theory assumes poverty and stagnation caused by severe population pressure on resources. The take-off theory assumes the pre-existence of a fairly high level of development in the political, social and institutional framework. Very few developing countries would be able to satisfy these conditions. The big push theory assumes both, and also an internal market large enough to support a domestic capital good sector. By the time all these specific features have been incorporated into a composite model, there might exist only a handful of countries like India, Pakistan, Indonesia and Malaysia to which this model may apply. The same can be said of the models that conventional economic theory has to offer. One must allow for specific features of the countries being considered.

One of the important reasons for lack of realism arises from trying to be too different from the conventional models of economic analysis. This occurs as a result of selecting unusual cases in the conventional economic models of analysis and then taking it for granted that these exceptions to the normal case must apply to the less developed countries because they are so different from the developed countries in social values, attitudes and in institutional settings. Examples of this approach include the background bending supply curve of labour, the demonstration effect, the revolution of rising expectations, and the belief that peasants in developing countries do not respond to economic incentives. In fact there has been accumulating evidence to show that peasants do respond to price changes by switching from one crop to another or by bringing more land under cultivation.[5]

As to the relevance of existing economic doctrine to the case of developing countries, it is easy to under-estimate the significance of the orthodox static theory of the allocation of resources to the developing countries. No country, and especially no developing country, can afford to put up with inefficient and wasteful use of their meager economic resources. One example is the subsidising of the public and manufacturing sectors through price distortions. By affecting relative prices, agricultural output is discouraged both for consumption and for export. The resulting lack of agricultural employment and the relative wage differential between the agricultural and manufacturing sectors lead to an influx of people from the country-side into the urban areas. Only a small proportion get absorbed due to highly capital-intensive methods adopted in the "modern" import-substituting industries fostered through price distortions. This only aggravates the problem of

urban unemployment, leading to increased requirements for investment in housing and social services. Scarce capital and foreign exchange is used wastefully, both in government prestige projects (steel mills, airlines, grandiose public works projects, armies equipped with modern armaments) and in private industries (lying idle almost half the time) as a result of artificially low interest rates. This is further aggravated by over-valuation of currencies and import controls in favour of capital goods, which encourages the businessman to obtain import licenses to buy the most expensive and capital-intensive types of machinery abroad. This diagnosis has a familiar ring to it since many developing countries are in this predicament, and it therefore seems the conventional theory of resource allocation is far more relevant here than it is given credit for.

All in all, theory is an abstraction and simplification of reality. The objective is to derive meaningful propositions about the system being studied. They should be derived without unduly complicating the analysis. If a theory corresponded fully to reality, it would not be a theory but a fact. Therefore some amount of abstraction and simplification are necessary, however the theory should not be so abstract and simplified as to throw the baby out with the bath water. Economic theory can also be subjected to criticisms about not being realistic and relevant in the case of developed countries where most of the current-day problems seem to be intractable.[6] The criticism however, would be misplaced if it were directed against the whole corpus of economic theory instead of concerning itself with the choice of analytical models that are currently in use.

Similarly, the basic postulates on which standard economic

theory has been built, appear to have general applicability. Most of neo-classical economics is based on the Paretian value judgement, that if a proposed change benefits some people without affecting others adversely, then that change should be instituted. This judgement would have general applicability. In most developing countries, there is a strong desire for real change and an increase to their well-being, whatever that might be taken to mean. This simply restates that more, or the potential for more, is preferred to less.

The criticisms are nevertheless useful in pointing out that economics of development must have more relevance to the problems of the developing countries. This necessitates both modifications and extensions of conventional economic theory. One should be wary of using highly elegant models, formulated in the context of the developed economies, in developing countries since such models might lack some features that are essential for a fruitful analysis of a specific country's problems. One should be aware also of the institutional relationships in the developing countries since they may differ from those in the advanced countries.

Adapting theory to a developing country is therefore challenging and requires considerable ingenuity. Welfare economists and public finance experts have to deal with similarly seemingly

intractable problems such as the assessment of the incidence of different taxes and items of government expenditure and the measurement of benefits and costs of public projects. Conventional theory acquires a great deal of significance in confronting these problems. Therefore, while admitting that developing countries have problems differing in degree and kind from those of the developed countries, there is still no convincing argument so far for doing away with conventional economic theory in confronting them.

2.3 Planning or the Market?

A related argument against conventional economic theory is that it is inextricably bound up with preconceptions and biases in favour of economic policies of laissez faire, free trade, and conservative fiscal and monetary policies. It is argued that these economic policies are not suitable for fostering rapid growth in the developing countries, since it is only possible under large-scale government planning, widespread protection and import controls, and deficit financing of development programs. Thus the central issue is whether to rely on the market mechanism or to resort to detailed planning for the optimum allocation of resources and rapid economic development.

Most arguments against relying on market forces obscure the basic issues. They tend to identify the existing theory of resource allocation with the policy recommendations of laissez faire. Next, they proceed with the argument that the free play of market forces

in the developing countries will not lead to an optimum allocation of resources since the conditions postulated by perfect competition are lacking. Finally, the two-fold conclusion is reached that both existing economic theory and laissez faire policy are inapplicable to the developing countries.

It is necessary to point out that though there is an historical association between the theory of resource allocation and the laissez faire doctrine, there is no logical link between the two. One can work on the basis of an optimum allocation of resources without accepting laissez faire policy. In criticising the working of the market, as Myint (1967b) points out, it is necessary to differentiate clearly between concerns with its defects as the means of attaining the optimum allocation of resources and concerns with the inadequacy of the concept of the optimum itself for the purposes of promoting economic development of the developing countries. Given the prevalence of planning in the developing countries, the concept of the optimum, then, seems to be accepted.[7] (In economic planning it is required of the plan that it be both feasible and consistent, and the task of the planner is to determine whether the adopted plan is an optimum one.)

There is then no theoretical difference between those who aim to achieve the efficient allocation of resources through the market mechanism and those who aim to achieve it through state-wide planning. The theoretical basis is the same, though the policy recommendations differ. The theory of the optimum allocation of

resources is perfectly compatible with state-wide planning. We are constantly reminded that perfect competition or laissez faire policies are neither necessary nor sufficient for the optimum optimorum. If both exist, then it is purely by accident.[8]

The substantive criticism concerns the relative efficacy of the market mechanism in promoting economic development vis-a-vis state planning. The case for planning rests upon the alleged inability of the price mechanism in ensuring growth, efficiency and equity. The basic question is under what circumstances and to what extent should the government intervene in a market system? In the advanced countries, aside from the Soviet Union and other Eastern European countries, reliance was placed on the market system although the government always had at least a minimum role to play in providing law and order, enforcing property rights and supervising free and unhindered commerce. The role of the government has been increasing in the developed countries also, and the whole arena of macroeconomic stability has become the responsibility of the governments in various degrees after the theoretical and practical successes of Keynesian analysis.

> Economic development is almost invariably a process in which planning and direction on the one hand and freedom of enterprise on the other, play their part and are mixed.[9]

In reality then, the choice for the vast majority of the countries is not between complete laissez faire and total state planning of the means of production, but rather a combination of private and public enterprise. What mix has been or will be chosen would depend

on the value judgements of the citizens or the rulers of the developing countries.

Planning has had wide support from economists of all persuasions since World War Two. Rosenstein-Rodan (1943), in one of the earliest articles written about development, submitted arguments for active government involvement and planning. He was followed by Gunnar Myrdal, who argued that to achieve a rapid rate of development, governments in the developing countries had to take the initiative by having central planning. Leaving the economy to natural forces would mean continued stagnation and slow development.[10]

There are several reasons usually advanced for the necessity of planning in various forms. The state, it is argued, is the only institution in the developing countries capable of organising a development effort and the role of planning is to enable the state to achieve its specified objectives through the co-ordination of its administrative decisions. A free market, it is further argued, does not produce as high a rate of growth as is desirable. This is so because people's actions with regard to saving and investment depend a lot on their guesses about the future. The requirements of the future, so the argument goes, have to be looked at not from the individual point of view, but from the point of view of the society as a whole. Given the natural preference of people for present rather than future satisfaction (rate of time preference), resources in a free market will tend to be allocated to the production of goods for immediate consumption rather than for building up of the means of production. Thus, in the absence of state intervention, the needs of society in

the future tend to be under-provided for by the free market.

A second consideration is that market prices tend to be imperfect guides to the social optimum allocation of resources since they do not reflect the true opportunity cost or value to society of the use of factors of production or production of commodities. A perpetual shortage of capital and foreign exchange and a surplus of labour at existing market prices are seen as evidence of structural disequilibrium and a very imperfect market system. The associated disequilibrium in factor proportions cannot be corrected just by improving the allocative efficiency of the market mechanism with given availability of resources, techniques of production and the pattern of demand.

Thirdly, many projects have externalities and would be profitable to society, but may not appear profitable under a pure market system, since individual entrepreneurs cannot account for externalities in their profit calculations. Therefore, the elements of risk will be higher for a series of unco-ordinated individual projects. The level of investment will thus be below the social optimum and it would be preferable to have a co-ordinated investment program undertaken systematically through some central direction.

Fourthly, it is said that the market mechanism operates rather slowly, with marginal adjustments and is not likely to produce the rapid structural changes required in developing countries. For example, there may be instances where the supply of some factors may be completely price ineleastic, and thus there is no alternative to the public provisions of the goods or factors in question.

Finally, arguments against the market are couched in terms of equity. The results produced by relying on the market are undesirable since the income distribution that prevails as a result is both unjust and socially undesirable. Under planning, it is asserted, such a state of affairs would not be allowed to continue or could be avoided.

Proponents for the market point to the dangers associated with planning. It is asserted that unqualified and corrupt administrators will assume responsibility for resource allocation and are likely to perform worse than the market mechanism. This is a strong argument against planning since there are costs involved in planning, as the experience of many developing countries makes clear.[11] Government interference in the economic life of a nation has always been viewed with scepticism and suspicion by many an economist since Adam Smith's time. Market imperfections and price distortions, it is countered, are not by themselves arguments for planning but rather arguments for ensuring that the price mechanism functions better:

> . . . . . .we have suggested that a failure to study systematically how the market forces actually work or fail to work in the different types of underdeveloped framework, has contributed to the failure to develop a satisfactory analysis of the "mixed economy" in the underdeveloped countries. A study of the different patterns of market imperfections in different types of underdeveloped countries is largely an unexplored subject.[12]

In cases of market failures due to a divergence between private and social costs and benefits, it is contended, use could be made of policies to promote competition, subsidies could be extended to private producers in cases where private returns from socially desirable projects fall short of the social returns. However, this presumes knowledge of social returns and costs on the part of the policy maker which may not exist. In the whole area of ex-

ternalities, public goods, joint products, etc., where private costs and benefits diverge from social costs and benefits respectively, there is perhaps a stronger case for planning. There are, no doubt, socially necessary projects in developing countries, where no amount of incentive would lead to direct private investment in roads, bridges, dams, hospitals, schools and the like. Such projects are undertaken by state and local governments, to various degrees, in developed countries also.

We can now summarise the arguments presented so far. Economic theory is concerned with the optimal allocation of scarce resources between competing ends. A perfectly competitive market would, under certain conditions, in equilibrium, correspond to a point of maximum efficiency, solving the economic problem of allocation. The working of the market does not require any administrative set up, or a central decision-making body, but relies rather on an "invisible hand". Most developed countries have tried to work with this model to various degrees. However, there is no reason to presume that a perfectly competitive market is the only means by which scarce resources can be optimally employed, and what is optimal may not be the best with reference to the income distribution it entails. Detailed central planning, could in principle, employ resources as efficiently and, it has been argued, much more effectively in the case of developing countries which have rigidities inhibiting development, built into the system. Relying on market forces to overcome these rigidities by marginal adjustments would take an unacceptably long time relative to direct intervention. The market is a relatively attractive and cheap

instrument but it can be ruthless and can lead to severe distortions when the necessary conditions are absent.[13] Planning is an alternative means and, some would say, the only means by which rapid economic development in the developing countries can be brought about. Planning has a greater chance of bringing about undesired results, since it requires highly skilled personnel for its successful implementation, and such personnel are by no means abundant in developing countries.

So far planning has been winning out, in that developing countries of Asia, Africa and Latin America have tried to eliminate the structural bottlenecks which inhibit growth and change through national economic plans. Economic planning, in the majority of cases, has taken place within the context of a mixed economy.[14] The presumption has been that planning is a pragmatic solution to the problems encountered in economic development. However, over the past twenty years or so, planning has not had a track record which one can be proud of. Whether it will serve as a vehicle to solve some of the major problems of development, only time will tell. However, the evidence is accumulating rapidly.

Healey (1972), has surveyed various studies done on countries which followed policies of detailed government planning and import substitution with a minimum involvement in the international economy.[15] Evidence on the policies of import substitution leads to the conclusion that it tends to shift the distribution of income in favour of the urban sector, whose expenditure has the highest component of imports. On the question of unemployment, after citing the results of various studies he concludes that the signs of unemployment and underemployment

became more obvious in the 1960's and it is in the growth of unemployment that past failures of development strategy are most clearly in evidence. Coupled with the growth of unemployment, income distribution is becoming more unequal with the passage of time. Faced with empirical evidence amassed by these studies Healey indicts planning, thus:

> Planning. . . . .with its conscious manipulation of industries, sectors, exchange rates et al. is seen increasingly to have led to inconsistent policies and to wastage of the all-too-scarce resources of the developing countries.

Finally, he concludes, "It is time that we learned to strengthen and to make use of market forces instead of tilting ineffectively and disastrously against them."[15]

FOOTNOTES TO CHAPTER 2

1. Georgescu-Roegen (1960), p. 2.

2. Beling and Totten (1970), p. iii.

3. By conventional economic theory it is meant the neoclassical theory which describes the economic processes of a society in which the individual behaves strictly hedonistically, where the entrepreneur seeks to maximise profits and where any commodity can be exchanged on the market at uniform price. Marxist theory refers to an economy characterised by class monopoly of the means of production, profit making entrepreneurs, markets with uniform prices for all commodities and complete independence of economic from demographic factors.

4. Rosenstein-Rodan (1943, 1961).

5. For some empirical evidence see Behrman (1968, 1973) and Falcon and Gotsch (1968).

6. For example inflation and unemployment and balance of payment problems currently plaguing the more advanced countries of USA, Canada, U.K., etc.

7. Four types of planning can be distinguished. First, planning may refer to the making of a program for public expenditure. Secondly, it may refer to the setting of production targets for private and/or public enterprise, in terms of inputs (manpower, capital or other scarce resources), or it may refer to use in terms of output. Thirdly, it may be comprehensive, purporting to set targets for the economy as a whole, and allocating all scarce resources among all the sectors of the economy. Fourthly, planning may describe the means which the government uses to force upon private enterprise the targets which have been previously determined.

8. For instance: see Winch (1973).

9. Johnson (1962), p. 152.

10. Myrdal (1956).

11. In Pakistan, for example, graft and other forms of malpractice are prevalent and are a real cost of reliance on administrative controls.

12. Myint (1967b), p. 43.

13. The Theory of the Second Best (see Winch, 1973). If all conditions of perfect competition do not hold, trying to fulfill them piecemeal may be worse.

14. Plans have been formulated for at least fifty developing countries. Some people claim that plans are not made to co-ordinate growth but to obtain foreign aid since agencies such as the World Bank and the Agency for International Development (AID) are imposing planning on the developing countries by making aid conditional upon it. See Vernon (1966). Sometimes the construction of plans is an exercise for foreigners, by foreigners: for example, in the Sudan (Government of Sudan, 1963), the plan was prepared by foreign technicians and once it was prepared, the planning organisation was disbanded and planning ceased. The World Bank, at times, prepares plans suggesting projects for the Bank to finance, (e.g., see IBRD, The Economic Development of: Guatemala 1951, Iraq 1952, Malaya 1955, Libya 1960, Kuwait 1965, Spain 1963, etc.)

15. Some of these studies are: Little, Scitovsky and Scott (1970), Turnham and Jaeger (1970), and International Labour Organisation (1970).

16. Healey (1972), p. 794.

CHAPTER 3

A SURVEY OF DEVELOPMENT MODELS

3.1 Introduction

Over the last thirty odd years, models designed for analysing the issues facing developing countries have increased greatly, both in number and complexity. Development effort is concerned with attempting to move the entire economy into self sustaining balanced growth, and economy-wide models are widely regarded as helpful in this regard, inasmuch as they assist in understanding how the different parts of a developing economy are linked and how they respond to external stimuli. It is typically the case that a developing country will co-ordinate its efforts through the systematic formulation of a development plan, usually covering five to ten years. A basic problem is the allocation of investment among different sectors over the plan period. Behind every development plan, implicitly or explicitly, there lies a model of growth on which projections over the planning period are based. Some models of this kind are considered in the present chapter.[1]

3.2 Aggregate Growth Models

The simplest forecasts are based on the Harrod-Domar model.

In this model, a fixed capital-output ratio is assumed and the operations of the entire economy are conceived of in terms of aggregate savings, investment and income relationships. For illustration consider the following:

(3.1) $K_t = kY_t \quad \text{or} \quad k = K_t/Y_t$

where k is a constant capital-output ratio, K is capital stock, Y is gross national product (or some other appropriate output measure), and t stands for time.

(3.2) $S_t = sY_t$

where s is a constant propensity to save and S is total savings. The equilibrium condition of demand for output is

(3.3) $S_t = I_t$

where I is gross investment. Rewriting (3.3) by substituting for I_t,

(3.4) $sY_t = K_{t+1} - K_t + aK_t$

where a is the depreciation rate. The rate of growth of output (g) is

(3.5) $g = (Y_{t+1} - Y_t)/Y_t$

Through the capital stock's proportional relationship with output, g will also be the growth rate of the capital stock. Using equations (3.1) to (3.5), we can obtain

(3.6) $g = sk - a$

This is the familiar growth condition. If the growth rate of the

labour force is n and the rate of growth of productivity of the labour force is m, then for equilibrium growth such that neither labour nor capital is unemployed, the growth equation is modified to,

$$g = n + m = sk - a \tag{3.7}$$

Equation (3.7) is based on a set of restrictive assumptions and may not hold in practice. Savings may not be stable in a developing country; the equation may have to be modified by disaggregating savings according to different saving propensities out of wage and profit incomes.

The assumption of a fixed capital-output ratio can be relaxed, based on a well-behaved linear homogeneous production function which gives rise to the neo-classical growth model. Also the model can be extended by incorporating differing saving propensities, different sectors, and so on. In the early sixties some developing countries adopted two-gap models, within which their plans were constructed.[2] These two-gap models can be viewed as workable generalizations of the Harrod-Domar model. While the original Harrod-Domar model treats capital as the only relevant scarce factor of production, the elaboration of the two-gap model introduces foreign exchange as another scarce factor, the need for which is crucial in developing countries. The two-gap model takes into account rigidities in foreign trade, absorptive capacity limits and limits on the rate of increase of domestic savings, investment and exports. Since capital inflows (F), defined as the difference between exports (X) and imports (M), add to investable resources, the saving-investment relation can be modified

to

(3.8) $$I = X - M + sY$$

Equation (3.8) is termed a saving constraint or gap. The trade constraint or gap can be written as

(3.9) $$b_1 I + b_2 Y - x = F$$

where b_1 and b_2 are marginal import shares in investment and GNP. Scarcity of skilled labour can also be specified as a constraint. In practice, output, exports and capital inflows are given current values exogenously, and then either equation (3.8) or (3.9) will be binding in a specific country. Investment (and therefore the future growth rate of output) will be restricted by the particular binding constraint. This type of analysis has been used also as a crude means of assigning foreign aid, since capital inflows would have a relatively greater impact on the growth of income when the trade gap is binding.[3]

Two-gap models have had varied applications, ranging from testing the feasibility and consistency of plans (Sukkar 1971) to being further elaborated to include optimising procedures, shadow prices, disaggregation of productive sectors and explicit treatment of structural change over time (Chenery and MacEwan 1966, Bruno 1967). The Harrod-Domar model and its variants are highly aggregative. They serve to make projections of GNP, total employment, balance of payments, etc. For many purposes of planning and analysis, more disaggregated models are desirable. There are a variety of economy-wide models which are more disaggregative. They postulate quantifiable relationships between the various sectors of the economy. Models of

this type can generally be classed as:

(i) Input output models

(ii) Simultaneous equation models of a behavioral nature.

(3.3) Input-Output Models

These models are based on the input-output table originated by Professor Leontief who developed a general theory of production based on the notion of economic interdependence. The input-output table shows how the output of each industry is distributed as inputs into other industries (sectors) of the economy.

Input-output models are not only used for explaining the underlying multisectoral structure of the economy but also to project sectoral output (sometimes employment) in a way consistent with the structure of production (given by the linear sectoral production functions in the input-output matrix). The input-output model has had an abundance of applications in economic planning, including application to problems of economic development.[4] The models have been used in testing the feasibility, at the disaggregated level, of attaining target growth rates of GNP, and of revealing the sectoral supply-demand implications of macroeconomic plans.

Input-output models are useful in providing sectoral detail and serve as a basis for consistency checks among sectoral targets in terms of output and investment. At the international level they provide a consistency check between the overall import requirements and export possibilities arising out of, or associated with, various sectoral outputs. They aid in the allocation of investment to achieve

the projected sectoral outputs and provide a test of the sufficiency of available investable resources.

The requirements for skilled labour (if a set of skill coefficients is available) and for imports can be estimated, and the possibilities of import substitution can be analysed.[5] Regional input-output models aid in the regional allocation of investment.[6] Since planning was espoused as the most pragmatic way of allocating resources in developing countries, and since just about every country has tried to get into the planning game, input-output models complemented planning. Both static models (no explicit theory of investment) and dynamic models (incorporating an accelerator type of investment theory in which current demands for investment goods depend on future expected growth of output) have been widely used in the formulation and testing of development plans.

Apart from their use in country planning, these models can and have been used to deduce more general propositions through changing their structural parameters and determining a set of solutions based on either simulation or optimisation procedures. Static and dynamic models have thus been incorporated in general optimising models. Linear programming models have provided the necessary extension of input-output models to optimisation procedures.

Given the objective, which could be maximisation of per-capita consumption, employment or any other quantifiable economic objective, the linear programming models provide optimal solutions for final demand and resource allocation.

Applications of input-output models and optimising techniques have been widespread in determining optimal patterns of growth and aid, key sectors on which the development effort should be concentrated, optimal patterns of trade and development, alternative patterns of import substitution, and so on. Problems of intersectoral and inter-regional allocations have also been explored and recent interest has been in areas of agricultural and educational planning.[7] The question of income distribution along with growth has also come to occupy increasing attention.[8]

The input-output type of model which is based on a restrictive set of assumptions and excludes most forms of substitution, tends to exaggerate specific rigidities in the economy.[9] All sectoral output and factor use forecasts are conditional on the expected growth patterns of the different components of final demand which are estimated exogenously.[10] For the purposes for which these models are usually constructed, exogenously determining final demand appears satisfactory since a major use of the models is to check on just how realistic these projections for final demand are in terms of their probable requirements for factors of production.

These models, however, have several limitations. They are always expressed in real terms and are characterised by supply bottlenecks due to capital and/or foreign exchange constraints. The interactions of inflation, finance and flow of funds are virtually ignored. The specifications at best include a limited set of policy instruments and these models have very little to say on the question of stabilization. Short-run flexibility is extremely limited because

elasticities of substitution are zero and short-run price responses are negligible. Relative prices do not figure in these formulations. J.S. Behrman has rightly pointed out that in input-output and programming models,

> . . .the most interesting question seems to be 'what could happen if socially optimal readjustment of the economy occurred in response to policy changes', rather than 'what would happen if independent economic units which make up the economy followed their traditional patterns of behaviour in response to such changes'.[11]

The input-output type models are used in sketch out future growth paths for the economy which seem feasible in terms of estimates of future saving levels and the availability of foreign exchange. However, policies needed to mobilize these resources such as shifts in interest rates, forced development of financial markets, trade subsidies and so on, are not determined at all within the context of the models, taken by themselves.

The architects of input-output models have concentrated on the balance equations to the exclusion of a genuine concern for the behavioural equations for consumption, investment, construction, employment, imports, exports, inventories, wages, prices, and interest rates. Granted, most developing countries have supply constraints in one form or another, but a model must give some attention to these other equations too, for they also determine the character of future growth.

3.4 Simultaneous-Equation Models of a Behavioural Nature

There is a class of macroeconomic aggregate models which deals with behavioural relationships. These models explain:

(1) the components of the GNP: consumption, capital formation, exports, imports and government expenditure;

(2) the component of national income: wages, profits, rent and interest income;

(3) the reconciliation of these aggregates;

(4) the production technology;

(5) wage rates, price level and interest rates.

There may be identities and definitions which link the variables of the models and impose consistency on them, and important institutional characteristics may be displayed, such as those of the tax-transfer systems, the banking and monetary systems, the form of organisation of business enterprises and various schemes of the government such as wage and price controls, etc.

These models are usually specified at high levels of aggregation and have been extensively used in forecasting for policy and stabilization purposes in such industrial developed countries as the U.S.A., Canada, Japan, U.K., Netherlands, Germany, and others. Such models are customarily characterised as being Keynesian, in that a great deal of attention is focused on an analysis of aggregate final demand and its components.

These behavioural models are estimated from time series or cross-sectional data and incorporate both linear and non-linear relationships among variables. These models, with due allowance for changing points of emphasis to reflect institutional differences among different industrial countries, appear to have worked well in

explaining short-run behaviour. Such models have not been used in developing countries as extensively as the input-output models. The basic reasons are that there is very little theoretical guidance on how to construct econometric models for developing countries and that many developing countries do not have an adequate data base, so that econometric models suffer from lack of degrees of freedom in econometric estimation.

What kind of models should be used for developing countries? The question posed by Klein (1965) still remains unanswered. although Klein, his students, colleagues and others have tried to suggest some answers. As Klein noted, the earliest macroeconometric models for the developing countries, (e.g. Narasimham 1956, Suits 1964) were patterned after the Keynesian models prevalent in the U.S.A. and other developed countries. Such models were not adequate in explaining the structure of the developing countries for which they were built, leading to the question of whether model building for developing countries was a worthwhile effort at all.[12]

Slowly the kinds of models proposed for the developing countries have begun to change to reflect conditions prevalent there. Numerous research studies have been prepared for a wide variety of countries. Some models have given special emphasis to the role of relative prices and to utility and profit maximisation (Zarembka 1967, 1972; Marwah 1963, 1970; Kabir 1981). Greater use has been made of expectational variables based on distributed lag formulations (Evans 1970). The major role that foreign trade plays in many developing countries has been incorporated in more recent models.[13] Some models have tried to come to grips with the financial structure and

institutions in the developing countries (Khetan 1973; Bhuiyan 1971). The importance of direct flows and retained earnings in the investment process, due to fragmented and poorly functioning capital markets, has also been explored.

While the earlier models were demand determined, the later models have emphasised supply considerations (Marwah 1970; Beltran Del Rio and Klein 1973; Dar 1981). Some models have been disaggregated, thus permitting the specification of different production and consumption functions for different sectors (Islam 1965; Agarwala 1970; Zarembka 1972; Kelley, Williamson and Cheetham 1972). Many developing countries are predominantly rural and the agricultural sector plays a strategic role in food production and the supply of basic materials for export. Some models have attempted to develop demand and supply relationships for various agricultural commodities.[14] By giving more attention to the special conditions and institutions of individual countries for which they are designed, macroeconometric models should prove to be useful frameworks for policy formulation and analysis. The continuing effort, both at the national and international level, in collecting and processing data, and the resources devoted to modelling work at the United Nations and other international agencies, should help bring this about.

Macroeconometric models of a behavioral nature avoid many of the problems associated with input-output modelling mentioned above, in that the role of monetary and fiscal policies can be explicitly incorporated and policies can be co-ordinated to move the economy towards the long-run objectives. One does not have to specify unambigiously social welfare functions (as linear programming models do)

nor attempt to impose a welfare function upon the decision maker; rather, they offer the possibility of trade-offs among the several objectives.[15] However, the production side, present in input-output models, should be given more detail in macroeconometric models.

Typically, there have been, on the one hand, long-term econometric models which are essentially growth models based on productivity indexes and production functions and changes therein over time, and on the other hand, short-term econometric models emphasising the determination of the level and composition of aggregate demand. Attempts to integrate both types of models into a single macroeconometric model have been rare. (A notable exception is the 1965 study of the Economic Planning Agency of the Government of Japan.) In the case of developing countries, the relative importance of demographic factors, structural and technological changes in the case of long-term growth and the persistence of dualistic differences between sectors, would suggest the importance of such an integration. This way it would be possible to indicate the implications of alternative policy packages on various development targets.

3.5 Linking Up Of Input-Output And Macroeconometric Models

Input-output models and macroeconometric models provide two ways an economy can be modelled.[16] The emphasis is on different parts of the economy. In the supply-constrained developing economies, use has been more frequent of input-output models and their extensions in the context of development planning. These have been medium and long-term planning models with little scope for fiscal, monetary, income, and commercial policies. Macroeconometric models with detailed

analysis of final demand have been used for forecasting and short-term stabilization purposes for developed countries.[17] The construction and use of macroeconometric models for policy planning in the developing countries has not been prevalent since many features have eluded modellers and the whole supply side has not been adequately elaborated to bring out the bottlenecks and constraints characterized these countries.

A promising innovation seems to be the development of a more general system encompassing both the traditional econometric model and the input-output model. This joint model would determine final demand from equations of economic behaviour and also allocate it over sectoral production activities by means of the input-output table.

This study does precisely that. An econometric model of the Pakistan economy is constructed with an input-output block, characterising the production side, embedded in it. It is felt that the two models linked together can form a complete model of the economic process and provide a consistent framework for an analysis of different policies. Before constructing the model the Pakistan economy is considered in the next chapter in order to provide an appropriate background for the subsequent development of the model.

FOOTNOTES TO CHAPTER 3

1. For a good survey of development models see Taylor (1975).

2. Pakistan's various five year plans have been based on two-gap theories. The planners sought to use the foreign resources available along with other factors, in such a way that dependence on foreign assistance would be eventually eliminated.

3. It should be remembered that, ex post, there is only one gap which is simultaneously the savings gap, the trade gap, and the foreign inflow of capital. In reality no gap is actually dominant. See Tinbergen (1970).

4. For some applications see studies in Adelman and Thorbecke (1966) and Chenery (1971).

5. For example, Blitzer (1971), Weisskopf (1971).

6. MacEwan (1971).

7. Adelman (1966).

8. Chenery and Ahluwalia (1974).

9. Another assumption is that each sector produces a single good, implying that price and quantity indices have to be constructed at the sectoral level. The treatment of competitive imports is arbitrary. On this see Taylor (1975).

10. Occasionally, they are made endogenous in a "closed" input-output system by additional equations tying them to some measure of income, commonly the sum of sector value-added or the sum of wage payments from the value-added breakdown of the input-output system.

11. Behrman (1975), p. 461.

12. Vernon (1966).

13. Dutta (1964).

14. See UNCTAD (1973), pp. 109-176.

15. Linear programming models also have problems when trying to specify terminal conditions. See Manne (1974) and Taylor (1975).

16. There are other types of economy-wide models which have not been tried in the developing countries for instance truly Walrasian models, Johansen Models, etc. See Taylor (1975).

17. However, they do include aspects of supply such as production technology, factor demands, etc. See Klein (1978).

CHAPTER 4

A DESCRIPTIVE ANALYSIS OF THE PAKISTAN ECONOMY

4.1 Introduction

This chapter looks at the economy of Pakistan and its development since 1956. A good understanding of the economy under study is an essential pre-requisite for a model that attempts to represent it. A close look at the economy, especially at its institutional features, will serve as a basis for the development of the model in the subsequent chapters. Almost all data for Pakistan are on a fiscal year basis, i.e. from July 1 of one year to June 30 of the following year. Unless explicity stated, any year mentioned in this study, will refer to the year ending June 30. For convenience in exposition, all tables appear at the end of the chapter.

Pakistan was formed out of the partition of British India and came into existence on August 14, 1947. Since independence in 1947, the people of contemporary Pakistan have undergone several traumatic socio-political experiences. The partitioning of British India resulted in communal riots of unprecedented violence and scope, and mass population shifts. Conservative estimates of 250,000 dead and at least 12 million Hindu, Muslim and Sikh refugees provide only a hint of the human tragedies involved. Pakistan has been at war with India twice over the disputed state of Jammu and Kashmir. A civil war in December 1971, culminated in the secession of East Pakistan, now Bangladesh.

4.2 Population and Labour Force

Pakistan has an area of 307,374 square miles with a population estimated in 1979 to be approximately 77.86 million people. The population density, 253 persons per square mile, is among the lowest in Asia. However, the majority of the people are confined to the vicinity of the Indus Valley and there are vast differences in population density among the four provinces--for example, there are approximately 500 persons per square mile in the Punjab (the most densely populated province) and 20 persons per square mile in Baluchistan.

Since 1901, the population has increased fourfold and continues to grow at 3% annually, one of the highest growth rates in the world. If this rate continues, the population is expected to double in the next twenty-four years which will put increased pressure on the land for food and social services. Nearly half the population is under fifteen years of age, a fact which can be expected to have an impact on demand for increased employment opportunities in the future.

As of June, 1979, approximately 72% of the population in Pakistan lived in rural areas.[1] The proportion had declined from 82.4% in 1951. The rural-urban migration over the years is explained by development of the economy and associated structural changes taking place in the country. The under-utilisation of manpower and pronounced seasonal unemployment in rural areas contrasts with the concentration of industries, better health and education facilities, and better job opportunities in urban areas, and have led to a continual flow of rural population to the urban areas.

The labour force of Pakistan is estimated to have been 23 million in 1978 and is assumed to be growing at the same rate as the

population, 2.8-3% annually. The participation rate of 29.5% of population in the labour force is one of the lowest in the world. This is explained by the extremely low participation rate for women (about 2% of the total female population) and the relatively large young population, resulting in a high dependency ratio. Approximately 24% of the labour force is located in the urban areas and 76% in the rural areas.

In rural areas, the majority of the employed labour force (about 72%) is engaged in agriculture and related jobs, followed by production, transport and related occupations. In urban areas, on the other hand, approximately 40% of the employed labour force in urban areas are engaged in production, transport and related occupations, and 21% are sales workers. Table 4.1 gives the industrial structure of the labour force for selected years.

The overall agrarian character of the Pakistan economy is reflected in the fact that at present approximately 54% of the labour force is employed in the agricultural sector. This proportion has gone down from 60% in 1961. The share of the manufacturing sector has remained virtually constant at about 13% of the labour force, whereas the share of the services sector (trade, restaurants and hotels, financing, insurance, real estate, business services, community social and personal services) has gone up from 16% in 1961 to 26% in 1978. Approximately 76% of the total labour force consists of self-employed and unpaid family workers. (In agriculture, self-employed and family workers account for 90% of the labour force). In manufacturing, mining, construction, transport, storage and communication, there is a roughly even distribution between employers and workers on

own account and salaried employees, which is to be expected since these sectors are relatively more organised. Wage earners and salaried personnel are predominant in electricity, gas, water, and the services sectors.

The general level of skills of the labour force is low. Approximately 84% of the labour force consists of unskilled and semi-skilled workers. Professional, technical and related workers and administrative and managerial workers represent barely 3%. Even though the economy of Pakistan can be characterised as a labour surplus eeconomy, the overall skill component of the labour force is low and there is a general shortage of skilled and professional personnel. Therefore, the productivity of labour remains low.

There are two main dimensions to the unemployment situation in Pakistan: open unemployment in urban areas, particularly among the educated; and chronic under-employment in agriculture. Another aspect of the situation is involuntary idleness in the form of people who do not even look for work believing that the search is useless, which in part explains the relatively low rate of participation in the labour force.

No major research work has been done so far at either the sectoral or the aggregate level, concerning the employment aspects of growth in income and the implications of increased participation rates for the economy. The paucity of research in the general area of employment is primarily due to lack of comprehensive data on employment and wages at the sectoral level.

Since the early seventies, a new factor has emerged--that of the emigration of large numbers of people to the Middle-East. A breakdown by skill of the emigrants is unavailable but it would be

plausible to expect that in the early stage unemployed and unskilled workers emigrated to find employment primarily as construction workers and that over the years the demand has increased for skilled workers to be employed in newly installed factories and in the services sectors there. According to recent statistics from 1971 to 1978, approximately 370 thousand workers had emigrated to the Middle-East, representing approximately 1.7% of the total labour force of Pakistan in 1978.[2] The opening up of the Middle-East market for skilled workers has further aggravated the problem of shortage of certain skills in Pakistan.

Given that the labour force is increasing at roughly 3% annually, a growth rate of output of 3% would be required to absorb the growing labour force, assuming constant factor intensities in production. However, as the economy grows, the general tendency would be to employ relatively capital-intensive production techniques (substitution of tractors for manual labourers in agriculture, for example) and output would have to increase more than 3% to fully absorb the growing labour force, not to mention the currently unemployed and under-employed labour force.

From an overall perspective, full employment of the labour force in the years ahead in Pakistan will depend crucially upon the growth rate of output at the sectoral and aggregative levels, and on the formulation and implementation of strategies to correct manpower imbalances and the initiation of skill development programs to ease the shortage of skilled workers. The current Fifth Five-Year Plan addresses itself to some of the problems, as noted above.[3]

4.3 National Income and Expenditures

The nominal gross domestic product (GDP) of Pakistan, at factor cost in 1978, was estimated at Rs. 156.5 billion, or Rs. 45.8 billion at 1963 prices. In U. S. dollars it was $15.8 billion in nominal prices or $4.6 billion in 1963 prices. With a population estimated at 75.6 million, the per-capita GDP amounted to Rs. 2070 in current prices or Rs. 605 in 1963 prices ($209 in current prices and $61 in 1963 prices). Pakistan thus ranks with countries like Indonesia, India, Kenya and Srilanka as amongst the lowest group of developing countries in the world.

Table 4.2 shows the share of the various economic sectors in GDP for selected years. The agricultural sector is the largest sector in the economy with 31% of 1978 GDP coming from there. Three crops alone--wheat, rice and cotton--account for 11% of GDP and the economy is highly dependent on them. Most food requirements and raw materials for the country's major manufacturing industry, cotton textiles, come from this sector. The second largest sector is the mining and manufacturing sector, accounting for 16.3% of GDP. The major contribution comes from the manufacturing sector as value added in mining is negligible. Wholesale and retail trade is the third largest sector, contributing 13.7% to GDP in 1978, followed by public administration and defence (10.7%), personal and community services and banking and insurance (10.3%), and transport, storage and communication (6.9%).

The economy underwent rapid structural change during the period 1956-1978. The share of agricultural sector in GDP went down from 46% in 1956 to 31% in 1978, and the share of other sectors in-

creased (Table 4.2). The construction and electricity, gas and water sectors' shares increased more than two-fold. The share of mining and manufacturing increased from 12.3% to 16.3%, the major increase being in the manufacturing sector. Shares of transport, storage and communication, the government sector, and services also increased, but not as significantly as the other sectors. The share of ownership of dwellings decreased from 5.1% in 1956 to 3.4% in 1978. Structural changes in the economy have, of course, been associated with differences in the relative growth rates of the various sectors (See Table 4.3).

Output of cotton, rice and wheat more than doubled during the period, growing at an average annual rate of 7%. However, year-to-year growth showed considerable fluctuations. Output of cotton, rice and wheat fell in the years 1960, 1961, 1966, 1971 and 1974, due to mainly bad harvests brought about by drought and/or floods. During the period 1966 to 1970, the major crops recorded impressive growth rates as a result of the green revolution. An upsurge in the installation of private tubewells, increased use of chemical fertilizers and improved seeds increased yields from these crops substantially. The livestock, fishing, forestry and other minor crops sector had an annual growth rate of 2.7% over the period and consequently its share in GDP went down markedly from 33% in 1956 to about 20% in 1978.

The mining and manufacturing sector grew at an annual rate of 6.5% during the period. Manufacturing, which accounted for 95% of the total sector's value added, set the pace of growth in this sector. The high rate of growth in manufacturing is accounted for by the exceptionally low level of manufacturing activity at the time of

Pakistan's independence and the subsequent government encouragement through its commercial and other economic policies. During the sixties (see Table 4.3) the yearly growth rates in mining and manufacturing sector were as high as 13% and averaged 9.8%.

In the seventies, growth in this sector was not as impressive, and the rate actually fell in 1972 due to the loss of a major market for Pakistan's manufactures (Bangladesh). The sector rebounded in 1973, recording a growth rate of 10%, as substitute foreign markets were found for Pakistan's manufactures and the effect of the 1971 war on the economy wore off. The manufacturing growth rate was 7.7% in 1975. In the following three years, until 1977, there was hardly any growth in the sector as the government of Mr. Bhutto took over control of key manufacturing industries. Nationalisation, or the threat of nationalisation, curtailed activity. The minimal rate of growth recorded was presumably due to the growth in mining activity. After the removal of Mr. Bhutto's government in 1977, the subsequent guarantees by the new government of General Zia-ul-Haque seemed to have helped in the recovery of the manufacturing sector and in 1978, the growth rate rose to 9%.

The annual growth rate in the construction sector has been generally high but has shown considerable fluctuations, as seen in Table 4.3. The high growth rates in construction are to be expected in light of the various large-scale projects, such as the building of dams, irrigation networks, roads and other infra-structural facilities, undertaken by the government during the period. The construction sector's share in GDP therefore increased from 2.2% in 1956 to 5.2% in 1978.

The electricity, gas and water sector underwent rapid transformation over the period and value added from this sector was over twenty-eight times what it had been in 1956. The increased availability of hydro-electricity from all the dams built during the period, significant findings of natural gas and its increasing utilisation in meeting the energy needs of the economy, and increased sewage and sanitary facilities have been determinants in the growth of this sector.

In 1956, except for the major cities, electricity was generally not available to the majority of the populace. The situation has changed drastically although a significant part of the population still does not have electric power available to it. The share of electricity, gas and water in GDP was 2.8% in 1978, in contrast to only 0.3% in 1956. The transport, storage and communication sector grew at an annual average rate of 11.5% over the period, which is again explained by the government's efforts in this sector.

Table 4.4 gives the structure of expenditures in the economy over the period 1956 to 1978. Table 4.5 gives the annual growth rates of the various expenditure aggregates in the national accounts for the same years. Private consumption expenditures at market prices in 1978, accounted for 81% of GNP (at 1963 prices). The ratio of private consumption expenditures to GNP was generally around 73% to 81% during the period. During the period of the Second Five-Year Plan (1960-1965), the ratio fell to 73% as the country responded to the appeals of the government to save for rapid growth in the economy. However, the ratio increased again as more domestic consumer goods became available subsequently.

Given that the population in the late fifties and early sixties was growing at a rate of 3% annually, real per-capita consumption expenditures hardly grew at all from 1956 to 1962. Between 1964 and 1968, per-capita consumption expenditures increased at an annual rate of 6% due to increased income accruing from the rapidly emerging manufacturing sector and the general increase in the level of economic activity. After hardly any growth between 1968 and 1972, as the country was engulfed in political strife, private consumption expenditures again grew rapidly as transfer payments from the government and remittances from abroad increased. In 1978 the ratio of private consumption to GNP was the highest during the entire period.

Public consumption expenditures constituted approximately 11% of GNP throughout the period 1956 to 1978, as seen in Table 4.4. Defence expenditures have constituted approximately 40-50% of the total. The general trend of public expenditures was upwards until 1972, as evident from Table 4.5. This was partly due to inability of the government to cut expenditures on defence, especially with wars in 1966 and 1972. Also the need to provide social services to the rapidly growing population generally supported the upward trend.

Summing the two consumption categories, it will be noticed that aggregate consumption expenditures have generally been around 83% to 91% of GNP. The highest savings rate (17% of GNP) that the economy ever achieved throughout the entire period was in 1964 during the final years of the Second Five-Year Plan. As mentioned above, this was the time when the government made concerted efforts to move the economy onto a higher growth path. As a result, over the same period, GNP grew at an annual rate of 6.2%. Since 1970 national

savings have been roughly 10% of GNP, and in 1978 they were 8.3%.

Pakistan's predicament, shared by other low-income countries, is that income per-capita barely suffices to fulfill the basic needs of the populace and increases in income go into satisfying them, leaving insufficient saving for increased capital formation and the desired higher growth rates.

Gross real domestic capital formation, as will be noticed in Table 4.4, had a higher ratio to GNP than the savings ratio over the entire period 1956 to 1978. This higher ratio was made possible by the inflow of external resources through the trade gap. The composition of gross investment has changed in favour of public investment. In 1978 public investment was twice the amount of private investment, whereas in 1956 it had been 86% of the latter.

Exports of goods and services, in 1963 prices, grew at an annual rate of 3.6% from 1956 to 1978, whereas imports of goods and services grew at the rate of 6.2% annually. Thus the trade gap increased continually. The fact that foreign transfers of resources have been financing a substantial part of gross capital formation, thereby enabling the country to grow at a higher rate than its own resources would permit, implies a decisive role for the trade sector in determining the economy's future course. The trade sector will be examined later in this chapter.

The annual growth rate of real GNP was 5.4% between 1966 and 1978. Given that the population was growing at a rate of 3% annually, the increase in real pre-capita GNP was 2.4%. At this rate it would take roughly 29 years for the real per-capita GNP to double. A doubling of per-capita GNP by the year 2007, will not make the gap

between it and a developed country any closer. For example, real per-capita GNP in Canada was growing at roughly the same rate as in Pakistan (2.4%).[4] Pakistan would thus have to achieve a higher growth rate, not to catch up to the more developed countries, for that would take a miracle, but to assure its citizens of meeting their basic needs. Also, the distribution of income in Pakistan is highly skewed with the majority of the populace having incomes far less than the national average.[5]

4.4 Public Finance

Government revenues and expenditures are collected and disbursed at the central, provincial, and local levels. The greater part of the taxing power is concentrated in the central government which also has the greatest borrowing power. It is legally required to share part of its proceeds with the provinces and, in addition, it allocates sizable grants and loans to them for development purposes. Receipts and outlays of the local units are known to be small, though there is not enough data available to determine their exact magnitude.

Annual budgets of the central and provincial governments are composed of a current account and a capital account.[6] The current account covers recurrent expenditures for defence, civil administration, social services, debt services, other recurrent items and some development outlays. It is financed from current revenues derived from customs, excise taxes, sales taxes, various department net receipts, net receipts of government commercial undertakings, and interest receipts on loans.

The federal government collects most of the tax revenues except for agricultural taxes and some provincial excise taxes. A

certain part of the federal tax proceeds are distributed amongst the provinces according to formulas reviewed every two years or so.

The capital accounts of the central and provincial governments are designed for the purposes of creating material assets, required to add to the economic potential of the country. They are also directed towards the reduction of recurring liabilities. Development expenditures in the capital accounts are co-ordinated with the Planning Commission's annual development and five-year plans.

Capital expenditures are met generally out of surpluses from the current accounts, long-term and short-term domestic debt, external assistance in the form of long-term loans and grants (central government), and loans and grants from the central government (provincial governments). The provinces have been increasingly assigned the responsibilities for development and consequently the federal government has increased grants to them. The central government has been the main domestic borrower from the public and the only level of government entitled to borrow from abroad. It then gives away or loans a portion of these proceeds to the provinces.

The ratio of total tax revenues to GDP is fairly low in Pakistan compared not only with developed countries such as the U.S.A. and Canada but also when compared with some of the less developed countries like India. In 1978, the ratio of total tax revenues to GDP was 14.3% (Table 4.6). It had increased from 9.2% in 1956 due to changes in tax rates, and taxation on commodities not covered before.

The major share of tax revenue is generated through indirect

taxes (in 1978 approximately 87% of tax revenues were from them). Central and provincial excise taxes are the most important sources of indirect taxes. Customs taxes are the next important source. The general scheme of taxation followed in respect of imports is that the luxury or "non-essential" goods are subject to higher tariff rates, and the "essential" articles, and imports of a developmental nature, to lower rates. The import tariff has progressively been given an industrial bias by keeping the duties on raw materials and other industrial requirements lower than semi-finished and manufactured items. Sales tax are not as important as the other kinds of indirect taxes mentioned above. They contributed 13% to total tax revenues in 1978 (Table 4.6).

The levy of income tax in Pakistan follows the pattern obtaining in Canada and U.S.A. The tax is chargeable for each financial year, called the assessment year which begins on first July and ends on the following 30th day of June. Agricultural income is not included in taxable income. Taxes on income of companies are generally at 50%. There is a fairly high exemption limit on personal income and about 80% of the population is exempt from paying any income tax.

Other revenue receipts, which in 1978 contributed 29% to total revenues in the current account are comprised of receipts from the operation of various government enterprises (post office, telegraph and telephone departments), interest receipts on loans to government employees, receipts of administrative departments by way of fees for work done and services rendered, trading profits, aviation, and broadcasting.

Most expenditures except for debt services in the current account are classified as government consumption expenditures. These expenditures consist of wages and salaries of government employees and payments for goods and services. The major share of consumption expenditures goes to defence, whose share in consumption expenditures in 1978 was 52% (Table 4.7). On the average about 50% of consumption expenditures have gone for defence purposes, although during the two wars with India (September 1965 and December 1971), defence's share went up to nearly 60%.

The rest of consumption expenditures are devoted to civil administration, which includes general administration, education, public health, foreign affairs, civil works, social services, and various other offices run by the various governments. Their share has tended to be 50% of government consumption expenditures except for times of war when it went down. Government consumption expenditures on the whole have been less than revenues in the current account, as the emphasis has been to devote increasing sums to development expenditures. Debt services and subsidies are another major expenditure in the current account. In 1978, they amounted to 13% of total revenues. Debt services include interest payments for domestic and foreign debt. These have increased over the years as Pakistan has incurred increasing domestic and foreign debts. In 1978, Pakistan had a net domestic permanent debt of Rs. 35 billion and a foreign debt of Rs. 49.6 billion. With 11% of current revenues going to debt servicing (Table 4.7), and an increasing portion of it in terms of foreign exchange, debt servicing along with defence expenditures threatens the government's budget balance.

Subsidies were minimal until 1960. They have grown as the government has increasingly subsidized inputs like fertilizer and imports of food grains. Presently subsidies amount to roughly 12% of revenues in the current account. Though government consumption expenditures have been less than revenues, growth of debt services and subsidies have kept total current expenditures roughly at 70% of revenues.

Capital receipts are broadly classified into internal and external categories. Internal receipts in the capital account are made up of permanent debt (long-term bank and non-bank borrowings), floating debt (treasury bills and short-term borrowings from the State Bank, and cash credit accomodations from commercial banks), unfunded debt (proceeds of small savings schemes and contributions of government employees to their provident fund accounts), and recoveries of loans and advances made earlier to the provinces and local bodies. Net capital receipts along with surplus from the current account constitute internal resources for financing the annual development plans of the various levels of government.

External receipts in the capital account consist mainly of foreign aid. Pakistan receives aid in the form of loans as well as grants. These loans and grants are further subdivided into the categories of project loans and grants, and commodity loans and grants. Project loans and grants are in the form of machinery and equipment, meant for projects both in the public and private sectors. Commodity loans and grants are mainly utilized for the imports of food-grains, for industrial raw materials in the private sector, and for fertilizers and pesticides. Project loans are loans contracted by the central

government and re-lent to the provinces and credit institutions for financing development activities, and guaranteed loans which are contracted by the provincial governments, semi-autonomous bodies, and the private sector, on the guarantees of the central government.

Pakistan has been receiving foreign economic assistance since the commencement of the Colombo Plan in 1950. In the early years a major portion of foreign assistance was in the form of grants, but they had decreased to 13% of total foreign assistance by 1978. The share of loans went up and accounted for a major portion of foreign assistance. Consequently debt services (principal and interest) increased, representing a severe drain on the country's resources. In 1978 they accounted for 15% of the country's total export earnings, fairly high for a country already experiencing deficits in foreign trade.

Of the total aid given to Pakistan (inclusive of project and commodity aid), about 70% has been provided by consortium countries consisting of Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Norway, Sweden, the U.K., and the U.S.A. The share of World Bank, International Development Agency (IDA), International Finance Corporation (IFC), and Asian Development Bank (ADB), constitutes another 14%. The remaining 16% has come from non-consortium countries consisting of socialist states of Eastern Europe, the Soviet Union, China, and the oil-rich states of the Middle-East.[7]

Capital expenditures of provincial and central governments are broadly divided into development and non-development outlays. The bulk of these are investments in development projects. Non-development expenditures are incurred mostly for repayment of debt

and for reduction of recurring liabilities. The broad structure of various receipts and expenditures in the capital account (for all levels of government) are given in Table 4.8.

4.5 Development Planning

The government's role in the economic development of Pakistan with respect to fiscal, monetary, commercial, and incomes policies, has been crystallised through the formulation and implementation of consecutive five-year plans since 1951. These plans have generally articulated the objectives and magnitudes of government involvement in the economy by providing a comprehensive outline of its gross sectoral investment (development) expenditures over a period of five years. Also the government has ennuciated its attitude towards the level and composition of private gross capital formation and the various economic, social, and political parameters within which planned development would be pursued.

To gain insight into the government's role in the economic development of the country we will take a brief look at the objectives, formulation and implementation of the various five-year plans in Pakistan. The various plans and their durations are as follows:

Development Program	1950-1956
First Five-Year Plan	1955-1960
Second Five-Year Plan	1960-1965
Third Five-Year Plan	1965-1970
Fourth Five-Year Plan	1970-1975
Fifth Five-Year Plan	1978-1983

The history of the above mentioned plans (except for the Fifth Five-Year Plan in progress) has been amply documented. We will be concerned mainly with the factors of planning, in the context of Pakistan, up to and including the Fourth Five-Year Plan. The objectives, formulations, and implementation were conceived in terms of Pakistan and Bangladesh combined. The objective of growth in income and other targets in the plans were based on Bangladesh (East Pakistan) having a larger population and a lower rate of growth than Pakistan (West Pakistan). It might appear then on the basis of ex post assessments that Pakistan (erstwhile West Pakistan) achieved higher rates of growth in per-capita income than set out in the various plans. Conclusions as to the success of any plan would therefore have to be tempered.

Planning started in Pakistan in conjunction with the Colombo Plan for development of South and East Asia when the Pakistan government assembled several continuing and some hurriedly prepared public projects into a six-year Development Program. The plan could not be based on an accurate assessment of internal and external resources because of the inadequacy of statistical data and the shortage of planning personnel. Due to the Korean War boom, development in the country was brisk but it did not follow the planned pattern. The industrial sector grew fast, but agriculture remained stagnant.

During the duration of the Development Program a Planning Board (renamed Planning Commission) was created in 1953, charged with drafting the First Five-Year Plan. The Planning Board attempted a comprehensive evaluation of the country's physical, financial and human resources. Aggregate targets and investment programs for the

economy were suggested for the First Five-Year Plan, and submitted to the government.

The main objectives and targets of the plan included increasing per-capita income by 7%, increasing employment opportunities, increasing exports to obtain a surplus in balance of payments, increasing the rate of domestic savings, and increasing food-grain production (to eliminate the gap between domestic production and consumption of food). The plan was not approved by the government until the beginning of the fourth year, and policies recommended in it were neither taken seriously nor implemented. Therefore, it did not prove to be a success.

The Second Five-Year Plan (1960-65) was launched under more favorable circumstances and fared well in contrast to its predecessors in that most of the growth targets were met or were exceeded. At the end of the Second Five-Year Plan period the concept of long-term planning was adopted by the preparation of a twenty-year Perspective Plan (1965-1985). The idea was to determine the long-term national objectives and then provide time paths for their achievement through successive medium-term (five-years) plans. The main objectives of the Perspective Plan were to quadruple national income, have universal literacy, have full employment, eliminate dependence on foreign aid, and remove economic disparities between East and West Pakistan by 1985.

The Third Five-Year Plan was conceived in terms of the Perspective Plan, and set a target annual growth rate in real GNP of 6.5%. It addressed itself also to removing the increasing disparities in income between East and West Pakistan. However, from the outset several unfavourable and unexpected events occurred. The climate for foreign aid became uncertain, a brief war with India in September 1965

led to a sharp increase in defence expenditures, and an unprecedented drought for two years in succession led to an increase in imports of food-grains. Several ad hoc adjustments had to be made, such as the switching away of resources from long gestation projects requiring a high proportion of imported materials.

The latter half of the plan period was beset with political and economic crises. The Fourth Five-Year Plan as originally conceived was irrelevant to the conditions prevailing in Pakistan after December 1971. No other plan was adopted instead and planning was then effected on an annual basis. Mr. Bhutto's regime which took over power at the time, changed the whole structure and ideology of planning by emphasising welfare considerations instead of growth considerations. The Fifth Five-Year Plan was launched in 1978. It envisaged nominal public investment to increase by 10.8% annually and set a GDP annual growth target of 7.2%. (Planning Commission, 1978).

In Pakistan, no doctrinaire assumption has been behind planning as to the kind of economy postulated (exclusively capitalist or exclusively socialist), but the approach has been pragmatic generally. Encouragement has been given to private enterprise and state intervention in industry has been resorted to only when private enterprise is found unable or unwilling to develop certain strategic industries.

The formulation of a five-year plan in Pakistan begins with a basic economic framework prepared in the Planning Commission. This framework evaluates past performances and lays down tentative targets of broad aggregates such as national income, savings, investment, imports and exports. The precise magnitude of each of these aggregates is determined by various factors. Growth targets for example

are based partly on a continuation of the historical trend and partly on the objective, to achieve maximum feasible growth in the economy.

Saving and investment targets are based on a detailed projection of the economy's internal and external resources. Export and import targets reflect the export potential and import requirements of the economy, and also the country's policy regarding foreign aid. (When foreign aid has been liberal imports required for development of the economy, have been allowed to increase at rates higher than exports.)

The basic model of development followed is the two-gap model based on the Harrod-Domar growth model (discussed in Chapter 3). Growth is assumed to depend on capital formation, which in turn depends on savings. The resource gap between investment and domestic savings is matched with the balance of payments gap, by adopting policies that will reduce the foreign exchange gap to the level of the resources gap.

Whereas planning for the public sector is comprehensive it is more in the nature of broad directions for the private sector. The main instrument of control in the industrial field is the Industrial Investment Schedule, which lays down broad targets for each industry within the framework of the five-year plan. The licensing of foreign exchange for imports is another important instrument of control.

4.6 Trade and Balance of Payments

The importance of foreign trade to a developing country can barely be minimised. Imports of goods and services provide the capital equipment and expertise it lacks, for growth in output and exports

provide the means to pay for all or part of imports. If exports finance only part of imports the balance must be made up by credits from abroad. Since credits have to be paid eventually, financing through credits can only be a short-term measure. As domestic income increases, demand increases for domestic and foreign resources, thus putting limits to exports and further aggravating a country's trade deficits.

In principle policy measures like devaluation would tend to close the import-export gap. However, in the case of developing countries, this would mean reducing imports (of which capital goods are a major portion) and increasing exports of goods (which barely satisfy domestic demand). Balance of trade pressures have thus been a major constraint on growth in income in developing countries.

The pattern of Pakistan's foreign trade is similar to that of many non-oil producing, developing countries. These countries are still in the early stages of development and do not have much surplus for exports. At the same time they require essential consumer goods, raw materials, intermediate, and capital goods for development. Since independence, Pakistan's imports have generally been higher than its exports and therefore external indebtedness has been the tradition. Table 4.9 depicts the situation in merchandise trade for selected years.

To contain the deficit in trade over the years, reliance has been placed on commercial policies consisting of tariffs, licensing and quantitative restrictions on various categories of imports, and export boosting measures such as the Export Bonus Scheme.[8] Pakistan

also has had to devalue its currency.[9]

Initially Pakistan's exports consisted of primary commodities such as raw cotton, raw wool, hides and skins, and oilseeds. As the country started industrialising, domestic absorption of primary commodities by the industrial sector increased, mainly to satisfy demand for consumer goods consisting of cotton manufactures, leather and woolen goods, vegetable oils and sugar. The decline in exports of primary commodities was replaced by manufactured and semi-manufactured goods.

In light of Pakistan's production capacity. growth of primary commodity and manufactured goods exports was relatively slow due to the economy's orientation towards meeting demand from Bangladesh. To meet demand of the former two parts of the country and to keep prices under control exports of selected commodities such as raw cotton and some cotton manufactures were restricted. Also exports of certain varieties of rice were banned and sold to Bangladesh.

Exports from Pakistan started taking their natural course from 1972 onwards. Pakistan is now the biggest exporter of cotton yarn in the world. She is a major exporter among the developing countries, of raw cotton, cotton fabrices, and rice.

The composition of exports and imports for selected years is summarised in Table 4.9. The economy's dependence on exports of raw cotton, cotton yarn, and fabrics is noteworthy. These products accounted for 53% of total exports in 1960. Among these products, cotton fabrics emerged as the leading export. This resulted partly due to the switching of cotton textiles exports to world markets,

following liberation from Bangladesh. Exports of rice had to be diverted to world markets also and emerged as the leading export commodity, accounting for 19% of exports in 1978.

Exports of raw cotton (leading export commodity till the early seventies) fell due to bad harvests, brought on by floods and bad weather. Bad harvests also resulted in relatively low exports of cotton yarn and fabrics. Carpets and rugs became major export items, accounting for 9% of exports in 1978. There is potential for further increases in their exports to North America and Europe, as they are reputed for their design, durability, and elegance. Since rugs and carpets are considered luxury goods by the West, increased exports would depend on growth in incomes in these markets, and vigorous export promotion to compete with comparable carpets and rugs from countries like Iran and India. Other exports consist of wool and wool products, tobacco and products, cutlery, surgical instruments, electrical goods, tents and other canvas goods, cement and cement products, etc. Pakistan also started exporting capital goods on a minor scale, and further increases would depend to a large extent on the capacity of the newly installed (only) steel mill, and whether the quality and prices of these goods would be competitive in world markets.

The lack-lustre performance of Pakistan's exports and their inability to keep pace with imports is mainly due to their structure. Agricultural products still are the main component of exports, e.g. rice in 1978 alone accounted for 19% of exports (Table 4.9). Pakistan thus needs to diversify its commodity export trade, to avoid undesirable consequences of heavy export dependence on a few major items.

The serious setbacks suffered in export trade during 1973-1977 resulted due to the country's dependence on a few commodities mentioned above. Their exports were affected negatively by a combination of recession in cotton and cotton textile markets, fall in international prices of rice, and bad weather conditions.

During the period under study imports increased substantially. Exports as a percentage of imports were generally 70-80% till 1960. The proportion fell to 31% by 1965 due to the liberalisation of imports coupled with credits and loans from abroad. Since then it was between 40 to 50% (Table 4.9). A major factor that contributed to imports exceeding exports was the necessity to import increasing amounts of capital goods and raw materials, needed for manufacturing consumer goods, intermediate, and capital goods.

Pakistan's import structure for selected years is also summarised in Table 4.9. The large share of capital imports is noteworthy. Imports of electrical and non-electrical machinery, transport equipment, iron, and steel and their manufactures, together accounted for 36% of total imports in 1978. Imports of petroleum and related products which were a minor portion in total imports in 1960, were the major import item in 1978 (accounting for roughly 18% of value of total imports). This was due to the substantial increases in petroleum prices that ocurred regularly since 1973.

Fertilizer imports decreased with increased domestic production. They constituted 3.8% of total imports in 1978, in contrast to 6.6% in 1974. Imports of vegetable oils increased to 5.5% of imports in 1978, due to increased demand for vegetable oil by the rapidly increasing population. With a significant domestic vegetable oil industry, imports are expected to decrease in the future. Imports of tea increased

after 1972 due to severance of trade ties with Bangladesh, which used to supply the major part of Pakistan's tea needs.

Imports of food-grains (grains, pulses and flour) fluctuated over the years, depending chiefly upon the harvest conditions in agriculture. Shares in total imports of transport equipment and non-electrical machinery decreased gradually, indicating some import-substitution in these goods.

Imports by economic categories should give a better indication of trends (Table 4.10).[10] Imports of capital goods were 35% of total imports in 1956 and 50% in 1968. In the early sixties various incentives were given for importing capital goods. They included low rates of financing at an over-valued exchange rate and low rates of tariffs. The trend was reversed in the late sixties as imports of capital goods decreased. (They accounted for 33% of total imports in 1978.) Imports of raw materials and intermediate goods constituted 31% of total imports in 1956. Their share went down to 24% by 1968, due to higher tariffs relative to capital goods. However as the structure of industry changed in favor of production of intermediate goods, capital goods and consumer goods, (all needing foreign raw materials), increased to 47% of commodity imports by 1978.

Consumer goods underwent considerable import-substitution. Between 1956 to 1960, their import share fell from 30% to 16%. This was partly due to higher tariffs on them relative to other imports and partly due to their increased production at home.

Over the period of this study relative prices of the various imports may have changed, giving a bias to the trends noted above. Therefore the various imports were deflated by their relevant import unit value indices (1963=100). Although the percentages changed as

seen in the lower half of Table 4.10, the general trend as noted above was the same. Imports by volume, increased at an average rate of 15% over the period 1956-1978. (Imports of capital goods increased by 13%, imports of raw materials by 30%, and imports of consumer goods by 5%.)

Trade with Bangladesh till 1971 was Pakistan's internal trade and consequently did not involve any foreign exchange. Over the period 1956-1971, Pakistan constantly had a surplus in its trade account with Bangladesh (Table 4.11). Bangladesh exports to Pakistan generally amounted to half of its imports from Pakistan. Following 1971 all trade ties between the two countries were severed and both countries found alternate suppliers and markets.

Raw cotton, cotton manufactures, and rice were the chief commodities exported to Bangladesh, constituting 50% of total exports to Bangladesh (1970). Tea, paper, paper-board, and jute manufactures were the major commodities imported from Bangladesh, accounting for 55% of total imports from there (1970). The importance of the Bangladesh market can be gauged from the fact that in 1970, exports to Bangladesh accounted for 69% of Pakistan's commodity exports to other countries. In some years the ratio was even higher, as evident in Table 4.11.

After the loss of the Bangladesh market, Pakistan diverted its trade elsewhere and found a widening market in the Middle-East and North Africa. Increasing petroleum revenues were revolutionising dietary habits there, and boosting demand for all types of farm products. Pakistan became firmly entrenched as a U.S. competitor in these markets for rice, while making headway in other commodity areas

also. Demand from the region for Pakistan's exports increased hand-in-hand with exploitation of petroleum resources and increased revenues from them.

Also populations though still sparse in many Arabian Peninsula nations, expanded rapidly, with the arrival of thousands of foreign workers to participate in development projects there. While rising incomes stimulated changes in consumption patterns, agricultural production in much of the region remained small scale and sluggish. These developments resulted in increased imports of agricultural commodities from Pakistan and other countries. The loss of the Bangladesh market was consequently cushioned with increasing exports to the Middle-East and North Africa.

During the sixties shipments to the region averaged Rs. 156 million a year (5.6% of Pakistan's total exports). During the period 1971-1976, exports to the region averaged Rs. 3319 million or 16.7% of total exports, with annual increases of 60% sometimes. In 1978 exports levelled off to Rs. 2970 million with agricultural exports accounting for nearly half of the total. In 1978 Iraq was the leading agriculture export market worth Rs. 472.23 million, followed by Saudi Arabia (Rs. 308.8 million), Dubai (Rs. 284.1 million), and Kuwait (Rs. 169.3 million).[11] Pakistan's exports to these countries consist of rice, fruits and vegetables, manufactured tobacco, and cotton fabrics.

Pakistan has the potential to capture an even larger share of the Middle-Eastern market for its rice, fruits and vegetables, spices, meat, tobacco products, sugar and sugar products, and other intermediate and capital goods. Increased agricultural exports would

depend on supply -to a large extent. Agricultural production is insufficient presently even to meet domestic requirements (increasing by 3 to 5% annually). Therefore improvements would have to be made in agricultural productivity to increase exports. This would require improvements in production techniques, rational pricing decisions by the government (based more on market conditions), new agricultural policies, and an improved rural infrastructure. Similarly there is potential for exporting other commodities such as cement, steel products, and consumer goods, but again it would depend on their increased production.

Pakistan's trading partners have increased over the years. In 1978, 5.5% of exports went to Africa, 4.5% to Eastern Europe countries (USSR 2%), 32% to Asia (Hong Kong 6.1%, Japan 8.5%), 5.6% to North America (USA 5%), 24% to Western European countries (U.K. 6.6%), and 20% to the Middle East (Iraq 5%). In the same year 15% of imports came from North America (U.S.A 12.5%), 25% from Western Europe (West Germany 7.8%, U.K. 8.3%), 3.8% from Eastern Europe, 19% from Middle East (Kuwait 5.2%, Saudi Arabia 8.9%), and 29% from Asian countries (Japan 12%).

The country's balance of payments has been cause for considerable concern and has highlighted the main problems it faces in its international financial relations. These comprise of the sizable trade gap (as seen above), the importance of foreign aid in bridging that gap, the large and growing cost of foreign debt, and consequently the progressive reduction in the actual net inflow of given amounts of foreign aid (see Table 4.12).[12]

The country's balance of payments account for selected years

is summarised in Table 4.12. The sizable trade gap will be noticed. In 1967 for instance, commodity imports alone were 1.57 times that year's value of exports of goods and non-factor services. In 1978, the ratio increased to 1.62. The trend in interest charges on foreign debt is also noteworthy. They were 6% of exports of good and non-factor services in 1967, increasing to 11% in 1978. This trend is expected to persist as a result of increased financing of the trade deficits. The importance of foreign aid to finance Pakistan's trade gap is thus evident in Table 4.12.

Pakistan's deficit in the trade account has also been financed by remittances from abroad during the past few years. They were the largest foreign exchange earning item in 1978, and were about 73% of merchandise exports and non-factor services (Table 4.12). These remittances consist of transfer payments by emigrants to their families and/or relatives living in Pakistan. It seems Pakistan's best exports are Pakistanis.

4.7 Money and Banking

The rural and agrarian character of the economy is reflected in its monetary statistics as well. Currency in circulation constitutes about 42% of the total money supply (currency and demand deposits).[13] This is mainly due to the lack of banking habits among the people, coupled with the lack of banking facilities especially in the rural areas. It also bears evidence to the fact that a great bulk of day to day transactions take place in currency.

The money market in Pakistan, like most developing countries, is characterised by its dual nature. The unorganised money market

caters to the needs of the predominant rural sector while the organised money market is confined to the industrial urban sector. Unlike India where professional money-lenders meet a major portion of credit needs in the rural sector, Pakistan's rural credit needs are met mainly by friends, relatives, and traders, etc. Institutional sources such as the Agricultural Development Bank of Pakistan (ADBP) and the various co-operatives are inadequate in fulfulling total credit needs.

The size of the organized market is rather small. Total credit supplied by the banking system to private and public sectors was roughly 18% of GNP in 1978. The monetary system of the organised sector in Pakistan is dominated by the central bank (the State Bank of Pakistan) and a number of commercial banks (scheduled banks). There are other institutions like co-operative banks, specialised credit institutions, and two stock exchanges. Among the specialised institutions are the ADBP, IDBP, PICIC, HBFC and the People's Finance Corporation.[14] These term-financing and specialised institutions were introduced by the government because of the traditional aversion of the commercial banks to long-term financing. There are a few land mortgage banks but their total assets or liabilities are too small to warrant serious attention.

Commercial banking in Pakistan is structured like Canada according to the British system of branch-banking. Commerical banks are composed of the scheduled banks and the non-scheduled banks. (The former category is equivalent to what is known as chartered banks in Canada.) The number of non-scheduled banks is very small and their combined assets are relatively insignificant.

The scheduled banks had 6,880 branches in Pakistan in 1979. Fifteen of the banks were domestically owned with 6,704 branches and eight were foreign-owned (with 45 branches confined mostly to the major cities and urban areas). Domestically owned banks thus held 99.3% of the total bank branches operating in Pakistan. They also accounted for 91.3% of all the credit disbursed, 92.4% of all deposits, and 97.6% of all investments made in government and private securities.[15] There has been a phenomenal increase in the branches of the scheduled banks in Pakistan when one considers that there were 1800 branches at the end of June 1968, and 2942 at the end of 1973. However a substantial part of the population is still not covered by banking services. On average, the density of branches with respect to population stood at one for over 11,000 people in 1979.

Deposits from the public are the principal sources of funds for the commercial banks. Growth in deposit liabilities have grown hand in hand with the growth in branches. An interesting feature of the growth in deposits is that although both types of deposits went up significantly during the period under study, the rate of growth in time deposits was much higher than that of demand deposits. From about 28% in 1956 the proportion of time deposits in total deposits went up to 47% in 1978. This may be due partly to the rapid expansion of banking facilities in the country, and partly due to an increase in the level of income in the non-agriculture sector. Among other sources of funds, commercial banks' borrowings from the State Bank and their own capital and reserves are prominent. Scheduled banks' borrowings from the State Bank of Pakistan have recorded sizable increases over time.

Loans and advances including bills purchased and discounted, and investment in government securities, are the most prominent types of assets held by the scheduled banks. In the earlier years investment in government securities was as prominent as loans and advances, however, in recent years loans and advances have emerged as the single most important form of asset. The banks are quite conservative in their lending operations and in 1978, unsecured and secured advances accounted for merely 11% of their total loans and advances. The commercial banks have traditionally limited their operations, mainly to the provision of short-term credit to large-scale trade, commerce, and industry.

The State Bank of Pakistan as currently set up, was established in 1956 to serve as the country's central bank and financial adviser to the government. Like the Bank of Canada it has a issue (currency), department and a banking department. It is the sole bank of issue, banker to the public sector, holder of the gold and exchange reserves, and lender of last resort to the other banks. It is vested with wide regulatory powers over the commercial banks. The State Bank's objectives are to foster the growth of the monetary and credit system in the best national interest, and to help in the fuller utilization of the country's productive resources.[16]

The monetary policy that the SBP is required to pursue is to keep a balance between maintenance of price stability (by controlling the rate of credit expansion) on the one hand and to ensure an adequate credit flow to the productive sectors of the economy (by permitting a secular expansion in credit) on the other. Although the State Bank has recourse to traditional policy instruments such as the bank rate, open-

market operations, and reserve requirements, these have been varied rarely due to the special nature of the economy.

In addition to the traditional powers mentioned above the SBP has been given a wide range of selective weapons for controlling and regulating the flow of bank credit. The bank has the legal authority to determine the advance policy of the banking companies and to issue directions specifying the purposes for which loans and advances may be made. The purpose of this selective control is to provide some degree of flexibility to monetary policy and to regulate the flow of credit to various sectors of the economy according to priorities established by the central government's development plans. Thus monetary policy's effect on the composition of private investment is through influencing credit operations, instead of the interest rate as in the developed economies of Canada, U.S.A., etc.[17]

This then concludes a descriptive analysis of the economy of Pakistan and its evolution over the period 1956 to 1978. In the following chapter we will attempt to incorporate the major features highlighted here, into a consistent macroeconometric model based on economic theory and qualifed by the availability of data.

TABLE 4.1

SECTORAL DISTRIBUTION OF LABOUR FORCE

(PERCENTAGE SHARES)

	1961	1965	1969	1973	1977	1978
Agriculture	60	57	55	57	53	53
Manufacturing	13	14	15	14	13	14
Infra Structure	3	5	5	5	5	5
Construction	2	3	4	4	4	4
Other	22	21	21	20	25	26
TOTAL	100	100	100	100	100	100

NOTES: (1) Components may not add to exactly 100 because of rounding.

(2) Agriculture includes livestock, fishing and forestry.
Manufacturing also includes mining.
Infrastructure is defined as transport, storage and communication, electricity, gas and water.
Other includes all services and activities not adequately described.

Source: Yearbook of Labour Statistics, International Labour Office, Geneva (various issues).

TABLE 4.2

SECTORAL DISTRIBUTION OF GDP AT FACTOR COST

(PERCENTAGE SHARES)

	1956	1960	1964	1968	1972	1976	1978
Major Crops	13.0	12.9	12.1	12.9	13.5	11.7	11.1
Agriculture (other)	33.0	32.0	28.1	25.5	23.7	20.6	19.9
Manufacturing, Mining	12.3	12.8	16.0	16.6	16.7	16.3	16.3
Construction	2.2	2.6	4.3	3.9	3.7	5.3	5.2
Utilities	0.3	0.5	0.7	0.8	2.4	2.5	2.8
Transport	5.8	5.8	5.6	6.9	6.4	6.6	6.9
Trade	12.0	12.5	13.6	13.6	13.5	14.0	13.7
Dwellings	5.1	5.1	4.5	3.9	3.7	3.4	3.4
Administration, Defence	7.1	6.5	6.0	7.2	7.3	9.9	10.7
Services	8.7	9.4	8.9	8.7	9.3	9.9	10.3
GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTES: (1) Components may not add to exactly 100 because of rounding.

(2) Percentages have been calculated from data at 1963 prices.

(3) Major Crops include wheat, rice and cotton.

Agriculture (other) includes other crops, livestock, forestry and fishing.

Utilities includes electricity, gas and water.

Transport includes transport, storage and communication.

Services include financial services also.

Source: Pakistan Statistical Year-Book (C.S.O. Karachi, 1977, 1978 issues).

TABLE 4.3

GROWTH OF GDP AT FACTOR COST

(ANNUAL PERCENTAGE RATES)

	56/60	60/64	64/68	68/72	72/76	76/78
Major crops	2.7	4.3	8.6	5.4	1.9	1.8
Agriculture (other)	1.8	2.9	4.1	2.4	2.0	2.9
Manufacturing, Mining	4.1	12.3	7.6	4.5	4.9	4.8
Construction	7.1	20.6	3.4	3.0	15.9	3.7
Utilities	19.3	13.1	12.0	36.4	6.2	12.4
Transport	3.0	5.4	12.0	2.3	6.5	7.3
Trade	3.7	8.5	6.6	4.1	6.6	2.0
Dwellings	3.0	3.0	3.4	3.0	3.6	3.6
Administration, Defence	0.5	4.3	11.5	4.5	14.1	9.1
Services	5.0	4.9	4.0	6.1	7.3	6.8
GDP	3.0	6.2	6.7	4.3	5.6	4.8

NOTES: (1) Growth rates have been calculated from data at 1963 prices.

(2) Sector definitions same as in Table 4.2

Source: Same as in Table 4.2

TABLE 4.4

DISTRIBUTION OF EXPENDITURES AT MARKET PRICES BY TYPE

(PERCENTAGE SHARES)

	1956	1960	1964	1968	1972	1976	1978
Private Consumption	77.8	78.4	73.2	79.3	77.3	77.1	81.3
Public Consumption	11.7	11.1	10.7	10.0	11.9	10.7	10.1
Private Gross Domestic Investment	7.2	7.9	11.8	10.0	8.1	4.1	4.8
Public Gross Domestic Investment	5.1	7.8	11.1	7.2	6.0	10.4	10.0
Exports of Goods and Services	8.7	9.0	10.4	9.7	7.7	6.9	5.9
(less) Imports of Goods and Services	12.4	14.3	22.5	15.6	11.0	11.1	12.3
GNP at Market Prices	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTES: (1) Components may not add to exactly 100 because of rounding.

(2) Percentages have been calculated from data at 1963 prices.

(3) Data adjusted for separation of Bangladesh (See Data Appendix)

Source: (1) Naseem (1976)

(2) 25 Years of Pakistan in Statistics 1947-72, C.S.O., Karachi, 1973.

(3) World Tables, World Bank, Washington, D.C. 1976.

TABLE 4.5

GROWTH OF EXPENDITURES BY TYPE

(PERCENT)

	56/60	60/64	64/68	68/72	72/76	76/78
Private Consumption	3.1	4.5	9.4	3.9	5.5	8.7
Public Consumption	1.2	5.5	5.4	9.5	2.8	3.8
Private Gross Domestic Investment	5.0	17.8	2.4	0.0	-11.8	14.9
Public Gross Domestic Investment	12.4	16.5	-3.7	1.0	25.8	3.1
Exports of Goods and Services	3.6	10.5	5.2	5.0	2.7	-1.6
Imports of Goods and Services	10.8	10.6	5.5	3.6	6.8	12.2
GNP at Market Prices	2.6	6.5	7.2	4.6	5.6	6.7

NOTES: (1) Compound growth rates calculated from data at 1963 prices.

(2) Data adjusted for separation of Bangladesh (see Data Appendix).

Source: Same as in Table 4.4

TABLE 4.6

DISTRIBUTION OF GOVERNMENT REVENUES IN CURRENT ACCOUNT

(PERCENTAGE SHARES)

	1956	1960	1964	1968	1972	1976	1978
Customs tax	28.0	19.0	13.2	13.1	15.0	24.3	26.8
Excise tax	10.5	11.4	18.6	27.5	28.6	25.9	25.1
Sales tax	12.3	11.0	13.4	6.7	5.5	5.7	9.6
Direct tax	19.3	24.4	17.9	14.1	16.0	11.0	9.6
Others	29.9	34.2	36.9	38.6	34.9	33.1	28.9
Total Revenues	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Tax Revenues/GDP	9.2	8.7	10.0	11.2	13.3	13.3	14.3

NOTES: (1) Components may not add to exactly 100 because of rounding.

(2) Direct Tax includes corporate income tax, personal income tax, agricultural income tax, property tax, and inheritance tax. Others include non-tax revenues from government enterprises, license fees, royalties, etc.

(3) Provinces and central current accounts have been consolidated.

(4) Revenues from Bangladesh have been netted out (See Data Appendix).

Source: (1) Pakistan Basic Facts, Government of Pakistan, Finance Division, Islamabad, 1975-78 issues.

(2) 25 Years of Pakistan in Statistics, 1947-72, C.S.O. Karachi, 1973.

(3) Basic Facts About the Budget, Government of Pakistan, Finance Division, Islamabad, various issues.

(4) Pakistan Economic Survey, Government of Pakistan, Finance Division, Islamabad, 1979.

TABLE 4.7

DISTRIBUTION OF GOVERNMENT EXPENDITURES IN CURRENT ACCOUNT

(PERCENTAGE SHARES)

	1956	1960	1964	1968	1972	1976	1978
Administration	38.0	40.0	34.1	24.0	23.6	21.8	27.7
Defence	51.2	41.8	28.4	33.0	42.4	38.2	31.7
Miscellaneous	5.2	3.5	2.8	2.9	4.4	11.9	10.8
Domestic Interest	4.0	7.3	4.6	4.9	7.0	5.7	5.1
Foreign Interest	0.0	1.0	3.4	3.9	4.4	4.6	5.5
Surplus	1.6	6.4	26.7	31.3	18.2	17.8	19.2
Total Revenues	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTES: (1) Components may not add to exactly 100 because of rounding.

(2) Administration includes civil administration, foreign affairs, education, beneficient and social services, medical and public health, civil works, and currency and mint. Total Revenues include tax and non-tax revenues in the current account.

(3) Provinces and central government current accounts have been consolidated.

(4) Expenditures in Bangladesh have been netted out (See Data Appendix).

Source: Same as in Table 4.6 and Alamgir and Berlage (1974).

TABLE 4.8

DISTRIBUTION OF GOVERNMENT RECEIPTS AND EXPENDITURES IN CAPITAL ACCOUNT

(PERCENTAGE SHARES)

	1956	1960	1964	1968	1972	1976	1978
Total Receipts	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Net Foreign Loans	0.7	10.8	32.8	64.7	6.1	44.9	62.2
Foreign Grants	7.0	37.1	27.4	5.5	0.6	5.7	8.9
Net Internal Debt	6.3	27.6	24.1	21.4	91.4	32.8	12.5
Other Receipts	86.0	24.4	15.6	8.4	1.9	16.6	16.4
Development Expenditures	100.0	86.2	93.8	86.6	44.0	74.5	82.2
Non-Development Expenditures	0.0	13.8	6.2	13.4	56.0	25.5	17.8

NOTES: (1) Components may not add to exactly 100 because of rounding.

(2) Other Receipts include other capital appropriations, profits from state trading, ad hoc treasury bills, and cash balance utilization.

(3) Provinces and central capital accounts have been consolidated.

(4) Expenditures in and receipts from Bangladesh have been netted out (see Data Appendix).

Source: Same as in Table 4.6.

TABLE 4.9

COMPOSITION OF COMMODITY EXPORTS AND IMPORTS

(PERCENTAGE SHARES)

	1956	1960	1964	1968	1972	1976	1978
EXPORTS:							
Raw cotton	62.2	24.1	25.1	22.2	8.1	8.7	18.6
Cotton manufacture	4.7	28.6	14.0	20.9	29.1	24.7	16.6
Rice	5.5	9.2	9.8	9.1	8.2	22.0	18.6
Carpets	0.0	0.0	1.0	2.0	3.2	6.4	9.0
Leather	0.2	2.0	3.5	4.5	5.1	5.3	4.9
Fish	2.5	2.6	2.7	2.9	3.3	2.5	2.6
Other Exports	24.9	33.5	43.9	38.4	43.0	30.4	29.7
Total Exports	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Exports/Imports	77.0	42.0	36.0	49.0	96.0	55.0	46.0
IMPORTS:							
Chemicals, Drugs and medicine	5.9	5.5	4.6	3.4	4.9	3.6	4.1
Fertilizers	0.0	0.3	0.5	4.2	1.5	2.7	3.8
Electrical Goods	1.8	3.1	6.1	5.9	7.3	5.8	5.7
Machinery	16.0	22.0	20.3	19.4	17.0	14.0	15.1
Transport Equipment	6.3	7.0	12.9	9.6	5.6	6.6	5.9
Iron, Steel and manufactures	7.7	7.3	12.1	6.8	12.5	8.3	9.5
Petroleum and products	8.1	10.2	4.9	1.7	7.3	17.8	14.2
Foodgrains	2.8	17.0	9.6	8.5	8.3	8.7	4.8
Tea	0.0	0.0	0.4	0.3	4.6	3.2	4.5
Vegetable Oils	0.0	0.0	2.2	2.3	2.4	5.1	5.5
Other Imports	57.3	27.6	26.4	37.9	28.6	24.2	26.9
Total Imports	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTES: (1) Components may not add to exactly 100 because of rounding.

(2) Leather includes leather and leather products.
Fish includes fresh fish and related products.
Electrical goods includes all electrical goods and electric machinery.
Machinery includes non-electrical machinery.
Food grains includes grains, pulses and flour.

(3) Trade with Bangladesh not included.

Sources: (1) 25 Years of Pakistan in Statistics 1947-72, C.S.O., Karachi 1973.

(2) Pakistan Statistical Year-Book, C.S.O., Karachi 1977, 1978 issues.

TABLE 4.10

ECONOMIC CLASSIFICATION OF COMMODITY IMPORTS

(PERCENTAGE SHARES)

	1956	1960	1964	1968	1972	1976	1978
			(nominal values)				
Consumer goods	30	16	9	11	14	12	15
Raw Materials	21	29	28	24	35	44	47
Capital Goods	35	37	52	50	42	35	33
Food-grains	3	17	10	14	8	9	5
Total Imports	100	100	100	100	100	100	100
			(in 1963 values)				
Consumer Goods	32	15	8	11	14	11	15
Raw Materials	26	28	27	23	24	40	45
Capital Goods	39	42	54	51	53	40	34
Food-grains	3	14	11	15	9	9	6
Total Imports	100	100	100	100	100	100	100

NOTES: (1) Components may not add to exactly 100 because of rounding.

(2) Raw materials include raw materials and intermediate goods.

(3) Trade with Bangladesh not included.

Source: (1) Islam (1967).

(2) Kamal and Alvie (1974).

(3) Pakistan Statistical Yearbook, C.S.O. Karachi, 1978.

TABLE 4.11

COMPOSITION OF TRADE WITH BANGLADESH

(PERCENTAGE SHARES)

	1956	1958	1960	1962	1964	1966	1968	1971
EXPORTS:								
Drugs and medicine	0.8	0.6	2.5	2.4	3.2	4.5	5.3	3.0
Rice	3.5	9.8	8.1	2.8	11.2	12.2	7.3	16.9
Rapeseeds and oil	12.0	12.8	12.3	14.3	9.3	11.1	10.9	8.1
Raw Cotton	5.7	8.1	10.7	9.5	9.3	11.2	9.8	9.7
Cotton Manufactures	43.4	38.8	18.5	36.1	28.4	23.7	20.0	21.3
Tobacco Products	10.8	4.4	7.7	0.2	9.5	1.5	0.3	3.8
Cement	0.0	0.9	2.0	2.8	1.0	1.2	5.1	3.6
Other Exports	23.8	24.6	38.2	31.9	28.1	34.6	41.3	33.6
Total Exports	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Exports/Exports to R.O.W.	45.0	161.0	74.0	157.0	83.0	100.0	75.0	69.0
Imports/Exports	71.0	38.0	64.0	47.0	57.0	54.0	64.0	58.0
IMPORTS:								
Leather	3.2	4.8	6.9	2.9	4.3	3.5	3.6	2.6
Matches	3.4	5.2	2.2	7.7	5.9	6.1	4.1	5.0
Betelnuts	3.3	3.3	2.2	4.5	4.7	1.1	1.5	0.2
Paper and Paste Board	6.3	11.5	11.9	15.6	11.4	12.1	11.6	11.2
Tea	36.6	32.6	32.9	21.1	32.1	37.3	29.2	34.1
Jute	20.6	22.2	20.2	22.1	19.6	21.1	19.7	9.1
Other Imports	26.6	20.4	23.7	26.1	22.0	18.8	30.3	37.8
Total Imports	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Imports/Imports From R.W.W.	25.0	19.0	20.0	18.0	17.0	23.0	24.0	22.0

...continued

TABLE 4.11 (CONTINUED)

NOTES: (1) Components may not add to exactly 100 because of rounding.

Jute includes raw jute and jute manufactures.

Leather includes leather and related products.

R.O.W. is defined as rest of the world.

Sources: (1) 25 Years of Pakistan in Statistics, 1947-72, Karachi, 1972.

(2) Islam (1967).

TABLE 4.12

BALANCE OF PAYMENTS

	1967	1970	1973	1976	1978	1967	1978
	AT CURRENT PRICES - MILLION $U.S.					AS % OF EXPORTS (GOODS AND N.F.S.)	
Exports of Goods	457	535	767	1162	1283	84	76
Imports of Goods	854	953	890	2139	2741	157	162
Trade Balance	-397	-418	-123	-977	-1469	-73	-87
Non-Factor Services (net)	-108	-61	-66	-171	-176	-20	-10
Interest (net)	-34	-45	-83	-145	-181	-6	-11
Investment Income (net)	-14.1	-3	-1	----	----	-3	----
Worker's Remittances (net)	12	82	145	353	1225	2	73
Current Account Balance	-541	-274	-130	-940	-601	-100	36
						As % of Net Capital Inflow	
Net Public Loans	243	261	443	706	446	82	47
Direct Investment (net)	17	15	0	----	----	6	----
Grants	118	102	29	119	112	40	12
Capital Transaction N.E.I.	-82	0	-216	138	382	-27.9	41
Changes in Reserves	246	101	-126	140	-315	----	----

NOTES: N.F.S. is defined as non factor services.

N.E.I. is defined as not elsewhere included.

SOURCE: (1) World Tables, World Bank, Washington, D.C. 1976.

(2) Pakistan Economic Survey, Government of Pakistan, Finance Division, Islamahad, 1979

FOOTNOTES TO CHAPTER 4

1. Government of Pakistan, Finance Division, Pakistan Economic Survey 1978/79, Islamabad.

2. Pakistan Economic Survey 1978/79, op. cit.

3. Government of Pakistan, Planning Commission, The Fifth Five-Year Plan (1978-83), Karachi, 1978.

4. International Monetary Fund, International Financial Statistics April 1981, Washington, D.C.

5. Some studies of income distribution in Pakistan are Haq (1964), Bergan (1967), United Nations Economic Commission of Asia and the Far East (1972).

6. In general, the budgetary process in Pakistan has followed the procedures inherited from British India at the time of partition.

7. Pakistan Economic Survey 1978/79, op. cit.

8. The mechanics and performance of the Export Bonus Scheme in Pakistan are given in Bruton and Bose (1962), Hecox (1970), Soligo and Stern (1966), and Kholiquzzaman (1966).

9. The official exchange rate was Rs. 3.31 = U.S. $1 until July 1955; Rs. 4.76 = U.S. $1 until May, 1972; Rs. 11.00 until February, 1973; and Rs. 9.90 thereafter.

10. The classification scheme is similar to the one used by the United Nation Economic Commission for the Far East (UNECAFE).

11. Pakistan Economic Survey 1978/79, op. cit.

12. The balance of payments is based on exchange data from the State Bank of Pakistan. Imports and exports are presented somewhat differently from the presentation based on customs data used by the CSO.

13. Pakistan Economic Survey 1978/79, op. cit.

14. These are defined as follows: Agricultural Development Bank of Pakistan (ADBP), Industrial Development Bank of Pakistan (IDBP), Pakistan Industrial Credit and Investment Corporation (PICIC), and the House Building Finance Corporation (HBFC).

15. All banking statistics quoted in the text are from Pakistan Economic Survey 1978/79, op. cit.

16. State Bank of Pakistan (1961, P. 1.

17. In the developed countries, monetary policy can be used to alter rates of return on various assets through open-market operations. This is standard fare in any macroeconomic text-book.

CHAPTER 5

A THEORETICAL MODEL OF THE PAKISTAN ECONOMY

5.1 Introduction

The purpose of this chapter is to develop a dynamic growth model to represent the structure of the Pakistan economy as it has evolved over the period 1956 to 1978. Although Pakistan has existed since August 1947, 1956 has been chosen as the starting year to avoid the period of disruption and dislocation which occurred following separation and the Korean war boom in the early fifties. It also coincides with the time when attempts at planned development commenced, with the formulation of the First Five-Year Plan in Pakistan. In light of the main objective of this study, which is to analyse the growth prospects of Pakistan over the period 1978 to 1990, the perspective is that of a relatively long-term growth model rather than the Keynesian short-run model so often used in the developed countries.

5.2 Overview of the Model

It is difficult to identify precisely the genealogical basis of the model. Its origins can be traced back to the Harrod-Domar theory of growth, with that theory's emphasis on capital-output and savings-income relationships. However, as will be seen in this chapter, the model goes much farther in its elaboration of sectoral detail and

in the way in which sectoral capital stocks determine output. As observed in Chapter 3, models for developing countries have to be built in such a way as to capture the underlying structure prevailing there, and each country has some important specific characteristics as well as some general ones. In supply-constrained countries, capital requirements should play the primary role in output determination. Whereas the standard short-run demand model relates wage changes to the gap between labour demand and supply, the long-run model should be designed to incorporate the long-run tendency of wages to rise in response to productivity and price trends.

In the short run, cyclical fluctuations in output are related to inventory change but over the long run the change in inventories may tend to even out. Some variables such as income shares, labour participation rates, and other demographic characteristics, though considered of lesser importance in the short run, are of considerable importance in the long run in determining consumption behaviour, labour supply and the composition of output.

For an analysis of development and growth in Pakistan, the main structural characteristics incorporated in the model relate to the following: (1) foreign trade, with special emphasis on (a) exports of primary commodities and the shift to exports of manufactured goods, (b) the composition of imports between capital goods, consumer goods, complementary raw materials and intermediate imports, and food-grain imports; (2) sectoral composition of production and supply; (3) income distribution and its effects on consumption and savings; (4) inflation and its effect on the allocation of resources; and (5) government and its role in development of the economy.

The features mentioned above are taken into account in the model but a number of others have had to be ignored, primarily due to lack of information. The nature and size of the model are governed partly by the availability of data and represent a compromise between an ideal long-run growth model of an open developing economy, as proposed by Klein and Behrman (1970) and others, and the available data. This compromise is most substantial with respect to the incorporation of demographic factors. From an overall perspective, the model includes, besides the factors mentioned above, disaggregation of GDP by sectors and the integration of an input-output block designed to illuminate inter-industry flows, allowance for government deficits in the determination of the money supply, and the division of consumption and investment expenditures into private and public components. The model also tries to explain aggregate employment and aggregate and sectoral capital stocks. Other characteristics of the model will become evident in the discussion of individual relationships.

5.3 The Model in Detail

The equations of the model are presented in Table 5.1 at the end of the chapter, in more or less general form. The variables appearing in the model were defined immediately following the equations.

Value Added by Sector

Value added by sector is generated by a input-output transformation process linking final demand with value added by sector. This linkage follows the original ideas developed in the Brookings econometric model and the work of Ross Preston on the Wharton Annual

and Industry Forecasting Model (1972). The input-output (inter-industry) table can be written summarily as

$$(5.1) \qquad X_i = \sum_{j=i}^{n} X_{ij} + \sum F_{ik}, \quad i=1, \ldots, n.$$

X_i = Volume of gross output from sector i.

X_{ij} = Intermediate sales of sector i to sector j.

F_{ik} = The kth final demand for sector i's product (i.e. final consumption of good i)

The first assumption normally made in input-output models is that the output of industry i that is provided to industry j is a fixed proportion of the total demand of industry j, i.e.

$$(5.2) \qquad X_{ij} = a_{ij}X_j$$

Substituting in equation (5.1), based on equation (5.2), and summing overall final demands for good i,

$$(5.3) \qquad X_i = \sum_{j=1}^{n} a_{ij}X_j + F_i, \quad i=1,\ldots, n.$$

where $F_i = \sum_k F_{ik}$

Dropping subscripts, equation (5.3) can be rewritten in matrix form as

$$(5.4) \qquad X = AX + F$$

Solving for gross output and expressing it in terms of final demand

$$(5.5) \qquad X = (I-A)^{-1}F$$

Equation (5.5) is the basic input-output relation and all standard

calculations start from here. Three kinds of problems arise as one attempts to proceed from national income accounting (which is the basis for macroeconometric models) to inter-industry transactions accounting:

1. Generally one would not have time series data on final demand deliveries by each sector, unless input-output tables exist for all years. This is rarely the case, even for developed countries with a relatively large data base, and certainly not true of developing countries.[1] In Pakistan there exists, up to now, an input-output table only for 1963, and this is used in this present study.[2] The series that are abundant in developing countries are time series of final demands by spending categories, i.e. final consumption, investment, exports, imports, etc. These series can be converted into final demand deliveries by industries if we make the assumption of input-output proportionality and constancy:

$$h_{ij} = f_{ij} E_j \tag{5.6}$$

We assume in equation (5.6) that the amount of output that sector i sells to final demand category j is a constant proportion f_{ij} of the total final demand component E_j. In matrix form, this assumption implies:

$$F = HE \tag{5.7}$$

where F is an (nxl) vector of final demand deliveries by sectors;
H is an (nxm) matrix of industrial distribution of final demand;
E is an (mxl) vector of final demands by spending categories.

2. In national accounting one is dealing with value-added concepts, whereas input-output accounting involves gross output concepts.[3] Intermediate transactions constitute the difference between the two, i.e.

$$Y_j = (1-\hat{\sum_i} a_{ij})X_j \tag{5.8}$$

where Y_j = net value added in sector j.

Defining b_{jj} as

$$b_{jj} = (1 - \hat{\sum_i} a_{ij}) \tag{5.9}$$

equation (5.8) can be rewritten in matrix form as

$$Y = BX \tag{5.10}$$

where Y is an (nx1) vector of value added by sector; B is an (nxn) diagonal matrix with b_{jj} in the diagonal; X is an (nx1) vector of gross output by sector.

Substituting of equations (5.5) and (5.7) into equation (5.10) we have a relationship between value added by sectors and final demand by spending category which takes into account the industrial interdependence in the economy:

$$Y = B(I-A)^{-1}HE \tag{5.11}$$

Defining Z as

$$Z = B(I-A)^{-1}H \tag{5.12}$$

equation (5.11) can be rewritten as

$$Y = ZE \tag{5.13}$$

Equation (5.13) is a system of n equations. The input-output table for Pakistan used in this study has thirty-five sectors. However, it had to be aggregated to ten sectors to allow for conformity with the national accounts data.

3. The link between value added by sector and final demand expenditure by category has been established on the basis of assumed constancy of the input-output coefficient matrix A and the matrix of sectoral distributions of final demand H. In the short-run, the assumption of constancy of technology (as represented in the A matrix) and tastes (as represented in the H matrix) may be valid, but for a long-run model, such as the one being developed here, its validity is doubtful. The aim of planned development in the developing countries is to change the existing structure and any projections based on a structure existing fifteen years ago should be suspect. This is a problem which is noted in many multisectoral models and then glossed over. There are various methods proposed in the literature by which errors in projections in input-output models could be handled.

The most obvious way would be to model each of the elements of the Z matrix, but lack of time series data on inter-industry transactions and the large number of elements to be modelled (i.e. (nxn) + (nxm)) make this impractical.[4] Another method suggested by Stone (1962) and developed by Bacharach (1965), popularly known as the RAS method, attempts, through iterative procedures, to find an adjusted matrix of input-output coefficients which is consistent with the given sectors of final demand and value added at each point in time. Thus, adjusted matrices of coefficients are derived for the time periods for which the data on value added and final demand are

available, and then the nature of changes in the input-output coefficients over time can be studied. The RAS method requires total intermediate input and output of each commodity for the year for which a new matrix of coefficients is to be estimated. The RAS method for updating input-output matrices has not been used in this study, because of a lack of such information in Pakistan's case.

A third way proposed by Arrow and Hoffenberg (1959) and Klein et al. (1965), is to model the differences between the actual value added by sector and the computed values, based on equation (5.11) above. A series of residual vectors can be constructed by comparing the computed Y_t vectors ($\hat{Y}_t$) with the actual Y_t vectors for the period. Now the factors that influence changes in $B(I-A)^{-1}H$ are the same as those that give rise to the observed errors, U. Incorporating time subscripts,

$$U_t = Y_t - \hat{Y}_t = Y_t - B(I-A)^{-1}HE_t \tag{5.14}$$

In the context of supply-constrained developing countries, the integration of input-output production processes within a demand oriented model does not go far enough in introducing supply factors into the model per se. There are various factors which influence the input-output coefficients, such as the structure of capital, the limitation of transport, social factors, and the scarcity of particular resources. These operate as constraints in such a way as to stimulate changes in both technical coefficients and tastes. These factors need to be considered explicitly for an adequate specification of the supply side.

In this study we attempt to model the residual vectors for each sector. By introducing the net sectoral capital stock into

each sector's residual equation, we explicitly bring in the supply contraints in production. Net investment by sector, through its effect on the sectoral net capital stock, has a direct and fundamental role in determining growth. Since the input-output table for Pakistan is for the year 1963, all elements of the E vector i.e. consumption, investment, exports, imports and food imports, are in terms of 1963 prices. Equation (21) in the model defines gross domestic product at factor cost as the sum of the sectoral value added generated in equations (1) through (20) (Table 5.1). Output is determined through the production side and is converted into nominal values in equation (22), by multiplying by the implicit gross domestic product deflator. Equation (23) defines gross national product at market prices as the sum of gross domestic product at factor cost, customs taxes, other indirect taxes and, net factor income from abroad less subsidies. Subsidies include transfer payments and grants; disaggregation of subsidies into these components is not possible due to lack of data. Equations (25) and (26) define national income and disposable income, respectively.

Private Domestic Demand

Consumption expenditures are split into private and public components because of the different propensities between the two. Behind most models of income-consumption relations, the goal of deriving a reliable predictor is ever present. Because private consumption expenditures comprise the major component of final demand, the accuracy with which they are predicted has a major bearing on the predictive ability of the model as a whole.

Several hypotheses about private consumption behavior have been suggested for the developing economies. These revolve around the Keynes' Absolute Income Hypothesis that consumption is a stable function of income and that the average propensity to consume is less than the marginal propensity to consume. This hypothesis, if true, would have a major bearing on the development strategy in the various developing countries, in that a rising income level would generate increased savings and consequently increased gross capital formation thus leading to a higher growth rate. The hypothesis also has important implications for the distribution of income. The developing countries generally have greater inequality of incomes compared to the developed countries and increased inequality would tend to increase savings and growth. The implications of the Absolute Income Hypothesis thus have to be taken very seriously. The Permanent Income Hypothesis states that permanent consumption is proportional to permanent income. One major implication of the Permanent Income Hypothesis would be that redistribution of income would lead to increased savings only if it were perceived to be transitory. Duesenberry's Relative Income Hypothesis is based on the interdependence of individuals' behaviour and the irreversibility of the consumption habit over time. Consumption is viewed as depending upon the ratio of current to previous peak income so that consumption expenditures do not change proportionately to income. Finally the Ando-Brumberg-Modigliani Life Cycle Hypothesis states that consumption expenditures depend on lifetime average income, making consumption relatively insensitive to short-term increases in income. However, the long-run effects may be different, depending upon whether people perceive

redistribution to be a continuing process through higher taxes and other government policies. If the Keynesian hypothesis is valid in the case of Pakistan, then the long-run implication would be a declining consumption-income ratio, as income increases. For policy makers, it would imply the framing of policies such that a balance between consumption and investment goods is maintained. On the other hand the Permanent Income, Relative Income and Life Cycle Hypotheses imply the constancy of the consumption-income ratio in the long run. For development purposes then, if the long-run ratio is close to unity, policies would have to be designed to reduce it so that there were adequate domestic resources to finance increases in the productive capacity of the economy. Domestic savings have generally been less than investment in Pakistan and foreign inflows have filled the gap. The Absolute Income Hypothesis would imply the narrowing of the saving-investment gap in the long run. No such prospects are held out by the other hypotheses unless suitable policies are framed to foster savings.

The various hypotheses outlined above were formulated for the developed countries originally and have been tested in the context of developing countries, by Chenery and Eckstein (1970), Singh (1971), Williamson (1968), Landberger (1970) and others. The basic relationship in most formulations is such that private consumption varies directly with disposable income. However, there may be modifications of this relationship along the following lines:

i) In most developing countries large numbers of individuals live at a subsistence income level. Since for such people consumption is equal to income, aggregate consumption may not be proportional to

income even in the long run. This would imply relatively high multiplier effects. In addition retained business earnings constitute a relatively important source of savings. A division between labour and non-labour income may thus be desirable so that the two propensities can be estimated.

ii) The marginal propensity to consume may be higher for income generated by exports than for income from other sources. To allow for this possibility, the inclusion of a separate argument in the consumption function for income from exports may be desirable. In the event that such a difference did exist, the foreign sector would have an increased impact on the economy.

iii) Most developing countries receive foreign aid in the form of loans and grants, primarily to alleviate the foreign exchange constraint which might inhibit economic growth through the country's inability to acquire raw materials, intermediate imports and capital goods, and hence to increase the productive capacity of the economy. It has been hypothesised, for example by Rahman (1968) that increased foreign aid may go, in part, to higher consumption. Since foreign aid is meant to supplement savings, this would have major implications for policies concerning aid in the aid-giving countries.

iv) Inflation may tend to reduce consumption which would imply that it is conducive to savings and capital growth (commonly called the Forced Savings Hypothesis).

v) Wealth could affect consumption behaviour in a positive or negative manner and the relationship is open for empirical determination.

Mikesell and Zisner (1973) have reviewed the existing empirical evidence for private consumption-savings behavior in Latin America and other developing countries. Some support has been found for these propositions, although the evidence is not overwhelming. One major finding, as reported by them, gives support for a medium-term version of Friedman's Permanent Income Hypothesis whereas efforts to find support for the Modigliani-Blumberg-Ando Life Cycle Hypothesis have been much less successful.

There have been relatively few empirical studies of the consumption function in Pakistan. Bhuiyan's (1971) explorations were based on data for Pakistan, including what is now Bangladesh. He used these data to test the Permanent Income Hypothesis employing both linear and log-linear trends in the computation of permanent income and transitory income. His results contradict the hypothesis: the marginal propensity to consume out of transitory income was not significantly different from unity. This may be due to the fact that models such as the Permanent Income Hypothesis and the Life-cycle Hypothesis which entail a long-run planning horizon may not be applicable in developing countries where households, small businesses and small farmers are subject repeatedly to abrupt and severe fluctuations in income and weather. Moreover since the majority of people who are at subsistence level would be consuming all their income and still not meeting their basic needs, they would tend to increase consumption with any transitory increase in income. The Absolute Income Hypothesis found some support in Bhuiyan's study. The marginal propensity to consume (MPC) was equal to 0.81 when he regressed real consumption expenditures on real disposable income. However the positive auto correlation amongst the residuals (Durbin Watson Statistic =

0.69) suggests that he neglected some other systematic influence on consumption.

A study of savings behavior in Pakistan by Ali (1977) found absolute income to be significant in explaining savings. However, the marginal propensity to save was 0.11, implying a higher MPC of 0.89 for Pakistan (Bangladesh excluded) than Bhuiyan's estimate of the MPC for Pakistan (Bangladesh included). Ali's result seems to suggest that Bangladesh, with a relatively lower per-capita income and proportionately more people in rural areas, had a higher savings rate than Pakistan. This result is surprising as a priori one would expect the opposite result. However, the finding has been confirmed by direct tests on Bangladesh data for the period 1960-1970. Of the different models experimented with by Alamgir and Berlage (1973), using Bangladesh data, the one involving disposable income produced an estimate of MPC of 0.79 and was considered to be a better predictor of private consumption than other specifications.

In formulating a model of private consumption behaviour for Pakistan in this study, it was expected that income would have a dominant influence, in light of the findings discussed above. However, a priori it might also be expected that the different income groups in Pakistan would have different propensities to consume. More specifically, the wage-earning group would be expected to have a higher MPC than the capitalist group. This expectation is supported by a study by Little et al. (1970), in which it was observed that some 70% of profits after taxes were saved in Pakistan. Arif (1979) has estimated that in 1977 the savings rate for Pakistan was 25.9% in the top 20% of the population, 10.5% in the middle income group

(comprising 40% of the population) and 7.5% in the lowest income group (comprising the remaining 40% of the population). Another factor to be considered is the relatively large size of the agricultural sector, which currently accounts for about 30% of income, and close to 50% of the employed labour force. Agricultural income is subject to substantial variations due to the vagaries of weather and market conditions.

In a study with Indian data, Gupta (1970) classified households by their urban and rural locations. He found that the MPS was higher in the urban sector than in the rural sector. Also, in both sectors the MPS tended to increase with per-capita income and a redistribution of income from rural to urban and from poor to rich households would be expected to lead to higher aggregate household savings.

Ideally, a disaggregation of consumption behaviour by income groups would be preferred, but data for private consumption in Pakistan are available only at the aggregate level. Private consumption expenditures could be explained by considering three components of income, i.e. agricultural income, non-wage income and wage income. Since it is after-tax income which would be relevant, the following form could be used

$$(5.15) \qquad CPR = f\left[(WYC/P) \times (1-t),\ (NWYC/P) \times (1-t),\ (YAR + YLFR) \times (1-t),\ CPR-1\right]$$

CPR denotes private consumption expenditures in constant prices; WYC denotes nominal wage income, which is deflated by the general price index (P); NWYC denotes non-wage income and is deflated similarly; YAR and YLFR stand for real value added in major crops

and in livestock, fishing, forestry and other crops; and t is the average tax rate.

Equation (5.15) would take explicit account of taxes. However, we are unable to estimate this equation for Pakistan because there is hardly any information available on wage and non-wage income, and on the average tax rate. Since most studies of the consumption function in the developing countries have found support for the permanent income hypothesis, we will use a modified version of it. Private consumption expenditures are explained by disposable income, and a one-period lag of private consumption expenditures to reflect habit-persistence. Some of the hypotheses about consumption behavior mentioned above are also tested and the results are reported in the next chapter.

Gross investment expenditures are considered separately for the private and government sectors. There is no clear-cut rule by which to define government investment expenditures. The government can and does invest in the consumer and intermediate good industries. It has taken an active role in the economic development of Pakistan through the implementation of the various five-year plans discussed in Chapter 4. It invests heavily in the various sectors of the economy, in light of its five year objectives: more specifically it invests in areas where it is felt that the private sector's response to the need for investment is not adequate. Thus government investment has been used as an active instrument of economic policy. Such investment may depend on factors quite different from those that determine private investment expenditures.

In specifying the equation for private gross investment

expenditures in Pakistan, the distinction between planned and realized investment becomes relevant. In countries with well-organized capital markets, the cost of capital can be clearly identified. Planned investment decisions are based on a comparison of the present value of the expected stream of income to be generated by the investment and the cost of the investment. Variables which enter into the investment decision include, therefore, the capitalization rate applicable to real assets and real net national product. Pakistan does not have an adequate capital market and much of the domestically financed investment does not pass through a capital market as such. The modern and traditional sectors are fragmented. In the rural sector, borrowing from friends and relatives is the only avenue open. In the modern sector, legal limits on nominal interest rates are almost always effective, so that credit rationing occurs in the bank markets according to priorities for sectors and enterprises specified by the government in its yearly Comprehensive Investment Schedule. Given that the legally fixed interest rates are normally effective, it seems unlikely that interest rates would be significant in the Pakistan investment equation.

In Pakistan, where most of the capital goods are imported in the form of machinery and equipment, part of the investment decision (such as the construction of the plant and complementary equipment) depends upon the availability of imported goods. Government investment activities in the infra-structure are undertaken sometimes to promote other forms of investment.

Keeping in mind all the factors discussed above, we specify gross private investment to depend positively on bank credit made available to the private sector and positively on the change in gross

domestic product. Credit extended to the private sector by the commercial banks is a policy variable and depends on the priorities established by the government in its five-year plans. The inclusion of gross domestic product in the specification is intended to take into account growth effects.

Government Sector

Functional relationships are formulated for government receipts and expenditures. Equations are specified for sales and excise taxes, custom duties, direct taxes on income and wealth and the net revenues generated by the various public departments and enterprises.

On the expenditure side, equations are specified for general government consumption expenditures,[5] government investment expenditures, general government subsidies, government interest payments on domestic debt and government interest payments on its net foreign debt.

In order to be able to predict total consumption in the economy, it is necessary to obtain separate predictions for private and public consumption expenditures. This is due to the fact that, whereas private consumption expenditures would be expected to be significantly related to disposable income, government consumption expenditures would more likely be related to the general level of operation of the economy, as reflected by the gross domestic product. The effect of different government policies on its own consumption expenditures is direct but the effect of these policies (fiscal, monetary and commercial) on private consumption is indirect. Conceptually, it is very difficult to predict the level of government consumption

expenditures, since it does not conform with any particular stable relationship. Furthermore, many of them depend in a large part on political considerations (e.g. expenditures on defence and social services).

Nonetheless, there seems to be a close relationship between overall government consumption expenditures and gross domestic product. A look at international cross-section data suggests this (Alamgir, 1971), as does a study by Alamgir and Berlage (1973) using Bangladesh data. However, the relationship may result from the fact that government tax revenues are related positively to gross domestic product, and that such revenues are the relevant variable which constrains government consumption. Government revenues may not be an effective constraint though, as the government can use foreign assistance and internal deficit financing to cover its expenditures. Evidence available suggests (not conclusively though) that such flows are diverted partly to current government expenditure (Ali, 1977). Other studies have found that government revenues significantly influence government consumption, which reinforces the view that the more relevant variable is government revenues, rather than gross domestic product (Ball 1973; Marzouk 1975; Del Rio and Klein, 1974).

In this study general government consumption expenditures in real terms, are hypothesised to be related to government revenues, population (indicating the need for government social services), net foreign assistance (exclusive of repayment of foreign loans), and a lagged government consumption term reflecting the inability of the government to alter its expenditures significantly in the short run.

Government gross investment expenditures are specified to

depend positively on foreign aid and government revenues. Planned government gross investment expenditures during any year depend upon the external and internal resources that can be mustered. By allocating its investment expenditures among various sectors of the economy according to the priorities worked out in the five year plans, the government tries to achieve the objectives of the plans. Government investment expenditures are thus an instrument of economic policy. In the simulation experiments with the model, nominal government investment expenditures will be specified under different assumptions to derive implications about the magnitudes of foreign assistance and domestic resources required to achieve specified growth rates.

Equations for interest payments by the government on domestic and foreign debt are related to the accumulated domestic deficit and accumulated net foreign indebtedness, respectively.

Government subsidies consist of losses incurred in distributing improved seeds and fertilizers to farmers gratuitously or at reduced rates. The government also incures losses by procuring major crops (primarily wheat and rice) at fixed prices, and then rationing them at subsidised rates. Government subsidies are specified as depending upon value added in major crops. In years of good harvests subsidies tend to go down.

On the revenue side, indirect taxes are disaggregated into customs (imports and exports) taxes and other indirect taxes (sales and excise taxes levied on domestically produced and used goods). Other indirect taxes in nominal values are related to nominal income in the primary sector and the secondary and tertiary sectors separately (exluding exports). Customs taxes have been an important

source of revenue for the government and are an instrument in its commercial policies. They are treated separately to estimate average export and import tariff rates. Nominal direct taxes are related to primary sector income and non-primary sector income. Direct taxes levied on the primary sector in Pakistan have been mostly wealth taxes in the form of land tax, and have constituted a relatively small proportion of total direct taxes. It is expected that the income elasticities for the taxes from these two sources would be different, with direct taxes on the primary sector being relatively income-inelastic. Revenues other than taxes consist of net receipts from the various government enterprises (post and telegraph, railways and various public departments). They would be expected to be related positively to the general level of activity in the economy, and in this study gross domestic product is used to explain these non-tax revenues of the government.

The nominal government deficit is the excess of nominal expenditures (general government consumption expenditures, investment expenditures, interest payments and subsidies) over government revenues plus foreign aid (net loans and grants).

Foreign Trade

Foreign trade relations are treated in some detail within the model because of the strategic importance of foreign trade for the economy. As seen in Chapter 4, Pakistan's major exports have been primary commodities such as raw cotton, rice, raw wool and leather. Traditionally raw cotton has been the main export item, but in recent years there has been a fall in production of cotton due to climatic

conditions and low export prices. Foreign earnings from raw cotton have declined over the years, whereas earnings from exports of cotton textiles have increased. Equations for exports of raw cotton, cotton textiles and other exports and services are specified in the model.

Raw cotton exports are considered from the supply point of view. It is hypothesised that since Pakistan is a small supplier of raw cotton to the world, it takes world prices as given. Supply of raw cotton from Pakistan is influenced positively by the ratio of the export price of raw cotton to the domestic wholesale price and positively by domestic production. Value added in the major crops sector in 1963 prices is used as an index of raw cotton production as data for the latter variable are unavailable.

The export equation for cotton textiles is a demand equation. Exports of cotton textiles have increased over the years with the expansion of the domestic cotton textile industry; in recent years, as much export earnings have been derived from cotton textiles as from raw cotton. Bangladesh was an important market for cotton textiles before 1972. Since then Pakistan has had to divert its exports to other markets.[6] Cotton textiles face an uncertain future due to competition from synthetic fabrics. A recent study by Ecevit (1977) indicates that demand for cotton textiles, which had been decreasing over the first half of the seventies, is increasing due to changes in tastes favourable to cotton. However, cotton textile imports by the developed countries face price and quantitative restrictions.

The demand equation for cotton textiles is specified to in-

clude the price of cotton textiles relative to the price of synthetic textiles (to reflect substitution in world demand) and an index of gross national product of the countries where Pakistan exports (to reflect the income effect).

Other exports include rice, leather, carpets and rugs, sports goods, cement and products, fish and fish preparations, shipping and insurance and banking. Pakistan's exports of rice have increased dramatically since 1973 and now are a leading export earner. As noted in Chapter 4, Pakistan produces a fine quality rice, Basmati, which is popular in the Middle-East due to its aromatic quality, and that area, with its increased oil revenues, has recently increased its imports from Pakistan. However, the rise in rice exports is a recent phenomenon, and it has not been accorded separate treatment in estimation. Instead exports of other goods and services including rice are related to a time trend and an index of gross national product of the countries where Pakistan exports.

Equations for imports are specified by economic use for consumer goods, food grains, raw materials and spare parts, and capital goods and services. It would have been ideal to distinguish between competitive and non-competitive imports. Non-competitive imports could then have been related to the using sectors in the input-output table by fixed coefficients.

However the input-output table used in this study treats all imports as competitive in that they are treated as negative final demand. That is, there is no row for non-competitive imports in the table, relating them to the using sector. In any event the classification of imports into competitive and non-competitive categories is difficult and in practice the distinction is often

made on the basis of foreign trade statistics and industrial census data, supplemented by a priori guesses about comparative advantage and near-term import substitution possibilities.

The choice of variables to explain import demand have been dictated by theory and availability of data. The economic theory embodied in the equations for imports is the theory of demand for a good, in that, they would be influenced positively by prices for substitutes, negatively by own price and positively by increases in income. It is modified in light of the characteristics of the Pakistan economy.

The Pakistan currency is not readily convertible in the foreign exchange market and all foreign exchange earnings by Pakistani residents have to be turned over to the State Bank (central bank). Over the period being studied Pakistan has pursued commercial policies to restrict imports via a system of exchange controls and import licensing. It may seem that the dependence of imports on income and relative prices is not realistic. However, as it has been argued elsewhere (Islam 1967; Kemal and Alvie 1974), the licensing policy has been responsive to the need for imports in the various sectors of the economy (imports of raw materials, spare parts and capital equipment). Generally the restrictions on imports have tended to discriminate selectively against consumer goods, relative to raw materials, spare parts, and capital goods. The point of emphasis has tended to shift over time, depending upon the investment priorities and the availability of foreign exchange. Policies with regards to the rationing of foreign exchange cannot be quantified. It is expected that they will be correlated with the levels of foreign exchange reserves, which are thus included in

the import equations.

Factors of Production

The net capital stock in the current year is defined as the sum of the net capital stock one period earlier, plus gross investment (public and private), less depreciation. One would expect that the depreciation rates would be different for the public and private sectors as most of the public investment is in infra-structure, social overhead and the like, whereas most of the private investment would be in capital equipment and other assets related directly to production. However, in the case of Pakistan, government investment is not limited to the infra-structure alone, and as mentioned previously, the government does invest in various sectors of the economy, in enterprises for which it is felt that private investment will not be forthcoming. The railway system is owned by the government and so is the domestic airline. It also has a major share in road transport. Over the period of this study, the government has invested heavily in the agricultural sector (dams, irrigation, canals). Even the infra-structure, such as roads, dams, bridges and railway lines does require maintenance. (Roads are notorious for requiring continuous maintenance due to the particular soil conditions and floods.)

It would have been desirable to have been able to use investment and depreciation estimates by sector but the data are available only since 1970. Before 1970, the data on gross investment by sector include Bangladesh. To calculate net capital stock by sector, use is made of a study by Khan and MacEwan (1967), in which

they estimated net capital-output ratios by sector for 1963.

To calculate the net capital stock in some sector i (K_i) in any given year, the capital-output ratio k_i (available from Khan and MacEwan, 1967) for the sector is multiplied by its output in the previous year (Y_{i-1}). However, the sum of these sectoral estimates generally will not be equal to the aggregate net capital stock figure (KR), arrived at independently. (The sum of public and private net investment and capital stock in the previous period.) The difference between the two aggregate capital stock estimates is allocated among the various sectors by a correction factor. The formula for the calculation is:

$$K_i = k_i \cdot Y_{i-1} + a_i(KR - \sum_i \hat{K}_i) \tag{5.16}$$

this can be rewritten as:

$$K_i = \hat{K}_i + a_i (KR - \sum_i \hat{K}_i) \tag{5.17}$$

and the correction factor a_i is calculated as:

$$a_i = \hat{K}_i / \sum_i \hat{K}_i \tag{5.18}$$

Substituting equation (5.18) into (5.17),

$$K_i = \hat{K}_i \, (KR / \sum_i \hat{K}_i) \tag{5.19}$$

Investment has a dual role in this model. Demand for investment increases income in the current period and the investment itself adds to the capital stock, thereby increasing the productive capacity of the economy.

The equation for employment makes it dependent on the capital stock: a fixed relationship is assumed.

Most multi-sectoral models of the developing countries project labour requirements on the basis of labor-output ratios. The relevant equation is:

$$F = L \quad (I-A)^{-1} E_{-1} \tag{5.20}$$

where F is an (nxl) vector of labour requirements (direct and indirect) by sectors; L is an (nxn) diagonal matrix of labour-gross output ratios by sectors; $(I-A)^{-1}$ is an (nxn) matrix of direct and indirect technical coefficients; E is an (nxl) vector of final demands by sectors.

A similar approach could have been employed in this study. Labour force could be projected on the basis of the 1963 input-output table, however, lack of information on the labour coefficients prevents this approach. Even if the labour coefficients were available for 1963 they would have changed over time, due to changes in technology and productivity relationships. As the main purpose of this study is to analyse the growth prospects of Pakistan, the focus is on the aggregate requirements for labour, rather than on the sectoral requirements. A study focusing on sectoral requirements would no doubt be a useful extension. It would bring in sectoral labour requirements through equation (5.20) and, given information on the actual labour force by sector, would attempt to model the residuals between actual and predicted sectoral employment.

Money Supply and the Price Level

The financial markets for the developed economies are generally patterned on the extensions of Tobin's (1969) portfolio equilibrium model as developed by Ando (1974). Private-sector asset holders have demand functions for four imperfectly substitutable assets: equities, bonds, foreign securities and money. The demand for each asset is a function of the rates of return (money having a zero rate of return), and income, and the interest rate for foreign securities are assumed to be exogenous.

The theoretical aspects of the supply of money have remained relatively unexplored in the developed countries. In the discussions of monetary theory and policy, the supply of money is usually considered to be determined by the actions of the monetary authorities. The money supply is related to the reserve base by a multiplier determined by a reserve ratio, associated with the banking system, and by the ratio between currency and deposits held by the public. The trend of later research on the money supply has been towards treating these ratios as behavioural relationships employing asset choices, rather than as exogenous variables. This approach differs substantially from the money-multiplier approach, in that the analysis is based on the behaviour of the individual bank rather than the banking system as a whole. Economic theory is applied in explaining the level of reserves desired by the bank, relating its behavior in increasing or reducing its assets to the difference between its actual and its desired reserves. These innovations are exemplified in Brunner's (1961) schema for the supply theory of money within the institutional framework of the U.S. banking system. Ronald Teigen

(1964) presented a money supply hypothesis (again in the context of the U.S. banking system), based on the notion that the total reserves in the Federal Reserve system, the underlying institutions and rules, and certain regular behavioral relationships, determine a maximum attainable money stock at any time. The maximum money stock is the sum of two parts; one is exogenously determined, mainly at the initiative of the Federal Reserve system, and the other is endogenously determined by the banking system in response to loan opportunities and interest rates.

It is observed that the modelling of the financial markets, briefly outlined in the foregoing paragraphs, rely, to a large extent, on technical relationships which exist under the legal and institutional conditions of the United States. These relationships would apply equally well to other developed countries, such as the United Kingdom and Canada, which have well functioning markets for foreign and domestic assets.

It is doubtful whether the financial market in Pakistan could be adequately modelled in a similar fashion. The asset markets are quite fragmented, function very poorly and are relatively unimportant in channeling investible funds. Dualism prevails, with changes in the organized market having limited impact on the unorganized sector. Government bond markets and private security markets are quite small. Dealing in foreign assets is illegal for Pakistani residents. The interest rates on demand and time deposits are fixed, with quantitative restrictions on internal credit.

Under such circumstances, monetary policy would be expected to be limited in scope. The very small bond market would preclude substantial open-market operations. The nominal money supply would not be exogenous, but would depend on de facto or de jure obligations

to finance the government deficit and on foreign exchange movements. Nominal money supply, defined as currency in circulation plus demand deposits held by the public, is an endogenous variable in the model. To explain the change in the stock of money, we consider the factors which would cause such a change.[7]

The change in the supply of money should generally be equal to the commercial banks' loans and advances to the public, changes in the holdings of the government debts by the commercial banks and the central bank, and changes in foreign exchange reserves. This is generalised to obtain the historical definition of money supply as being functionally dependent upon the government deficit, commercial bank borrowings from the State Bank and the change in foreign exchange reserves. Borrowings of the commercial banks from the State Bank would generally be resorted to when the commercial banks face a high demand for credit from either the private sector or the government. They are explained in the model as depending positively on credit extended to the private sector and positively on the government deficit.

The implicit gross domestic product deflator, representing the general price level in the economy, is the only price variable explained within the model. The treatment of relative prices and their allocative role are the least satisfactory features of most econometric models of developing countries. The present model is no exception.

Originally, thought was given to formulating a model of prices at the sectoral level and relating these prices to final demand prices. A major obstacle in explaining prices at the sectoral level is the fact that data on wage rates and productivity by sectors are simply

not available, and these would be key variables in determining sectoral prices. Moreover, during the period under study various classes of commodities have been under price controls which have distorted the formation of price expectations.

Regarding the question of price determination in Pakistan, the proper approach should be based on the generalization of the micro-economic principles of supply-demand interactions. The factors operating on the demand side would include monetary expansion, rising private and public expenditures, wage increases, etc. On the supply side, one may include real gross domestic product, increases in production costs and indirect taxes, and the volume and prices of imports and exports.

There would also be some transient factors which could cause temporary fluctuation in prices such as bad harvests and production stoppages. The expectation of price increases could result in stock-piling on the part of consumers, leading to an actual increase in prices. Monopolist pricing by producers, to secure higher margins of profit, could be expected to affect prices. Finally, an upward adjustment in controlled prices would have an upward effect on the general price level.

The factors affecting the price level being so numerous and unquantifiable in many cases, it would be extremely difficult, if not impossible, to assess the influence of each factor on the price level separately. For the purposes of this study, a variant of Harberger's (1963) aggregative regression analysis of the price level in Chile is used. Our basic hypothesis is that the general price level can largely be explained by the level of aggregate demand. The

general price level is hypothesised to depend upon the stock of money in circulation (demand version of monetary or quantity theory), the general level of import prices (raw materials and capital goods comprise a major part of imports), representing the supply influences and a lagged price term reflecting the fact that prices do not adjust instantaneously.

In this chapter we have outlined the framework of the model to depict the Pakistan economy as it has evolved over the period from 1956 to 1978 and provided theoretical justifications for individual relationships within the model. The model has been developed in light of the objective of this study, which is to analyse Pakistan's growth prospects over the period 1978 to 1990. Moreover, construction of the model serves as a statistical testing exercise for alternative components of the system. In the next chapter we shall present the estimation results obtained by confronting the model with data for Pakistan and the results of testing alternative hypotheses about individual components of the system.

TABLE 5.1

THEORETICAL GROWTH MODEL OF PAKISTAN

Production (Value Added by Sector)

$$
\begin{bmatrix} YAR \\ YLFR \\ YMMR \\ YEGR \\ YTSR \\ YWRR \\ YCONR \\ YPADR \\ YODR \\ YSRVR \end{bmatrix} = \begin{bmatrix} z_{1,1} & \cdots & z_{1,5} \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ z_{10,1} & \cdots & z_{10,5} \end{bmatrix} \begin{bmatrix} CR \\ \\ IR \\ \\ EXR \\ \\ MTLFR \\ \\ MFR \\ \\ \end{bmatrix} + \begin{bmatrix} UAR \\ ULFR \\ UMMR \\ UEGR \\ UTSR \\ UWRR \\ UCONR \\ UPADR \\ UODR \\ USRVR \end{bmatrix} \tag{1}
$$

$$UAR = UAR\ (UAR_{-1},\ KAR,\ TIME) \tag{11}$$

$$ULFR = ULFR\ (ULFR_{-1},\ KLFR,\ TIME) \tag{12}$$

$$UMMR = UMMR\ (UMMR_{-1},\ KMMR,\ TIME) \tag{13}$$

$$UEGR = UEGR\ (UEGR_{-1},\ KEGR,\ TIME) \tag{14}$$

$$UTSR = UTSR\ (UTSR_{-1},\ KTSR,\ TIME) \tag{15}$$

$$UWRR = UWRR\ (UWRR_{-1},\ KWRR,\ TIME) \tag{16}$$

$$UCONR = UCONR\ (UCONR_{-1},\ KCONR,\ TIME) \tag{17}$$

$$UPADR = UPADR\ (UPADR_{-1},\ KPADR,\ TIME) \tag{18}$$

$$UODR = UODR\ (UODR_{-1},\ KODR,\ TIME) \tag{19}$$

$$USRVR = USRVR\ (USRVR_{-1},\ KSRVR,\ TIME) \tag{20}$$

National Income

(21) GDPR = YAR+YLFR+YMMR+YEGR+YTSR+YWRR+YCONR+YPADR+YODR+YSRVR

(22) GDPC = P x GDPR

(23) GNPR = GDPR + (TIC+TXMC)/P + NFYR - SBR

(24) GNPNANEC = (GNPR-YAR-YLFR) x P - (EXR x PEX)

(25) NYR = GNPR - DEPR - (TIC+TXMC)/P + SBR

(26) NYDR = NYR + (INTCD-TDC)/P

(27) NYNAC = (NYR-YAR-YLFR) x P

Private Domestic Demand

(28) CPR = CPR (NYDR, N, CPR_{-1})

(29) IPR = IPR (CREDC/P, (GDPR-$GDPR_{-1}$))

Government Sector

(30) CGR = CGR (GRC/P, N, FINC/PM, CGR_{-1})

(31) IGR = IGR (FINC/PM, GRC/P, IGR_{-1})

(32) SBR = SBR (YAR, TIME)

(33) INTDC = INTDC ($GDEBTC_{-1}$)

(34) RFDC = RFDC ($TFDC_{-1}$)

(35) GDEBTC = $GDEBTC_{-1}$ + GDEFC

(36) TFDC = $TFDC_{-1}$ + FINLC

(37) TIC = TIC (GNPNANEC)

(38) TXMC = TXMC (EXRxPEX, MRRxPMRI, MKRxPMKI, MCRxPMCI)

(39) TDC = TDC (NYNAC)

(40) TOC = TOC (GDPC)

(41) GRC = TIC + TXMC + TDC +TOC

(42) FINC = FINLC + FINGC

(43) GDEFC = (Px(CGR+IGR+SBR) + INTDC + RFDC) - (GRC+FINC) + SDIS

Total Domestic Demand

(44) CR = CPR + CGR

(45) IR = IPR + IGR

Foreign Trade and Balance of Payments

(46) ECTR = ECTR(RELPCTI, GNPR, YAR)

(47) ECTTR = ECTTR(RELFABP, GNPW)

(48) EOSR = EOSR(GNPW, TIME)

(49) EXR = ECTR + ECTTR + EOSR + BEXR

(50) MCLFR = MCLFR(NYDR, PMCI/ P, FERC/PM, MCR_{-1})

(51) MFR = MFR(YAR, NYDR)

(52) MKR = MKR($YMMR_{-1}$, FERC/PM, MKR_{-1})

(53) MRR = MRR(YMMR, FERC/PM, MRR_{-1})

(54) MSR = MSR(GDPR, MSR_{-1})

(55) MTLFR = MCLFR + BIMC/P + MKR + MRR + MSR

(56) $FERC = FERC_{-1} + (PEX \times (ECTR+ECTTR+EOSR))_{-1} + FINC_{-1}$
$-(PM \times (MCLFR+MFR+MKR+MRR+MSR))_{-1} + OTHT$

Factors of Production

(57) $KR = KR_{-1} + IR_{-1} - DEPR_{-1}$

(58) DEPR = 0.04 KR

(59) $KADF = KR/(a_1 YAR_{-1}+a_2 YLFR_{-1}+a_3 YMMR_{-1}+a_4 YCONR_{-1}$
$+a_5 YEGR_{-1}+a_6 YTSR_{-1}+a_7 YWRR_{-1} a_8 YODR_{-1}$
$+a_9 YPADR_{-1}+a_{10} YSRVR_{-1}$

(60) $KAR = a_1 YAR_{-1} \times KADF$

(61) $KLFR = a_2 YLFR_{-1} \times KADF$

(62) $KMMR = a_3 YMMR_{-1} \times KADF$

(63) $KCONR = a_4 YCONR_{-1} \times KADF$

(64) $KEGR = a_5 YEGR_{-1} \times KADF$

(65) $KTSR = a_6 YTSR_{-1} \times KADF$

(66) $KWRR = a_7 YWRR_{-1} \times KADF$

(67) $KODR = a_8 YODR_{-1} \times KADF$

(68) $KPADR = a_9 YPADR_{-1} \times KADF$

(69) $KSRVR = a_{10} YSRVR_{-1} \times KADF$

(70) EMP = EMP (KR)

Money Supply and the Price Level

(71) MSUPC = MSUPC(BORC, GDEFC, FERC)

(72) $P = P(MSUPC, PM, P_{-1})$

(73) BORC = BORC(CREDC, GDEFC)

Definitions

1. a_1: capital-output ratio in major crops sector, (wheat, rice, cotton) in 1963.

2. a_2: capital-output ratio in livestock, fishing, forestry, and other crops in 1963.

3. a_3: capital-output ratio in mining and manufacturing in 1963.

4. a_4: capital-output ratio in construction in 1963.

5. a_5: capital-output ratio in electricity and gas in 1963.

6. a_6: capital-output ratio in transport, storage and communication in 1963.

7. a_7: capital-output ratio in wholesale and retail trade in 1963.

8. a_8: capital-output ratio in dwellings in 1963.

9. a_9: capital-output ratio in public administration and defence in 1963.

10. a_{10}: capital-output ratio in services in 1963.

11. BEXR*: total exports to Bangladesh in millions of 1963 Rupees (during the period 1956 to 1971)

12. BIMC*: total imports from Bangladesh in millions of Rupees (during the period 1956 to 1971)

13. BORC: commercial banks' borrowings from the State Bank in millions of 1963 Rupees

14. CGR: general government consumption expenditures in millions of 1963 Rupees

15. CPR: private consumption expenditures in millions of 1963 Rupees.

16. CR: total consumption expenditures in millions of 1963 Rupees.

17. CREDC*: bank credit extended to the private sector in millions of Rupees

18. DEPR: depreciation of capital stock in millions of 1963 Rupees.

19. ECTR: exports of raw cotton in millions of 1963 Rupees. (excluding exports to Bangladesh from 1956 to 1971)

20. ECTTR: exports of yarn and cotton textiles in millions of 1963 Rupees (excluding exports to Bangladesh from 1956 to 1971).

21. EMP: total employment in millions of man-years.

22. EOSR: exports of goods, other than cotton and cotton textiles and services in millions of 1963 Rupees.

23. EXR: total exports of goods and services in millions of 1963 Rupees.

24. FERC: foreign exchange reserves held and controlled by the State Bank of Pakistan in millions of Rupees (beginning of the year)

25. FINC*: foreign aid extended to government of Pakistan in millions of Rupees (grants and loans net of repayment)

26. FINGC*: foreign grants given to Pakistan in millions of Rupees.

27. FINLC*: foreign loans extended to Pakistan in millions of Rupees (net of repayments on previous loans).

28. GDEBTC: total domestic government debt in millions of Rupees.

29. GDEFC: government deficit in millions of Rupees.

30. GDPC: gross domestic product at factor cost in millions of Rupees.

31. GDPR: gross domestic product at factor cost in millions of 1963 Rupees.

32. GNPR: gross national product at market prices in millions of 1963 Rupees.

33. GNPW*: index of gross national product of countries which buy Pakistan's exports (1963 = 100).

34. GNPNANEC: gross national product less primary sector and export income in millions of Rupees.

35. GRC: total government revenues in current account in millions of Rupees.

36. IGR: gross capital formation by government in millions of 1963 Rupees.

37. INTDC: interest payments by government on domestic debt in millions of Rupees.

38. IPR: private gross capital formation in millions of 1963 Rupees.

39. IR: total gross capital formation in millions of 1963 Rupees.

40. KAR: net capital stock in major crops sector (wheat, rice, cotton) in millions of 1963 Rupees.

41. KADF: capital stock adjustment factor.

42. KCONR: net capital stock in construction in millions of 1963 Rupees.

43. KEGR: net capital stock in electricity and gas sector in millions of 1963 Rupees.

44. KLFR: net capital stock in livestock, fishing, forestry and other crops sector in millions of 1963 Rupees.

45. KMMR: net capital stock in mining and manufacturing in millions of 1963 Rupees.

46. KODR: net capital stock in dwellings.

47. KPADR: net capital stock in public administration and defence in millions of 1963 Rupees.

48. KSRVR: net capital stock in services sector in millions of 1963 Rupees.

49. KTSR: net capital stock in transport, storage and communications in millions of 1963 Rupees.

50. KWRR: net capital stock in wholesale and retail trade sector in millions of 1963 Rupees.

51. KMMR: net capital stock in mining and manufacturing in millions of 1963 Rupees.

52. KR: total net capital stock in millions of 1963 Rupees in the beginning of the year.

53. MCLFR: imports of consumer goods less food-grains in millions of 1963 Rupees.

54. MFR: imports of food-grains in millions of 1963 Rupees.

55. MKR: imports of capital goods in millions of 1963 Rupees.

56. MRR: imports of raw materials and intermediate goods in millions of 1963 Rupees.

57. MSR: imports of services in millions of 1963 Rupees.

58. MSUPC: money stock in millions of Rupees.

59. MTLFR: total imports of goods and services excluding food-grain imports in millions of 1963 Rupees.

60. N*: total population in millions of persons.

61. NFYR*: net factor income from abroad in millions of 1963 Rupees.

62. NYDR: disposable income in millions of 1963 Rupees.

63. NYR: national income in millions of 1963 Rupees.

64. NYNAC: national income less primary sector income in millions of Rupees.

65. OTHT* short-term accomodations and balancing item in the balance of payment account in millions of Rupees.

66. P: implicit gross domestic product deflator (1963=1.00)

67. PECTI*: ratio of wholesale price index of cotton to unit value index of cotton exports (1963=1.00)

68. PMCI*: unit value index of consumer good imports (1963=1.00)

69. PEX*: unit value index of exports (1963=1.00)

70. PM*: unit value index of imports (1963=1.00)

71. PMKI*: price index of capital good imports (1963=1.00)

72. PMRI*: price index of raw material imports (1963=1.00)

73. RELFABP*: ratio of world price index of cotton textiles to world price index of synthetic fabrics (1963=1.00)

74. RFDC: interest payments by government on foreign debt in millions of Rupees.

75. SBR: subsidies given by government in millions of Rupees.

76. SDIS*: short term accomodations and statistical discrepancy in the government budget in millions of Rupees.

77. TDC: direct taxes in millions of Rupees.

78. TFDC*: total foreign government debt in millions of Rupees.

79. TIC: indirect taxes in millions of Rupees.

80. TIME*: time measured in chronological units (1956=1)

81. TOC: non-tax revenues of the government in millions of Rupees.

82. TXMC: custom duties in millions of Rupees.

83. UAR: residual difference between actual and estimated value added in major crops sector in millions of 1963 Rupees.

84. UCONR: residual difference between actual and estimated value added in construction in millions of 1963 Rupees.

85. UEGR: residual difference between actual and estimated value added in electricity and gas sector in millions of 1963 Rupees.

86. ULFR: residual difference between actual and estimated value added in livestock, fishing, forestry and other crops sector in millions of 1963 Rupees.

87. UMMR: residual difference between actual and estimated value added in mining and manufacturing in millions of 1963 Rupees.

88. UODR: residual difference between actual and estimated value added in ownership of dwellings in millions of 1963 Rupees.

89. UPADR: residual difference between actual and estimated value added in public administration and defence in millions of 1963 Rupees.

90. USRVR: residual difference between actual and estimated value added in services in millions of 1963 Rupees.

91. UTSR: residual difference between actual and estimated value added in transport, storage and communication in millions of 1963 Rupees.

92. UWRR: residual difference between actual and estimated value added in wholesale and retail trade in millions of 1963 Rupees.

93. YAR: value added in wheat, rice, and cotton in millions of 1963 Rupees.

94. YLFR: value added in other crops, livestock, fishing and forestry in millions of 1963 Rupees.

95. YMMR: value added in mining and manufacturing in millions of 1963 Rupees.

96. YEGR: value added in electricity and gas distribution services in millions of 1963 Rupees.

97. YTSR: value added in transport, storage and communication in millions of 1963 Rupees.

98. YWRR: value added in whoesale and retail trade in millions of 1963 Rupees.

99. YCONR: value added in construction in millions of 1963 Rupees.

100. YPADR: value added in public administration and defence in millions of 1963 Rupees.

101. YODR: value added in ownership of dwellings in millions of 1963 Rupees.

102. YSRVR: value added in services (including banking and insurance) in millions of 1963 Rupees.

Note: The variables appearing with an asterick (*) are exogenous in the model: the subscript -1 indicates a one-period lag.

FOOTNOTES TO CHAPTER 5

1. In some developed countries, however, a refined and large-scale data base has resulted in time series of input-output tables being constructed. For example, Canada has a continuous series of input-output tables for sixteen years. (Statistics Canada (1979), (1980)).

2. The 1963 input-output table was updated by MacEwan (1971), to 1964.

3. Strictly speaking, value added is embedded in the input-output system in the form of payments to primary factors in each sector. The sum of these payments should equal gross national product at factor costs.

4. The sophisticated Arrow and Hoffenberg model (1959), which assigns several explanatory variables to each input-output coefficient, cannot be regarded as operational since its data requirements are prohibitive for most countries.

5. Includes compensation of employees and purchases by local, state and central governments from domestic enterprises and from the rest of the world, less sales of goods and services to domestic enterprises, households and the rest of the world.

6. Previous to 1971, trade with Bangladesh was internal trade in Pakistan and did not involve any foreign exchange, duties or restrictions. Subsequently, trade with Bangladesh came to a standstill. In the model trade with Bangladesh till 1971 is treated separately, and is exogenous.

7. Bhuiyan (1971), in his econometric model for the financial sector of Pakistan, uses a similar approach.

CHAPTER 6

ECONOMETRIC ESTIMATION OF THE MODEL

6.1 Introduction

A theoretical model of the Pakistan economy was specified in Chapter 5. This model is intended for use in forecasting national income, other income and expenditure aggregates, the government's budget, the balance of payments, utilisation of the factors of production, money supply, the general price level, and so on.

To estimate the model, yearly time series data for Pakistan were used for the period 1956 to 1978. The nature and sources of the data and the problems of collecting them are discussed in the data appendix. This chapter will be concerned with the estimation of the model. In section 6.2, the method of estimating the structural parameters of the model is discussed briefly. In section 6.3, the estimated equations of the model are taken up individually and analysed, and the results of tests of alternative hypotheses are presented and compared. The complete estimated model to be used for forecasting exercises is presented in Table 6.1, at the end of this chapter.

6.2 Estimation Method

Two procedures were used to estimate the parameters of the structural model presented in Chapter 5. These are Ordinary Least Squares (OLS) and Two Stage Principal Components (TSPC).

Parameters of each structural equation of the model were first estimated by OLS. Many alternative specifications and functional forms were tried. After each structural equation had been selected on the basis of theoretical plausibility, goodness of fit, significant t-values and F statistics, the simultaneous equations of the model were then re-estimated by employing the method of TSPC, since the OLS estimates of simultaneous equation parameters are known to be both biased and inconsistent in the general case.

Other methods exist for estimating simultaneous equations, such as Indirect Least Squares and standard Two-Stage Least Squares (TSLS), the most frequently used method being standard TSLS since it is simple and straightforward. However, it was not possible to employ the standard TSLS method in this study because the number of predetermined variables exceeded the number of observations. The principal components variant of TSLS was therefore employed instead.[1]

A set of nine principal components was calculated, based on predetermined variables in the model, including lagged endogenous variables and dummy variables. The nine components accounted for 98% of the total variation among the predetermined variables.

All endogenous variables appearing on the right side of each of the simultaneous equations were regressed on the set of nine principal components. The computed values of the endogenous variables were then used in the second stage of the two-stage procedure. The estimates obtained by the TSPC method were generally close to those obtained by OLS, except for the private consumption equation where the TSPC estimate of the coefficeint of lagged consumption was much higher, and the coefficient of disposable income was correspondingly lower.

6.3 Analysis of the Estimated Model

The complete estimated model to be used in the experiments and forecasts discussed in Chapter 7 is presented in Table 6.1. Most variables are defined in Chapter 5. Variables appearing for the first time are defined below the equations. All estimated equations bear the symbols (OLS) or (TSPC) appearing directly underneath the dependent variable, identifying the method of estimation used. The numbers in parentheses below the coefficients are their respective t-statistics. $\bar{R}^2$ is the coefficient of determination, adjusted for degrees of freedom, and D.W. is the Durbin-Watson statistic. The Cochrane-Orcutt iterative technique was used to correct for auto-correlation whenever it was required, as indicated by the D.W. statistic and/or the scatter-diagram of the residuals. The equations corrected for auto-correlation bear the symbol (CORC) underneath the dependent (left-hand side) variable, along with the type of estimation (OLS or TSPC).

The estimated model contains 73 equations. There are 33 stochastic equations, 10 input-output equations, 10 sectoral capital stock equations and 20 definitions and identities. The presence of several lagged variables makes the model dynamic and most of the equations are nonlinear in variables, since several variables appear in the form of ratios or products.

Of the 33 stochastic equations, 15 have been estimated by the TSPC method and the remaining 18 by OLS. Unless otherwise indicated in the discussion below all tests are at the 5% level of significance and are two-tail tests.

Value Added

Equations (1) to (10) determine value added in each sector. The explanatory variables are categories of aggregate final demand. However, the various parameters are elements of the Z matrix calculated from the input-output table of Pakistan (see data appendix), as discussed in Chapter 5. As these parameter values are based on the 1963 input-output table, there would be differences between actual and computed value added in each sector for other years. Equations (11) to (20) model the residuals between actual and computed value added. The supply constraints in production are represented by the net sectoral capital stock, a time trend and a one-period lag of the residual. This formulation, successfully used by Preston (1971), works well here too.[2] The net sectoral capital stock is statistically significant in explaining the residuals except in the wholesale and retail trade sector (equation 16) and the services sector (equation 20). All equations fit the data satisfactorily. Adjusted $\bar{R}^2$ values range from 0.65 to 0.98, except for wholesale and retail trade, construction and the services sectors.

Adjusted $\bar{R}^2$ values for the other sectors are above 0.80 and the t-values are significant. Given the various political and social crises, Pakistan has undergone over the past twenty-five years, it is not surprising that construction activity has been affected due to turmoil, conflict and work stoppages at various times, and thus one would expect difficulty in modelling the residuals for this sector. Many construction projects in Pakistan, such as the Mangla Dam, the Tarbela Dam, and the new capital of Islamabad, have been of a rather long duration, which would explain the significance of

the one and two-period lags. Dummy variables were also tried to capture the effects of political and social crises alluded to above, but with no significant improvement in the fit.

Similarly, the wholesale and retail trade and services sectors have been particularly vulnerable to the various disturbances. These sectors are relatively labour-intensive and therefore it is not surprising that the capital stock in these sectors seems not to exert a significant influence. Dummy variables accounting for various disturbances were introduced in these relationships without improvement in the fit. Capital stock is significant in explaining the increase in value added in the majority of sectors, and lends additional support to the hypothesis of supply constraints on production in developing countries.

Private Domestic Demand

The estimated coefficients of disposable income and lagged private consumption, are both statistically significant in the estimated private consumption equation (equation 28). The coefficient of lagged consumption is larger than the coefficient obtained by ordinary least squares and that of disposable income is smaller. The long-run propensity to consume in the TSPC version is 0.98, as compared to the OLS estimate of 0.96.[3]

Alternative versions of the private consumption equation were estimated by OLS to take into account income distribution, inflation and real balances. Some of these estimates are given below.

6.3.1 $$CPR = \underset{(5.77)}{0.8306\ ATYAAR} + \underset{(12.26)}{1.0077\ ATNPYR} \qquad \bar{R}^2 = 0.98,\ D.W. = 1.25$$

6.3.2 $$CPR/N = -70.69\ RATYAAR + 0.8511\ (NYDR/N) + 0.1679 + (CPR/N)_{-1}$$
(1.74) (9.02) (1.16)
$\bar{R}^2=0.97$ D.W.=1.93

6.3.3 $$CPR = 0.9408\ NYDR + 1726.96 PERP$$
(53.33) (0.79)
$\bar{R}^2=0.98$ D.W.=1.14

6.3.4 $$CPR = 0.9692\ NYDR - 0.0758\ MSUPR$$
(27.83) (0.72)
$\bar{R}^2=0.98$ D.W.=1.21

In equation (6.3.1) private consumption expenditures are regressed on after-tax agricultural income (ATYAAR) and after-tax income originating in sectors other than agriculture (ATNPYR). The coefficients are highly significant. However, the propensity to consume from agricultural income (0.8306) is considerably less than the propensity to consume from non-primary income (1.0077) the latter being contrary to theoretical expectiations.

Agriculture is the biggest sector in the Pakistan economy, and income generated in it fluctuates considerably from year to year, depending largely on weather conditions. It could be the case that farmers save more; because of the volatility of their income streams. The estimated propensity to consumer from non-primary income is significantly in excess of unity, implying that the non-primary sector is constantly borrowing from the agricultural sector for consumption. This could be so in the short run but highly improbable in the long run. Equation (6.3.1) was estimated, using the Cochrane-Orcutt technique to correct for auto-correlation, but the D.W. statistic of 1.25, still indicates the presence of auto correlation. In light of these considerations it was not used for the simulation exercises.

Per-capita private consumption expenditures, when regressed on the ratio of agricultural income to total income (RATYAAR), per-capita disposable income and a one-period lag of per-capita consumption expenditures (equation 6.3.2), produced a negative coefficient for RATYAAR, implying that as the ratio of agricultural income to total income increases, per-capita private consumption expenditure tends to fall. This result again reinforces the conclusion from equation (6.3.1), that the propensity to consume from agricultural income is less than the propensity to consume from income generated in other sectors. The long-run propensity to consume in equation (6.3.2), is in excess of unity, which could be destabilising in the model. The lagged consumption term was dropped and the equation was re-estimated. The coefficient of RATYAAR then became insignificant and the D.W. statistic indicated serious auto-correlation, which could not be corrected by the Cochrane-Orcutt technique.

Equations (6.3.3) and (6.3.4) were designed to test the significance of inflation (PERP) and real balances (MSUPR), respectively. However the coefficients were not significant indicating that neither the perception of inflation nor the level of real balance influences consumption expenditures.

In all the formulations tried for the private consumption function there was one persistent finding: only current disposable income and lagged private consumption are significant in explaining private consumption expenditures (in absolute and per-capita form). The long-run propensity to consume in all formulations remained around 0.98.

Since the TSPC method reduces to OLS if an equation has no endogenous variables appearing as explanatory variables, equation (29)

for private investment expenditures has been estimated only by OLS. The coefficient of credit extended to the private sector indicates that a unit increase in credit to the private sector, would lead to an increase in private investment of about 0.33. Although this appears low, given the turbulent history of Pakistan, the result is, in fact, not surprising, inasmuch as private investment decreased markedly during the seventies. There appears to be a lag in investment response to an increase in gross domestic product and investment demand seems to be stimulated after a lag of a year. Two dummy variables appear in the equation. One is included to capture the effect on investment demand of the advent of the Ayub regime in 1958 and one subsequent year. The other dummy variable takes on the value of 1 during Mr. Bhutto's tenure. The sign and size of the coefficients show that private investment expenditures were adversely affected during the two regimes. Equation (28) has been chosen for simulation purposes on the basis of the plausibility of the coefficients, as expected a priori, as well as an acceptable $\bar{R}^2$. The D.W. statistic indicates absence of auto-correlation.[4]

There have been no estimates of the private investment function for Pakistan. Bhuiyan (1971) estimated an aggregated investment function (private and public investment together) for Pakistan and Bangladesh. The explanatory variables were the credit extended to the private sector and the inflow of foreign aid. Since at that time separate series were not available for private and public investment, the inflow of foreign aid was designed to capture the effect of the government component. In this study we have dealt with private and public investment separately, excluding the Bangladesh

component (see data appendix), since there is no a priori reason to expect that similar influences will affect both. In Pakistan, public investment is guided by the availability of foreign and domestic resources which the government can muster to implement various projects, in light of its five-year plans. Ideally, separate investment functions ought to be specified corresponding to various sectors of the economy, such as manufacturing and mining, dwellings and agriculture, etc. However such disaggregation will have to await the availability of appropriate data.

Several hypotheses about private investment function in Pakistan were empirically tested and some of the equations are presented below.

6.3.5 $$IPR = \underset{(3.25)}{0.345}\ (CREDC/P) + \underset{(1.61)}{0.121}\ (GDPR_{-1} - GDPR_{-2}) + \underset{(0.33)}{0.043}\ IGR - \underset{(1.91)}{321}\ AYUBDUMY$$ $\bar{R}^2=0.88$, D.W.=2.40

6.3.6 $$IPR = \underset{(3.49)}{0.356}\ (CREDC/P) + \underset{(1.14)}{0.093}\ (GDPR_{-1} - GDPR_{-2}) - \underset{(0.68)}{0.092}\ IGR_{-1} - \underset{(0.68)}{576.00}\ AYUBDUMY - \underset{(1.20)}{338.32}\ BHUTDUMY$$ $\bar{R}^2=0.83$, D.W.=2.42

6.3.7 $$LnIPR = \underset{(2.35)}{1.61} + \underset{(1.88)}{0.2761}\ Ln(CREDC/P) + \underset{(0.03)}{0.0013}\ Ln\ GDPR_{-1} + \underset{(2.42)}{0.5060}\ LnIPR_{-1} - \underset{(2.13)}{0.2821}\ AYUBDUMY$$ $\bar{R}^2=0.87$, D.W.=1.92

The hpothesis that public investment expenditures are complementary to private investment expenditures, in that they make the

private expenditures economically feasible, was tested (equation 6.3.5). The coefficient of public investment expenditures, though of the right sign, was not significant. It was hypothesised that public investment expenditures in the preceding period would boost private investment in the current period (equation 6.3.6). The coefficient of the lagged public investment expenditures reversed signs and became negative indicating substitution between the two. It could be the case that public investment expenditures substitute for private expenditures. However, the coefficient of lagged public investment is not significant and not much confidence can be placed in the result. Whether public investment is a substitute for private investment in Pakistan, or complements it, remains a question for further inquiry.

The hypothesis that current investment decisions are partially based on the previous period's realized private investment was tested in both linear and log-linear versions. The results for the log-linear version are presented in equation (6.3.7). Generally it was found that the coefficient of lagged private investment was significant, but at the expense of the coefficients for credit and lagged change in GDPR, which became insignificant. This could be due to severe collinearity between the explanatory variables.

Several dummy variables representing political changes and wars with India in 1965 and 1971 were included, in conjunction with both the intercept and the slope term of the investment function; however, there was no improvement in the fit. Private investment activities generally have been among the more difficult areas for empirical research in the developing countries. The preponderance of agriculture with

traditional methods of production, and the difficulty of getting the correct picture of the investment activities in the rural sector, present what so far have been intractable problems. The lack of adequate and comprehensive data, prevents us from disaggregating the investment function by sector.

Equation (29) makes good sense from the theoretical point of view, in that there is response of private investment to credit extended to the private sector (a policy variable). Lagged change in GDPR gives the equation an additional dynamic element. The partial elasticity of private investment with respect to credit is 0.65 at the point of sample means. This is similar to Bhuiyan's (1971) partial elasticity estimate of 0.62 for Pakistan and Bangladesh combined. The partial elasticity of private investment with respect to lagged change in GDPR is 0.04, which is low but not negligible.

The Public Sector

Equation (30), the equation for general government consumption expenditures, was estimated by the method of two-stage principle components. The propensity to consume out of government revenues is 0.417, which is about what was expected since generally 40-50% of government revenues have gone for consumption expenditures. The coefficient of the population term (N) is significant and implies that government consumption expenditures rise by approximately twenty-six million rupees for a population increase of one million people. The negative sign on the coefficient of foreign assistance is interesting since it indicates that government consumption expenditures tend to decline with increased

foreign assistance. The conclusions of various comprehensive studies about whether foreign inflows increase domestic savings or encourage consumption have been either that there is no effect (Gupta 1970), or that foreign assistance retards domestic savings (Landau 1969; Chenery and Eckstein 1970). In this study we tried to determine the effect of net foreign inflows on aggregate savings using Landau's (1969) functional form. The result is presented below.

6.3.8. $$\text{Saving} = \underset{(0.33)}{0.05\ \text{FINR}} + \underset{(7.34)}{0.095\ \text{GNPR}} \qquad \bar{R}^2 = 0.86,\ \text{D.W.} = 1.26$$

Although the coefficient of foreign inflows indicates a positive influence on domestic savings, it is not significantly different from zero. It thus appears that in Pakistan aggregate savings are not influenced by net foreign inflows. However, in alternative versions of the government consumption expenditure equation, the coefficient of net foreign inflows, lagged one period, remained negative and significant.[5] The use of current net foreign inflows in the equation again produced a negative coefficient but it was not significantly different from zero. The negative sign on the coefficient of net foreign inflows can be explained by the fact that in Pakistan, most foreign inflows are channelled through the government for specific development projects. In submitting its requests for foreign assistance, the government has to provide evidence that it is making concerted efforts to channel its domestic resources towards investment. Equation (30) bears testimony to the effort on the part of the government to curtail consumption expenditures over the period.

Some alternative versions of the estimated government consumption expenditures are presented below. A dummy variable taking values of 1 in 1966 and 1972 for the two wars with India (WWARD) has the right sign and is significant. Government expenditures on defence were increased substantially during the two wars.

6.3.9 $CGR/N = \underset{(3.50)}{0.364\ (GRC/PxN)} + \underset{(3.38)}{0.506\ (CGR/N)_{-1}}$ $\bar{R}^2=0.61$, D.W.=2.03

6.3.10 $CGR = \underset{(5.11)}{0.438\ (GRC/P)} - \underset{(2.02)}{0.144\ FINR_{-1}}$ $\bar{R}^2=0.94$, D.W.=2.11

6.3.11 $CGR/N = \underset{(3.51)}{0.383\ (GRC/PxN)} - \underset{(0.57)}{0.057\ (FINR/N)_{-1}} + \underset{(3.33)}{0.488\ (CGR/N)_{-1}}$ $\bar{R}^2=0.62$, D.W.=2.09

It is found that lagged government consumption expenditures are significant when net foreign inflows are not included in the relationship in per-capita form. Equations (6.3.9) and (6.3.11), which are in per-capita form, show this. The coefficient of per-capita net foreign inflows (FINR/PxN), had a negative sign but is insignificant. Adjusted $\bar{R}^2$ went down in per-capita form. The reverse was true when the equation was not in per-capita form. The coefficient of net foreign inflows retained the negative sign but became significant at the expense of lagged one-period government consumption expenditures (Equation 6.3.10). Adjusted $\bar{R}^2$ increased to 0.94. Equation (30) in the model was selected for simulation experiments on the basis of goodness of fit (adjusted $\bar{R}^2$=0.98), plausibility, and significance of the coefficients.

Public investment expenditures is a policy variable which is exogenous in forecasting growth patterns of the economy over the period

1979 to 1990 but is endogenous in the historical simulation described in the next chapter. It was felt that since net foreign inflows affect general government consumption expenditures negatively, their effect on government investment expenditures should be positive. Equation (31), which determines public investment expenditures in the model, verifies this. There seems to be a dynamic response of public investment expenditures to inflows of foreign aid. Government investment expenditures have been planned for five-year periods during the sample period. The plans are based on five-year forecasts of availability of internal funds (government current account surplus) and net foreign aid.

It is relatively more difficult to forecast the yearly inflow of foreign aid. Normally the amount is committed by donor countries, but the timing is not since that depends on their budgetary priorities and allocations. Moreover, the amount committed by donor countries is generally greater than the actual aid inflow in any year. Equation (31) therefore, also includes a one period lag of foreign inflow to take this into account. Equation (31) implies the long-run propensity to invest out of real net foreign inflows is 37%. The remainder of the inflows presumably go to financing food-grain imports, making interest payments on foreign debts and supporting the balance of payments. The coefficient for government revenues, which is significant, indicates a propensity to invest out of government reveneus of 0.52. This appears reasonable since the propensity to consume is 0.42 (equation 30).

Government subsidies (equation 32) are regressed on: income in the agricultural sector (YAR), since the major part of subsidies go to that sector; TIME, to take account of the fact that the subsidies

have grown over the years; and a dummy variable (BHUTDUMY) for the period when Mr. Bhutto was prime minister. (During that time, subsidies were increased significantly.) The coefficients are significant. The negative sign on the coefficient for agricultural income is as one would expect, since it indicates that subsidies decrease in years when income increases in that sector.

Equations (33) and (34) are estimates of government interest payments on domestic and foreign debts, respectively. Two dummy variables, one for 1971 and one for 1973, are included in both equations (INTIDUM and INT2DUM). As a result of civil strife, the war with India, and the consequent separation of Bangladesh, interest payments on both domestic and foreign debts were drastically reduced in these years. The dummy variables are significant in both equations and bear the expected signs.

The estimated equations indicate that interest payments on domestic debt increase by 0.047 for a unit increase in domestic debt and interest payments on foreign debt increase by 0.036 for a unit increase in it. These estimates seem plausible since government securities have borne fixed rates of 5% over the sample period. Historically, most foreign loans to Pakistan have been long-term in nature, bearing very low interest rates (approximately 3%). With high levels of inflation and interest rates now prevailing in most developed countries (above 10%), such soft loans might be difficult to obtain in the future. The coefficients were stable in alternative versions of the two equations which had intercept and no dummy variables.

Equations (37) to (40) have to do with government revenues. Equation (37) determines indirect taxes (sales and excise taxes). The

income term (GNPNANEC) is exclusive of agricultural income and exports since that constitutes the relevant base on which indirect taxes are levied. The elasticity of indirect taxes with respect to non-agricultural, non-export income (GNPNANEC), is 1.01 at the point of sample means which is consistent with findings of Zubair Khan's (1973) study on responsiveness of tax yield in Pakistan. The coefficient of GNPNANEC implies a marginal rate of taxation of approximately 0.10 on non-agricultural, non-export gross national product and is also consistent with Zubair Khan's findings. A direct OLS estimate of elasticity of indirect taxes with respect to non-agricultural, non-export income, obtained by estimating equation (37), in log form:

6.3.12 $\quad LnTIC = 2.52 + 1.02\ LnGNPNANEC \qquad \bar{R}^2 = 0.98$
$\qquad\qquad\qquad\quad (1.97)\ (8.42) \qquad\qquad\quad D.W. = 1.79$

The direct elasticity estimate of 1.02, is practically the same as the one estimated at the mean from equation (37).

Tax rates on exports, imports of raw materials, imports of capital goods and imports of consumer goods are estimated directly in the equation for customs taxes (equation 38). The coefficients indicate the different rates prevalent in Pakistan on various categories of imports. Imports of capital goods having the lowest duty (7%), followed by raw materials (17%), and then consumer goods (62%) which are the class of imports subject to the highest tax rates. The average rate on total exports is 12.7%. The equation is satisfactory on grounds of the implied tax-rates and goodness of fit ($\bar{R}^2 = 0.98$).

The implied partial elasticity estimates at the sample means for the various categories of imports and total exports are:

Imports of consumer goods. . . . = 0.30
(less food grain imports)

Imports of capital goods . . . . = 0.10

Imports of raw materials . . . . = 0.26

Total exports. . . . . = 0.35

All the elasticities are low for customs duties on imports and exports. Since customs duties are one of the major sources of revenue for the government, this result has serious implications for the government effort to increase domestic revenues for development, based on the present customs tax structure. Consumer goods imports with the highest duty have generally been decreasing as a result of quantitative restrictions and prohibitive tariffs. The outlook for increasing customs revenues from imports of consumer goods, therefore, is not promising. With the composition of imports tilting towards raw material and capital good imports; which have low duties, what is now a major source of government revenues may decline in the future.

This dilemma confronts most non-oil producing developing countries which are trying to pursue large-scale development programs. On the one hand they discourage waste of foreign exchange by quantitative restrictions on consumer goods imports, as well as by high tariffs. The allocation of foreign exchange is towards capital goods (to increase the productive capacity of the economy) and raw materials. Duties are low on the latter categories. Duties on exports cannot be increased since exports have to compete in highly competitive markets. Custom revenues thus increase less than proportionately, and the government with expensive development plans is forced increasingly to finance them through deficits.

The outlook for revenues from direct taxes in Pakistan is not encouraging either. The biggest sectors in the economy, namely agriculture, livestock, fishing, and forestry, pay hardly any taxes.

The equation for direct taxes (39) indicates a significant coefficient of 0.0259 on non-agricultural income (NYNAC). The implied tax rate of 2.6% is consistent with the results of Zubair Khan's (1973) study on taxes in Pakistan. The implied elasticity of direct taxes with respect to non-agricultural income at the means is 0.67, indicating an inelastic direct tax structure. The value of the intercept is relatively high (344.52), when we consider that the sample mean of direct taxes is 1047.43. This apparently curious result can be explained by the fact that direct taxes include property, wealth and land taxes, which are based on flat rates which change very rarely. It was not possible to separate these from corporate and personal income taxes due to unavailability of data.

Gross domestic product in nominal units (GDPC) explains government non-tax revenues (TOC) satisfactorily (equation 40). The coefficient for GDPC is significant and has the plausible implication that approximately 4.8% of nominal gross domestic product consists of government non-tax revenues.

In summary, the public sector has nine stochastic equations which have all been estimated by the method of TSPC, except for the equation for interest payments on foreign debt (equation 32). All have good fits (adjusted $\bar{R}^2$ is above 0.90), and the Durbin-Watson statistics are acceptable. Of the nine, five are expenditure and four are revenue functions. The remaining five equations in the public sector are definitions or identities.

Foreign Trade and Balance of Payments

Three equations were specified and estimated for Pakistan's exports. Equation (46) for raw cotton exports is a supply equation. The plausible assumption is made that since Pakistan is a small exporter of cotton in the world market it takes export prices as given and tries to export as much as possible, given the constraints represented by domestic production and domestic demand. Since data on domestic production are not available, value added in major crops (YAR) is used as a proxy. The coefficients for the relative price term and YAR have signs as expected a priori, and are significant. Equation (46) indicates that Rs. 1 million increase in value added in the major crop sector will lead to Rs. 40,000 increase in exports of raw cotton.

The major domestic user of raw cotton is the cotton textile industry. The suppliers of raw cotton are viewed as operating in two markets (domestic and foreign). The allocation to the two markets is based on the prices prevailing in them. The relative price term (RELPCTI) is included to effect this allocation. The partial elasticity of raw cotton exports with respect to relative price is 0.61 at the sample means. The partial elasticity of raw cotton exports with respect to value added in major crops is 0.50. These results indicate that raw cotton exports cannot be relied upon in the future to help alleviate Pakistan's foreign exchange difficulties. Adjusted R^2 is on the low side, but that was to be expected, since raw cotton exports behaved erratically throughout the sample period. Various formulations were tried for the equation by the introduction of dummy variables for years of bad harvests, log forms, and lag structures

on the explanatory variables, without improving the fit. Since equation (46) gives plausible values for the parameters, it is retained for simulation and forecasting experiments.

For cotton textile exports, ordinary least squares estimation is appropriate (equation 45). The demand for Pakistan's textile exports is influenced positively and significantly by GNPW (index of gross national products of the countries to which Pakistan exports). The coefficient of the ratio of price of cotton textiles to price of synthetic textiles (RELFABP) has the expected sign, indicating substitution between the two. The partial elasticity of cotton textiles export demand with respect to relative prices is 1.21. This indicates that foreign demand for Pakistan's textile exports is sensitive to the differential between the cotton textile export price and the price of synthetic textiles. Hence Pakistan's cotton textile exports, to remain competitive in the international market, would have to hold the line on prices. The income elasticity of demand for Pakistan's cotton textile exports is 0.73, which seems plausible. It is well known that households' demand for clothing and food (basic necessities) does not increase proportionately to increases in their income.[6]

Exports of other goods and services (EOSR) are significantly correlated with an index of gross national product (GNPW) of the countries to which Pakistan exports (equation 48). Over time, Pakistan has increased its exports of goods other than cotton. This trend is picked up by the time variable (TIME). These other exports, which include rice, sports goods and leather products, have a potential for increasing in the future. Ideally, these exports ought to

be disaggregated and related to relative prices in forms similar to those of the other export equations. Since these exports have become prominent only recently and data on the appropriate relative prices are not available, it was not possible to do so in this study. Equation (48), for exports of goods and services other than cotton, has a relatively good fit and significant coefficients. The diversification of Pakistan exports other than cotton textiles is indicated by the coefficient of the trend term (TIME), 31.59 which is significant. The coefficient of the index of gross national product of the countries to which Pakistan exports is also significant. Inclusion of one-period lagged term makes the equation dynamic. However, the short-run partial elasticity of EOSR with respect to GNPW is fairly low, at 0.31; the long-run partial elasticity is 0.59. Equation (48) has a good fit ($\bar{R}^2 = 0.97$) and the D.W. statistic of 2.12 indicates the absence of auto-correlation.

Exports of goods and services to Bangladesh in the period 1956-1971 were domestic trade. After that period, all trade ceased between the two countries. The major products were cotton and related manufactures, which were protected by non-tariff barriers. Exports to Bangladesh (BEXR) are thus exogenous till 1971. In total, there are, therefore, three equations estimated for Pakistan's exports, one representing traditional exports (raw cotton), one representing relatively new exports, i.e. cotton textiles (ECTTR), and one representing other goods and services (EOSR). We now move on to the import aspect of foreign trade.

Alternative versions of the equation for imports of consumer goods less food grain imports (MCLFR) were tried, and some of the

ordinary least squares results are presented below.

6.3.13 $MCLFR = \underset{(1.38)}{0.0057}\ NYDR + \underset{(0.91)}{0.0548}\ (FERC/PM)_{-1} + \underset{(1.10)}{81.80}\ TRDUMY$

$+ \underset{(1.68)}{0.4248}\ MCLFR_{-1}$

$\bar{R}^2 = 0.62$
D.W. = 1.80

6.3.14 $MCLFR = \underset{(2.73)}{0.0095}\ NYDR - \underset{(0.53)}{39.54}\ (PMCI/P) + \underset{(0.47)}{0.0249}\ (FERC/PM)_{-1}$

$+ \underset{(1.66)}{0.4511}\ MCLFR_{-1}$

$\bar{R}^2 = 0.60$
D.W. = 1.78

6.3.15 $MCLFR = \underset{(1.01)}{0.0048}\ NYDR + \underset{(0.18)}{0.0187}\ (FERC/PM)_{-1} + \underset{(1.42)}{0.3870}\ MCLFR_{-1}$

$+ \underset{(1.15)}{96.26}\ TRDUMY + \underset{(0.42)}{75.28}$

$\bar{R}^2 = 0.54$
D.W. = 1.71

6.3.16 $MCLFR = \underset{(1.91)}{0.0069}\ NYDR - \underset{(1.08)}{0.0698}\ (FERC/PM - MFR) + \underset{(1.06)}{86.82}\ (PMCI/P)$

$+ \underset{(1.64)}{0.4856}\ MCLFR_{-1} - \underset{(0.04)}{0.2700}\ TIME$

$\bar{R}^2 = 0.60$
D.W. = 2.20

6.3.17 $LnMCLFR = \underset{(0.14)}{0.025}\ LnNYDR - \underset{(0.33)}{0.0396}\ Ln(PMCI/P($

$- \underset{(0.33)}{0.0988}\ Ln(FERC/PM)_{-1} + \underset{(2.40}{0.49}\ TRDUMY$

$+ \underset{(0.63)}{0.1598}\ LnMCLFR_{-1} + \underset{(1.73)}{5.30}$

$\bar{R}^2 = 0.50$
D.W. = 2.02

6.3.18 $MCLFR = \underset{(1.43)}{0.0058}\ NYDR - \underset{(1.24)}{100.60}\ (PMCI/P) + \underset{(1.52)}{0.0928}\ (FERC/PM)_{-1}$

$+ \underset{(2.06)}{0.5570}\ MCLFR_{-1} + \underset{(1.57)}{131.49}\ TRDUMY$

$\bar{R}^2 = 0.66$
D.W. = 2.08

The above equations are but a sample of the many attempts to get a good fit and plausible coefficients for the equation for consumer imports (less food-grains). These attempts basically revolved around choosing the explanatory variables as dictated by theory. Equation 6.3.13 has, as explanatory variables, disposable income, foreign exchange reserves and a one-period lagged dependent variable. A dummy variable is included, taking values of 1 from 1973 to 1975, to take account of the structural change after separation from Bangladesh. Although all coefficients had the expected signs, none was significant. The equation was re-estimated after dropping the dummy variable and introducing relative prices (equation 6.3.14).

The coefficient for relative price had the expected negative sign, but was not significant. Disposable income was the only significant variable, indicating a short-run propensity to import consumer goods of 0.0095, approximately. The inclusion of an intercept did not help (equation 6.3.15). Since there is no theoretical basis for retaining the intercept, a trend factor was introduced and the intercept dropped (equation 6.3.16). The inclusion of lagged foreign exchange reserves in the equations, as discussed earlier, was to reflect the policy of restricting consumer good imports whenever foreign exchange reserves were stringent. In equation 6.3.16, foreign exchange reserves at the beginning of the period were used. They were adjusted by subtracting imports of food-grains to reflect the policy of giving top priority to the latter. The coefficient of the adjusted foreign exchange reserves became negative. The trend variable indicated import substitution over the sample period but was insignificant.

Equation 6.3.14, was reformulated in logs and re-estimated. Equation 6.3.17 presents the result. Only the coefficient for the dummy variable is significant. Equation 6.3.18 was relatively satisfactory and had plausible coefficients. However, the only significant coefficient was the one on lagged imports of consumer goods. The t-values for the other coefficients were above one and the coefficients had the expected signs. The fit was marginally better than that of the other equations. From a theoretical view point, it was the preferred one, inasmuch as it included an activity variable (disposable income), relative prices, foreign exchange reserves (representing a constraint) and a lagged term reflecting dynamic influences. Equation 6.3.18 was re-estimated by the TSPC method and selected for forecasting and simulation purposes (equation 50).

The TSPC result is very close to the OLS result. The coefficient of disposable income is slightly larger, at the expenee of the other coefficients, whose values decrease. The short-run marginal propensity to import consumer goods is 0.006 while the long-run propensity is approximately 0.01. Associated with this, the short-run partial elasticity of imports of consumer goods with respect to disposable income is approximately 0.39 and the long-run elasticity is 0.64. The two partial elasticities with respect to relative prices are 0.27 and 0.60, respectively. It should be pointed out that these elasticity estimates have to be interpreted with caution since there have been quantitative controls on consumer good imports over the sample period. Thus, although the imports of consumer foods appear to be inelastic with respect to income and relative prices, the estimates may be low because of the controls.

The imports of food-grain equation (51) has significant coefficients for all variables. The coefficient of disposable income indicates a propensity to import food-grains of 0.012. The coefficient of value added in the agricultural sector has a negative sign, as expected. It indicates that a fall in domestic production would increase food-grain imports. A dummy variable is introduced for the years when Pakistan had bad harvests, and is quite significant, indicating the vulnerability of food-grain imports to bad weather. The partial elasticity estimate for food-grain imports with respect to disposable income is 1.01. The coefficient of value added in major crops (YAR), of which wheat comprises the major share, is negative and significant. It implies a partial elasticity estimate of 1.50. There are two reasons why imports of food-grains would have a high elastic response to value added in major crops:

(a) Value added in the major crops averaged approximately 15% of total gross domestic product, whereas imports of food-grains averaged only 1.3%. If value added in the major crops in any year decreased by 10%, the decrease in the absolute magnitude would be much larger than the increase of food imports of 15%. A simple example can be used to explain this. Assume value added in the major crops falls from 10.00 to 9.00, a decrease of 10%. Food imports would increase from 1 to 1.15, an increase of 15%.

(b) The second reason is related to the first, in that the absolute magnitude of the decrease in value added in major crops is 1.00, whereas the absolute increase in imports of food-grains is only 0.15. To maintain the same amount of food-grains available for the people, imports of food-grains of 1.00 would be required. However,

food-grains constitute only a part of value added in the major crops sector, which would explain why only 0.15 would be imported.

Ideally a production index for food-grains would be used, instead of value added in major crops, but data are not available at a disaggregated level. No serious complications should result by using the series on value added in major crops since it is in real terms, and its variation would reflect the predominant food-grain sector's production.

In alternative specifications of equations for imports of food-grains, some of which are reported below, value added in major crops remained significant:

6.3.19 $$MFR = \underset{(0.98)}{0.0027\ NYDR} - \underset{(3.24)}{8.11\ (YAR/N)_{-1}} + \underset{(8.07)}{262.13\ HARDUMY} + \underset{(5.84)}{579.14}$$

$\bar{R}^2 = 0.70$
D.W. = 2.08

6.3.20 $$LnMFR = \underset{(0.80)}{0.4834\ LnNYDR} - \underset{(2.10)}{2.60\ Ln(YAR/N_{-1}} + \underset{(4.70)}{0.7812\ HARDUMY} + \underset{(2.79)}{10.85}$$

$\bar{R}^2 = 0.70$
D.W. = 2.08

6.3.21 $$LnMFR = \underset{(1.30)}{1.75\ LnNYDR} - \underset{(1.74)}{2.47\ LnYAR_{-1}} + \underset{(4.39)}{0.7778\ HARDUMY} + \underset{(1.76)}{7.43}$$

$\bar{R}^2 = 0.68$
D.W. = 2.04

All three of the above equations were estimated by the Cochrane-Orcutt iterative method to correct for auto-correlation. Value added in major crops (with a one-period lag) is expressed in per-capita terms in equation 6.3.19. The hypothesis is that if per-capita value added in major crops were to fall, imports of food-grains would be

increased. The coefficient of per-capita value added is negative, as expected, and significant in this formulation. The coefficient for disposable income is not significant. The coefficient for the dummy variable for years of bad harvests is significant, as in all other formulations. The intercept is included (and is significant) on theoretical grounds.

Equation 6.3.19 was reformulated in logs. Equation 6.3.20 above is the result of the estimation in log form. Coefficients for the explanatory variables are direct estimates of the elasticities. The elasticity of imports of food-grains (MFR) with respect to per-capita value added in major crops is 2.60, indicating again the sensitivity of MFR to a decline in major crop production. The elasticity estimate decreased only slightly when value added in major crops was used instead of per-capita value added. However, it was insignificant. After considering the alternative formulations above, which represent only some of the numerous attempts to obtain more satisfactory results, equation (51) was selected for the model because of the significance and plausibility of its coefficients.

Equation (52), the equation for capital good imports, is estimated by ordinary least squares since there are no current endogenous variables appearing as explanatory variables. All coefficients are significant. The short-run propensity to import capital goods from income in the mining and manufacturing sector is 0.33 and the long-run propensity is approximately 0.54. Since most of the capital good imports consist of machinery, plant and equipment for this sector, this estimate seems plausible.

The coefficient of foreign exchange reserves implies that approximately 33% of the reserves in any one year tend to go to the

purchase of capital goods. The dummy variable, introduced to capture the effects of cessation of trade with Bangladesh since 1972 has a negative coefficient and is significant. Before 1972, several business enterprises which had plants in Bangladesh had their headquarters in Karachi, Pakistan. Capital goods destined for Bangladesh were imported by these business enterprises into Pakistan and re-routed to Bangladesh. After 1972, most of the factories located in Bangladesh and owned by Pakistanis were taken over. The negative coefficient of the dummy variable can be interpreted as a lowering of capital good import requirements.

The implied short-run elasticity of capital good imports with respect to income in mining and manufacturing is 0.87 at the point of means. The long-run elasticity is 1.30. Kamal and Alvie (1974) estimated imports of capital goods for Pakistan, using annual observations for the period 1961 to 1972. Their equation was in log-linear form, and their direct estimate of the elasticity of imports of capital goods with respect to income in mining and manufacturing was 0.88, which is approximately the same as our short-run estimate.

The implied short-run partial elasticity of capital good imports with respect to foreign exchange reserves at the point of means is 0.25 and the long-run value is 0.45. Most of capital goods are imported into Pakistan, there being no domestic industry for them. Inelasticity of foreign exchange reserves with respect to imports of capital goods is thus to be expected.

In the estimated equation for raw material imports, equation (53), the short-run propensity to import raw materials with respect to value added in mining and manufacturing is approximately 0.08.

In the long run, the propensity to import is 0.16. This estimate is plausible due to the fact that raw materials include petroleum and related products to be used as fuel and as input in various industries. As noted before, approximately 80% of Pakistan's petroleum needs are supplied from abroad. In the short run, approximately 8% of foreign exchange reserves are allocated to raw material imports; in the long run, approximately 16% are so allocated. The implied short-run and long-run partial elasticity estimates for imports of raw materials with respect to value added in mining and manufacturing are 0.34 and 0.68 respectively.

The short and long-run elasticity estimates for foreign exchange reserves are 0.09 and 0.18, respectively. These estimates indicate that demand for raw material imports is income inelastic, implying that as income rises, imports of raw materials will not rise proportionately, and that bodes well for Pakistan. However, not much confidence can be placed in conclusions that might emerge from the disposition of the foreign exchange reserves since they are allocated by priorities set by the policy makers. Foreign exchange reserves have been included in most of our import specifications as a constraint.[7]

The hypothesis that imports of raw materials are substituted by domestic resources was also tested. In one formulation a trend was introduced to take account of import substitution. In another, the hypothesis of import substitution due to the difference between raw material import price and domestic price was also considered. The results of the two formulations are presented below.

6.3.22 $MRR = \underset{(0.36)}{0.0953\ YMMR} - \underset{(1.26)}{11.43\ TIME} + \underset{(3.58)}{0.7850\ MRR_{-1}}$

$+ \underset{(1.11)}{208.34\ TRDUMY} - \underset{(1.00)}{58.53}$

$\bar{R}^2 = 0.86$
D.W. = 2.43

6.3.23 $MRR = \underset{(1.64)}{0.0947\ YMMR} + \underset{(1.47)}{384.62\ (PMRI/P)} + \underset{(2.22)}{0.5408\ MRR_{-1}}$

$+ \underset{(0.41)}{78.34\ TRDUMY} - \underset{(1.30)}{374.94}$

$\bar{R}^2 = 0.88$
D.W. = 2.10

In equation (6.3.22) the trend variable (TIME) has a negative coefficient which indicates import substitution, but it is not significant. Except for one-period lagged imports, the explanatory variables are not significant either. When relative prices were used to test for substitution (equation 6.3.23), the coefficient on the relative price term was positive, contradicting our theoretical expectation of a negative coefficient. In any event, the coefficient was not significant. Again, except for lagged imports of raw materials and intermediate goods, none of the explanatory variables were significant. In other formulations, lagged relative prices were used, with and without the intercept, but the coefficient of them remained positive, though not significant. It is quite conceivable that there has been substitution for imports in some raw materials and intermediate goods over the sample period, but that as manufacturing activity has increased, demand for different types of raw material and intermediate good imports has offset the effects of this substitution. The increased dependence of the economy on imported oil can be cited as a case in point. Though equation (52) does not incorporate import substitution <u>per se</u>, the presence of foreign exchange reserves would constrain raw material imports in our simulation and forecasting experiments.

Factors of Production

The primary factors of production determined in the model are labour and capital. Aggregate capital stock (net of depreciation) is explained in equation (57) as the sum of aggregate capital stock existing at the beginning of the previous period, plus the previous period's total investment (net of depreciation).

It is assumed for the purpose of this study that the average life of capital is thirty-four years. Depreciation in any one year then is 4% of the existing capital stock (equation 58). This estimate is based on Haq's study of planning in Pakistan (1966).[8] It could be the case that most investment in the future would consist of machinery and buildings whose average life may be lower than the one postulated in this model. It should be noted, though, that the series on depreciation, as compiled by the Central Statistical Organisation (CSO) in Pakistan since 1970, is lower than the one used in this model.[9] The CSO thus has implicitly assumed a longer life span for capital stock than this study. We will nevertheless use the assumption of thirty-four years, for want of a more plausible estimate.

Sectoral net capital stocks are calculated in the model on the basis of the capital-income ratios prevailing in 1963, as estimated by Khan and MacEwan (1967). The method of calculation was outlined fully in Chapter 5. To obtain net capital stock in a sector at the beginning of the period, the previous period's value added in that sector is multiplied by the capital-value-added ratio for 1963. Since the sum of the net sectoral capital stocks will not be equal to the aggregate capital stock from equation (57), (unless the aggregate capital-output ratio has remained constant throughout the sample

period), a capital adjustment factor (KADF), is used. In equation (59), the ratio of aggregate capital stock to the sum of the sectoral net capital stocks (KADF) is computed. Over the sample period, KADF falls from 1.20 in 1956 to 1 in 1963 and to 0.77 in 1978. This is due to the fact that the aggregate capital-output ratio falls from 3.09 to 2.09. The assumption inherent in the calculation of adjusted sectoral capital is that the capital-output ratio in each sector falls in the same proportion as the aggregate capital-output ratio. In equations (60) to (69), net capital stock at the beginning of the period, for the ten sectors, is calculated,

As mentioned in Chapter 5, the equation for employment is more in the nature of a requirement equation. Equation (70) is the employment equation connecting demand for labour to the aggregate capital stock. The assumption inherent in it is that there is surplus labour in the economy. This assumption is questionable in the case of skilled labour. However, since employment does not enter anywhere else in the model, no serious complications result from retention of this assumption.

Both the intercept and the coefficient of net capital stock are significant and have signs as expected. The size of the intercept suggests the labour intensiveness of the economy. The coefficient of net capital stock indicates that an additional one million rupees of net capital expenditure would be required to give employment to 145 workers, or approximately Rs. 7000 of net capital expenditure would be required to employ an additional worker. This result is in conformity with other estimates (Haq, 1967; Khan, 1970).

The elasticity of employment with respect to net capital stock is 0.50 at the means. Thus labour demand is rather inelastic with respect to the capital stock. The necessity to develop a capital goods sector in the future will tend to raise capital expenditure per additional worker. In light of these considerations, equation (70) is retained for the various simulation and forecasting experiments.

Money Supply and the Price Level

The money supply equation (71) was orginally estimated with change in the money stock as the left-side variable but then normalised on the end-of-period money stock. All coefficients have the expected signs, though change in the level of foreign exchange reserves (FERC) and commercial bank borrowing from the State Bank (BORC) are not significant.

An alternative version, in which the level of money stock depends upon the same variables, was tried. This was similar to the equation estimated by Bhuiyan (1971). The result is presented below.

6.3.24 $$\underset{\substack{\\ (2.61)}}{\text{MSUPC} = 2.77\ \text{BORC}} + \underset{\substack{\\ (0.38)}}{0.3410\ \text{GDEFC}} + \underset{\substack{\\ (2.92)}}{3.33\ \text{FERC}} \qquad \begin{matrix} \bar{R}^2 = 0.83 \\ \text{D.W.} = 1.51 \end{matrix}$$

It will be noticed that the coefficients on BORCE and FERC became significant at the expense of the government deficit (GDEFC). Although the above equation was used by Bhuiyan (1971) for his study on the monetary sector of Pakistan and Bangladesh, there is an apparent inconsistency. Whereas MSUPC and FERC are stock variables, GDEFC and

BORC are flows. Equation (71) does not suffer from this inconsistency. It also highlights the dependence of an increase in the money supply on the government deficit.

Various alternative versions, including the quantity theory version, were tried. They resulted either in the variables not being significant or in signs other than those consistent with theory. Equation (71) was retained in light of its plausible coefficient estimates. The coefficient of the government deficit indicates that approximately 79% of the deficit in any one year is financed by the State Bank acquiring government securities, which leads to an equivalent increase in the money supply. The rest of the government securities are presumably held by the commercial banks, which acquire them against their liabilities. The equation also indicates that money supply would increase by 44% of the increase in foreign exchange reserves. This is plausible since the domestic currency equivalent of the increase in the foreign exchange reserves does not all go immediately into the hands of the public. Part of it relates to government dealings with foreign countries. The equation thus reflects adequately the structure of the banking system in Pakistan as it has evolved since 1956. If all of the government deficit were financed by the State Bank, foreign exchange were freely convertible, all borrowings of the commercial banks led to credit expansion, and banks held no excess reserves, the equation would then be a definition of the change in money supply.

The only price variable explained in the model is the GDP deflator (P). The theoretical rationale for explaining it was provided in Chapter 5. All coefficients in the price equation (72)

have signs as theoretically expected, and are significant. The fit is good, as indicated by an R^2 of 0.99. There is no evidence of auto-correlation (D.W. = 2.05). Both money supply (MSUPC) and the unit value index of imports (PM) are significant in explaining P, along with its own lagged value. Consequently, equation (72) is chosen for use in the simulation and forecasting experiments.

The last equation in the model equation (73), explains commercial bank borrowings from the State Bank. It reflects the conservative nature of the commercial banks in that, for a unit increase in credit extended to the private sector, BORC increases by 22%.

Having selected the estimated equations individually for the complete model, on the basis of statistical and theoretical considerations, it remains to be seen how all the equations perform together in a historical simulation context. The predictive ability of the model and the forecasting experiments are the subject of the next chapter.

TABLE 6.1

ESTIMATED MODEL OF THE PAKISTAN ECONOMY

Production (Value Added by Sector)

(1) YAR = 0.1329 CR + 0.0657 IR + 0.2946 EXR - 0.1342 MTLFR
- 0.8007 MFR + UAR

(2) YLFR = 0.3264 CR + 0.1511 IR + 0.3146 EXR - 0.3085 MTLFR
- 0.2341 MFR + ULFR

(3) YMMR = 0.1525 CR + 0.2657 IR + 0.1932 EXR - 0.5046 MTLFR
- 0.0180 MFR + UMMR

(4) YEGR = 0.0133 CR + 0.0191 IR + 0.0127 EXR - 0.0249 MTLFR
- 0.0045 MFR + UEGR

(5) YTSR = 0.0584 CR + 0.0237 IR + 0.0448 EXR - 0.0207 MTLFR
- 0.014 MFR + UTSR

(6) YWRR = 0.1047 CR + 0.1164 IR + 0.1250 EXR - 0.0128 MTLFR
- 0.038 MFR + UWRR

(7) YCONR = 0.0040 CR + 0.3437 IR + UCONR

(8) YODR = 0.0431 CR + UODR

(9) YPADR = 0.0642 CR + 0.0019 IR + 0.0016 EXR - 0.0023 MTLFR
- 0.0004 MFR + UPADR

(10) YSRVR = 0.1005 CR + 0.0127 IR + 0.0135 EXR - 0.01759 MTLFR
- 0.0036 MFR + USRVR

(11) UAR = 0.2710 UAR_{-1} + 0.1374 KAR - 50.07 TIME
(OLS) (1.90) (1.90) (4.0)
+ 258.33 HARDUMY
(3.21)

$\bar{R}^2 = 0.89$
D.W. = 2.45

(12) ULFR = 0.4062 $ULFR_{-1}$ + 0.3489 $ULFR_{-2}$ + 0.0552 KLFR
(OLS) (1.78) (1.76) (1.80)

- 104.11 TIME
(2.81)

$\bar{R}^2$ = 0.99
D.W. = 2.05

(13) UMMR = 0.3702 $UMMR_{-1}$ + 0.1329 KMMR - 599.37 TRDUMY
(OLS) (3.11) (4.25) (3.34)

- 606.36
(3.04)

$\bar{R}^2$ = 0.92
D.W. = 2.28

(14) UEGR = 0.144 $UEGR_{-1}$ + 0.080 KEGR - 15.43 TIME - 179.18
(OLS) (2.24) (9.16) (6.75) (4.66)

$\bar{R}^2$ = 0.97
D.W. = 2.59

(15) UTSR = 0.1984 $UTSR_{-1}$ + 0.0331 KTSR - 169.04
(OLS) (1.31) (2.92) (2.40)

$\bar{R}^2$ = 0.81
D.W. = 2.67

(16) UWRR = 0.7910 $UWRR_{-1}$ + 21.31 TIME - 55.91
(OLS) (3.74) (1.67) (1.42)

$\bar{R}^2$ = 0.73
D.W. = 2.53

(17) UCONR = 0.4910 $UCONR_{-1}$ + 0.290 $UCONR_{-2}$ + 1.10 KCONR
(OLS) (2.39) (1.88) (2.11)

+ 60.24 TIME - 285.85
(2.42) (2.47)

$\bar{R}^2$ = 0.63
D.W. = 1.72

(18) UODR = 0.7727 $UODR_{-1}$ + 0.0055 KODR - 8.26 TIME
(OLS) (6.61) (1.65) (2.16)

$\bar{R}^2$ = 0.97
D.W. = 1.78

(19) UPADR = 0.7033 $UPADR_{-1}$ + 0.0835 KPADR - 30.67 TIME
(OLS) (5.38) (2.31) (1.85)

$\bar{R}^2$ = 0.85
D.W. = 1.84

(20) USRVR = 0.7789 $USRVR_{-1}$ - 7.61 TIME + 61.90 BHUTDUMY
(OLS) (6.92) (1.89) (2.11)

$\bar{R}^2$ = 0.79
D.W. = 2.03

National Income

(21) GDPR = YAR + YLFR + YMMR + YEGR + YTSR + YWRR + YCONR
+ YODR + YPADR + YSRVR

(22) GDPC = PxGDPR

(23) GNPR = GDPR + (TIC + TXMC)/P + NFYR - SBR

(24) GNPNANEC = (GNPR - YAR - YLFR)xP - EXPxPEX

(25) NYR = GNPR - DEPR - (TIC + TXMC)/P + SBR

(26) NYDR = NYR + (INTDC - TDC)/P

(27) NYNAC = (NYR - YAR - YLFR)xP

Private Domestic Demand

(28) CPR = 0.5362 NYDR + 0.4573 CPR_{-1}
(TSPC) (4.83) (3.69)

$\bar{R}^2$ = 0.99
D.W. = 1.52

(29) IPR = 0.3313 (CREDC/P) + 0.0838 ($GDPR_{-1}$ - $GDPR_{-2}$)
(OLS-CORC) (3.71) (1.86)

- 611.57 AYUBDUMY - 350.65 BHUTDUMY
(1.72) (1.32)

$\bar{R}^2$ = 0.84
D.W. = 2.32

Public Sector

(30) CGR = 0.4167 (GRC/P) + 26.61 N - 0.1530 (FINC/PM)
(TSPC) (12.65) (8.71) (3.38)

+ 656.72 WWARD
(5.15)

$\bar{R}^2$ = 0.98
D.W. = 2.58

(31) IGR (TSPC-CORC) = 0.5161 (GRC/P) + 0.2454 (FINC/PM)
(4.02) (1.82)

+ 0.1330 $(FINC/PM)_{-1}$ + 852.59 AYUBY
(1.11) (2.70)

R^2 = 0.92
D.W. = 1.32

(32) SBR (TSPC) = 0.3251 YAR + 106.15 TIME + 321.25 BHUTDUMY
(2.0) (2.51) (1.89)

$\bar{R}^2$ = 0.62
D.W. = 1.67

(33) INTDC (OLS) = 0.0469 $GDEBTC_{-1}$ - 229.40 INT=DUM
(34.42) (2.70)

- 620.24 INT2DUM
(7.14)

$\bar{R}^2$ = 0.97
D.W. = 1.76

(34) RFDC (OLS) = 0.0355 $TFDC_{-1}$ - 146.62 INT1DUM - 575.10 INT2DUM
(31.51) (1.70) (6.64)

R^2 = 0.97
D.W. = 1.69

(35) GDEBTC = $GDEBTC_{-1}$ + GDEFC

(36) TFDC = $TFDC_{-1}$ + FINLC

(37) TIC (TSPC-CORC) = 0.1023 GNPNANEC
(63.78)

$\bar{R}^2$ = 0.99
D.W. = 1.76

(38) TXMC (TSPC) = 0.1272 (PEXxEXR) + 0.6216 (PMCI x MCLFR)
(3.66) (2.33)

+ 0.1733 (PMRI x MRR) + 0.0732 (PMKI x MKR)
(2.49) (1.01)

$\bar{R}^2$ = 0.98
D.W. = 1.62

(39) TDC (TSPC) = 298.9 + 0.0259 NYNAC + 421.89 WWARD
(5.87) (20.16) (3.45)

$\bar{R}^2$ = 0.95
D.W. = 1.97

(40) TOC (TSPC) = 0.0486 (GDPR x P) − 592.70 BHUTDUMY + 372.33 WWARD
(57.49) (5.49) (2.89)

$\bar{R}^2 = 0.99$
D.W. = 1.82

(41) GRC = TIC + TXMC + TDC + TOC

(42) FINC = FINLC + FINGC

(43) GDEFC = P x (CGR + IGR + SBR) + INTDC + RFDC − GRC
− FINC + SDIS

Total Domestic Demand

(44) CR = CPR + CGR

(45) IR = IPR + IGR

Foreign Trade and Balance of Payments

(46) ECTR (TSPC-CORC) = 0.0412 YAR + 182.10 RELPCTI
(2.20) (2.70)

$R^2 = 0.30$
D.W. = 1.53

(47) ECTTR (OSL) = 1.38 GNPW − 366.84 RELFABP + 507.91
(9.79) (4.98) (5.70)

$\bar{R}^2 = 0.92$
D.W. = 2.13

(48) EOSR (OLS) = 1.91 GNPW + 0.4662 $EOSR_{-1}$ + 59.90 TIME
(5.22) (2.85) (5.22)

$\bar{R}^2 = 0.97$
D.W. = 2.12

(49) EXR = ECTR + ECTTR + EOSR + BEXR

(50) MCLFR (TSPC) = 0.0061 NYDR − 97.51 (PMCI/P) + 0.0887 $(FERC/PM)_{-1}$
(1.50) (1.21) (1.33)

+ 0.5425 $MCLFR_{-1}$ + 125.00 TRDUMY
(2.00) (1.47)

$\bar{R}^2 = 0.67$
D.W. = 2.11

(51) MFR (TSPC-CORE) = 0.0119 NYDR (2.27) − 0.1376 YAR$_{-1}$ (3.31) + 273.64 HARDUMY (8.67) + 318.30 (8.87)

$\bar{R}^2$ = 0.76
D.W. = 2.08

(52) MKR (OLS) = 0.3033 YMMR$_{-1}$ (4.59) + 0.3297 (FERC/PM) (1.49) + 0.4419 MKR$_{-1}$ (3.53)

− 879.59 TRDUMY (4.39) − 536.68 (1.45)

$\bar{R}^2$ = 0.84
D.W. = 1.64

(53) MRR (TSPC) = 0.0771 YMMR (2.26) + 0.0791 (FERC/PM) (1.06) + 0.5257 MRR$_{-1}$ (3.48)

+ 337.44 TRDUMY (2.66) − 190.10 (0.53)

$\bar{R}^2$ = 0.95
D.W. − 2.33

(54) MSR (TSPC) = 0.0315 GDPR (2.89) + 0.4067 MSR$_{-1}$ (2.35) − 577.37 TRDUMY (2.94) − 373.60 (1.90)

$\bar{R}^2$ = 0.75
D.W. = 2.82

(55) MTLFR = MCLFR + MKR + MRR + MSR + BIMC/P

(56) FERC = FERC$_{-1}$ + $\bar{P}$EX x (ECTR+ECTTR+EOSR)$\bar{}_{-1}$

− $\bar{P}$M x (MCLFR+MFR+MKR+MRR+MSR)$\bar{}_{-1}$ + FINC$_{-1}$ + OTHT

Factors of Production

(57) KR = KR$_{-1}$ + IR$_{-1}$ − DEPR$_{-1}$

(58) DEPR = 0.04 KR

(59) KADF = $\bar{K}$R/ (3.766 YAR$_{-1}$ + 1.313 YLFR$_{-1}$ + 2.074 YMMR$_{-1}$

+ 0.620 YCONR$_{-1}$ + 14.539 YEGR$_{-1}$ + 4.08 YTSR$_{-1}$

+ 1.421 YWRR$_{-1}$ + 12.581 YODR$_{-1}$ + 1.423 YPADR$_{-1}$

+ 1.449 YSRVR$_{-1}$)$\bar{}$

(60) KAR = 3.766 YAR_{-1} x KADF

(61) KLFR = 1.313 $YLFR_{-1}$ x KADF

(62) KMMR = 2.074 $YMMR_{-1}$ x KADF

(63) KCONR = 0.620 $YCONR_{-1}$ x KADF

(64) KGER = 14.539 $YEGR_{-1}$ x KADF

(65) KTSR = 4.08 $YTSR_{-1}$ x KADF

(66) KWRR = 1.421 $YWRR_{-1}$ x KADF

(67) KODR = 12.581 $YODR_{-1}$ x KADF

(68) KPADR = 1.432 $YPADR_{-1}$ x KADF

(69) KSRVR = 1.449 $YSRVR_{-1}$ x KADF

(70) EMP = 0.00014 KR + 9.98
(OLS-CORC) (6.70) (6.14)

$\bar{R}^2 = 0.99$
D.W. - 2.03

Money Supply and the Price Level

(71) MSUPC = 0.7857 GDEFC + 0.4359 (FERC-$FERC_{-1}$) + 0.3018 BORC
(TSPC) (2.34) (1.31) (1.18)

+ $MSUPC_{-1}$

$\bar{R}^2 = 0.83$
D.W. = 2.61

(72) P = 0.0000055 MSUPC + 0.1379 PM + 0.7519 P_{-1} + 0.1365
(TSPC) (2.01) (8.94) (11.40) (2.96)

$\bar{R}^2 = 0.99$
D.W. = 2.05

(73) BORC = 0.2251 CREDC - 334.53
(OLS) (8.66) (1.54)

$\bar{R}^2 = 0.90$
D.W. = 1.85

The new variables introduced in the final forms of the equations estimated above have the following definitions:

AYUBDUMY: Dummy variable taking the value of 1 in 1958 and 1959, 0 otherwise.

AYUBY: Dummy variable taking the value of 1 from 1960 to 1965, 0 otherwise.

BHUTDUMY: Dummy variable taking the value of 1 from 1973 to 1977, 0 otherwise.

HARDUMY: Dummy variable taking the value of 1 in 1959, 1963, 1966, 1974, 0 otherwise.

INT1DUM: Dummy variable taking the value of 1 in 1971, 0 otherwise.

INT2DUM: Dummy variable taking the value of 1 in 1973, 0 otherwise.

TRDUMY: Dummy variable taking the value of 1 from 1973 till 1975, 0 otherwise.

WWARD: Dummy variable taking the value of 1 in 1966 and 1972, 0 otherwise.

Note: The coefficients in equations (1) to (10) are derived from the input-output table and are not estimated by OLS or TSPC.

FOOTNOTES TO CHAPTER 6

1. For details of the method of Two-Stage Principal Components, see Koutsoyiannis (1977), pp. 424-436.

2. However Preston (1971) uses an autoregressive scheme for the residuals and a trend variable. Net sectoral capital stocks are not included as explanatory variables.

3. As the model is growth-oriented, to maintain desirable long-run properties, the use of an intercept is limited strictly to those equations for which there is a strong theoretical basis for retaining it. Restricting equations to have a zero intercept means that R^2 may be biased. This is due to the fact that the sum of residuals from such equations, will not, in general, equal zero. Thus R^2 can be negative or greater than one. Interpretation of goodness of fit and the comparison of alternative equations involving an intercept with those that do not have one on the basis of R^2 alone can be misleading. For more detail see Aigner (1971), pp. 85-92.

4. In connection with observations in footnote 3 above, the D.W. statistic should also be interpreted with caution as the sum of residuals will not add to zero. However, the Durbin Watson test for auto-correlation when there is no intercept in the regression has been used. See Farebrother (1980).

5. Similar results were obtained by Dar (1981), in the context of India.

6. See Houthakker (1957).

7. In some models, e.g. Marzouk *1975), Del Rio and Klein (1974), Klein and Behrman (1970), a capacity to import index defined as export earnings deflated by an import price index is used. It should be pointed out that this is not an effective constraint on imports since the country has recourse to foreign aid and transfer payments.

8. Haq (1967), Chief Economist in the Planning Commission, estimated that the average life of new capital stock would be about 25 years during the period 1955 to 1970 and would gradually decline to 20 years subsequently.

9. See Explanatory Notes in Pakistan Statistical Yearbook 1979, C.S.O., Karchi.

CHAPTER 7

FORECASTING EXPERIMENTS WITH THE MODEL

7.1 Introduction

In the preceding chapters, an econometric model for Pakistan was specified and estimated with the objective of forecasting the growth configuration of the various important aggregates in the economy from 1979 to 1990. In Chapter 6 the complete model was presented and each equation was evaluated on the basis of plausibility of the coefficients and statistical tests (R^2, t-tests, etc.). Even if all individual equations were to fit the data well and had significant coefficients, one could not be sure whether the complete model would track the historical data closely in a simulation context.

Simulation can be historical, in the sense that the solutions for endogenous variables are computed over the sample period, or ex ante, meaning that the solutions are computed beyond the sample period.[1] In this study the terms ex ante simulation and forecasting are used interchangeably to mean the solving for values of endogenous variables beyond the sample period.

In evaluating a model's forecasting ability, the normal practice is to compare the historical simulation values of the endogenous variables with their actual values. While constructing the model, we had occasion to substitute alternative formulations of the

various equations into the model to see how they performed historically when combined with other equations of the model. In this chapter, however, the various experiments reported have been performed with the complete model presented in Chapter 6 with the exception of public investment and government subsidies; the nominal values of the latter variables are exogenous in the forecasting experiments, although the real values are determined within the model.

In section 7.2, following a brief discussion of the solution method used, the predictive accuracy of the model is evaluated by comparing the solution values of the endogenous variables with the actual values. Section 7.3 assesses the forecast values of the major endogenous variables generated by the model for the period 1979 to 1990. In section 7.4 the forecast values to 1983 are compared with the targets set by the Pakistan Planning Commission in the context of Pakistan's Fifth Five-Year Plan, (1978 to 1983). In section 7.5., the effect on the growth path of the major endogenous variables of alternative assumptions about international factors, are discussed. Section 7.6 discusses the implications of alternative assumptions about domestic factors for the growth path of the economy. The major conclusions that emerge from the above-mentioned experiments are summarised in section 7.7.

7.2 Predictive Accuracy of the Model

The forecasting ability of the model was tested by comparing over the sample period, the solutions for the endogenous variables with the observed values for the same variables. These solutions will be referred to as historical solutions or simulations.

Since many equations in the model had one- and two-period lagged values of endogenous variables, the historical simulation was started in 1958 (two years into the sample period). The observed lagged values of endogenous variables prior to 1958, and the actual exogenous variables over the sample period, were used as input to the system. The model then generated values for all contemporaneous and lagged endogenous variables.

The simultaneous and non-linear part of the model was solved by using an iterative process called Brown's technique.[2] The initial values for the endogenous variables, along with values for endogenous variables and parameters, were used as input. It is vital for convergence that the initial values of the endogenous variables are consistent and all identities and definitions are exact, in the starting period. The elimination of identities and definitions through substitutions helps speed the process of convergence. An advantage of Brown's technique over the traditional Gauss-Siedel iteration technique is that normalization of equations is not required.

Unfortunately there is no unique criterion for evaluating the historical simulation of a model. True, if the model tracks all the historical data perfectly, then obviously no criterion is needed. However, most models do not fall into that category. The usual case is that the model tracks some series fairly well and others not so well, as judged by how well the turning points are predicted and in light of other criteria which we will now consider.

Various summary statistics exist for evaluating the predictive accuracy of a model, including the mean absolute error (MAE), the mean absolute percentage error (MAPE), the root mean-square error (RMSE), Theil's inequality coefficient, the mean per-

centage error (MPE), and so on. The above list is by no means exhaustive, but it gives an indication of the variety of criteria that have been devised.[3] Basically these criteria revolve around comparing the actual series of variables with the predicted series on a one-to-one basis. There is, however, no obvious preferred criteria. In evaluating the predictive accuracy of the model, we have used MPE and MAPE for reasons of computational simplicity and ease of interpretation. They are defined as follows:

$$(7.1) \quad MPE = 1/T \sum_{t}^{t} (\hat{Y}_t - Y_t)/Y_t \times 100$$

$$(7.2) \quad MAPE = 1/T \sum \left| (\hat{Y}_t - Y_t) \right| / Y_t \times 100$$

Where T = length of simulation period.

$\hat{Y}_t$ = Model solution value for a variable

Y_t = actual value of a variable.

The mean percentage error (MPE) indicates the extent to which the computed series of a variable cuts through the actual series. If the value is zero, there is no bias, i.e. no tendency towards consistent overestimation or underestimation. If the value is negative then, on the average, the model is underestimating the variable in question, and conversely if it is positive. However, it could be the case that there are large positive and negative errors which tend to cancel out, and thus give MPE a value close to zero. This problem does not exist with MAPE, which measures the dispersion of the computed values from the actual values of a variable. Using both criteria in evaluating the predictive accuracy of the model should suffice for our purposes.

The results of the historical simulation are presented in Table 7.1. The historical solution values for the period 1958 to 1978, for all endogenous variables, except for the residuals and some definitions (products and/or sums of various endogenous variables), are given in Table 7.1. The bottom two rows in the table present the summary statistics, MAPE and MPE. The actual value of the endogenous variables over the sample period are provided in the data appendix. The symbols used for the variables are defined in Chapter 5.

MAPE is below 9% for approximately 71% of the endogenous variables in the model. Only 13% of the variables have a value of MAPE above 20%. However the MPE for all variables is close to zero, indicating that there is no built-in tendency to consistently overestimate or underestimate the actual series in the model. We will now consider some of the variables which have high MAPE (above 10%).

All the trade variables except EDSR have MAPE above 10%. Total exports of goods and services have an MAPE value of 7% indicating that, although individually the export equations have large errors, these errors tend to cancel out when summed to arrive at total exports (EXR). On the export side then, there is no tendency for errors to accumulate, either temporally or across individual equations.

Imports of food-grains (MFR) have the highest MAPE, at 45%, in the imports sector followed by MSR (26%), MCLFR (21%), MKR (17%), and MRR (12%). These errors carry over to the identity of foreign exchange reserves (FERC), which has an MAPE of 38%. However, on the import side, the MPE for all variables is less than 2%.

Apart from the trade sector, other variables for concern include private and public investment, where MAPE is 17% and 13%, respectively. However, the errors cancel out and the aggregate capital stock has an MAPE of only 1.7%. The error in FERC carries over to the money supply variable (MSUPC), which has an MAPE of 21%. However, there is no major effect on the MAPE for the general price level, where MAPE is 5%.

For all the other important aggregates, including GDPR, GDPC, GNPR, NYR, NYDR, CPR, CGR, CR, IR, EMP, for the value added in the ten sectors (except construction and electricity and gas), and for capital stocks for the same sectors MAPE is below 8%. Since the trade sector has a high MAPE value, the error carries over to custom collections (MAPE=19%).

Most of the high MAPE result is due to the model not tracking the actual series closely in the first six years--i.e., from 1958 to 1963. For example, the percentage error for custom taxes in 1958 is 68%. In the same year, imports of raw material have a percentage error of 54%, ECTTR has a percentage error of 298% (this is because exports of cotton textiles were relatively unimportant then, at approximately 5% of what they were in 1978). Since interest payments on domestic and foreign debts in the earlier years were minimal (less than .03% of their 1978 value in the case of RFDC), MAPE is larger in those years. Generally, the large MAPE's associated with the variables mentioned above are due to large errors in the first six years involving variables with small magnitudes.

In the course of dynamically simulating the model, we have tried alternative equations for the variables with high MAPE's, but

without improving the overall tracking ability. In most advanced countries, such as Canada, USA, and Great Britain, all of which have more refined data bases, common standards used require errors to be less than 5%, and frequently to be as small as 1%. However, in the context of developing countries, with their gross deficiencies in the data base, including crude approximations of various aggregates and frequent revisions in the data, the standards applied ought to be less rigorous.

Compared to other models built for the developing countries, the results obtained from historically tracking the endogenous variables in this study compare favorably. For example, in Klein and Behrman's model for Brazil (1970), exports and imports are individually in error by more than 10%. Marrazouk's model for Sudan (1975) has MAPE for private and public investment above 10%. In Agarwala's model for India (1970), there are large errors in the investment variables. In the highly aggregative model for Pakistan by Bhuiyan (1971), the investment variable, aggregate imports variable and the tax variables have MAPE generally above 10%.

Among the reasons a disaggregated model for Pakistan, of the size presented in this study, was not attempted before, are the known unreliability, inconsistencies and deficiencies in the data base especially in the early years (1955 to 1965). A large amount of effort in this study has been devoted to the collection of data on various aggregates from various sources (see appendix) and attempts to make the data as consistent as possible. It is well known that pre-1965 national income and expenditures data for Pakistan were quite poor.[4] An argument can be made that since the model generally

performs well after 1965 it could also serve as a basis for generating more reliable and consistent data series for the years preceding 1965.

As mentioned before, those variables whose growth in the future are of major interest in our forecasting experiments, such as the value added in the various sectors, GDPR, GDPC, GNPR, NYR, NYDR, CPR, CGR, CR, IR, KR, EMP, P and capital stocks in the various sectors, bear out well in the simulation. Other variables, such as exports and imports, tax collections, government deficits, and government debt, though with large errors in the earlier years, perform relatively well in the later years. For example, interest payments on foreign debt (RFDC), with a high overall MAPE, are tracked within 1% of error in the last six years. The same is evident also for the other variables with high MAPE. The mean percentage error (MPE) for all variables is not more than 2%, indicating lack of any systematic bias in the model. The fact that high negative values might cancel out high positive values of errors was checked, and generally found not to be the case.

In concluding this section, it ought to be remembered that we are dealing with an under-developed economy with a most peculiar history. It emerged by separation from India and was bifurcated in 1971. Economic behaviour, especially in trade and government activities based on a pre-1971 Pakistan, have had to be modified in the post-1971 Pakistan. The model has been designed and estimated for forecasting purposes, and therefore, individual estimated equation have been selected partly on the basis of their long-run properties, and the future plausibility of the assumptions on which they rest.

Considering the factors mentioned above, we are inclined to claim that the predictive accuracy of the model is generally satisfactory for our purposes and that the model can be employed to forecast the values of the major endogenous variables under reasonable assumptions.

7.3 An Initial Forecast With the Model

The model can be used simply as an empirical description of the structural characteristics of the Pakistan economy. It can also be used in a historical simulation context to analyse the impact and long-run effects of alternative policies by computing impact and long-run multipliers. However the objective in this study is to formulate and predict growth patterns in the future.

Given 1978 as the starting year, since 1978 represents the end of the sample period, an initial forecast was made for the period 1979-1990, a span of twelve years. The period of the forecast is sufficient to evaluate the medium-to-longer prospects and implications of development in Pakistan.

The first forecast, called the initial forecast from now on, to distinguish it from later forecasts based on alternative assumptions, was made by substituting lagged values of the endogenous variables for periods prior to and including 1978. Also, values were chosen for the exogenous variables, such as the index of GNP of the countries to which Pakistan exports (GNPW), various imports prices, population, nominal public investment, nominal subsidies, bank credit extended to the private sector and others. The nature of the forecast depends crucially on the validity of the assumptions imposed on the model's exogenous variables. All values of the exogenous vari-

ables for the period 1979 to 1990 are given in the data appendix.

Data on international variables such as GNPW, import prices and export prices were available for 1979 and 1980 and have been used for the first two years of the forecast. For the remaining ten years, a smooth pattern of growth was assumed, based on compound growth rates over the preceding five years. For domestic exogenous variables, such as bank credit to the private sector (CREDC), nominal public investment (IGC), nominal subsidies (SBC), population (N), foreign aid (FINC), etc., values for the period 1979 to 1983 were obtained from the Planning Commission's estimates in connection with the Fifth Five-Year Plan (1978-1983). For the remaining period, 1984 to 1990, the series were projected on the basis of growth rates over the preceding five years.

Having supplied future values for all exogenous variables, the nonlinear simultaneous part of the model was solved by Brown's iterative procedure. Some results of the forecast are presented in Table 7.2, where the variables most significant in reflecting the growth pattern are listed. In Table 7.3, their forecast annual growth rates are given. In the final two rows the compound annual forecast growth rates between 1978 to 1990 are reported and, for comparison, the actual compound growth rates for the period 1966 to 1978.

The forecast results suggest that in a span of twelve years real GNP at market prices (GNPR) will approximately double, growing at a rate of 5.4% annually. That growth rate is the same as the previous twelve years. Real GDP at factor cost (GDPR), is projected to increase by 5.5% annually. The forecast indicates that GDPR will be growing at a slightly higher rate (0.1%) than GNPR. It will be

noticed that GNPR had a higher growth rate relative to GDPR during the period 1966 to 1978. This was due to the fact that net factor income from abroad increased substantially during the period thus boosting GNPR. Real net factor income from abroad, which is exogenous in the model, is assumed to stabilise to an annual growth rate of 1.6%. On the other hand, subsidies are assumed to stay constant in nominal values but will decrease in real terms over the forecast period. The forecast indicates that revenues from excise and sales tax (TIC) in nominal values, will increase annually by 12.8% and revenues from custom taxes will increase by 6% annually. Given that the general level of prices will be rising at the rate of 6.3% annually, revenues from custom taxes, in real terms, will be minimal. Revenues from sales and excise taxes, in real terms will thus be increasing by 6.5%. So we see that GNPR, in light of the income inelasticity of indirect taxes and a constant growth rate of net-factor from abroad, will continue to grow at the same rate as prevaling during 1966 to 1978.

A higher growth rate of 5.5% is projected for GDPR compared to 4.9% prevailing during the period 1966 to 1978. The main impetus is going to come from the major crop sector (YAR), which is projected to grow annually by 6.2%, from other crops, livestock, fishing and forestry which are projected to grow by 5.2%, and from mining and manufacturing which is projected to grow by 6.5%. These three sectors which contributed approximately 47% to GDPR in 1978, are all projected to grow at relatively higher rates during the forecast period. Of the three mining and manufacturing, especially, languished under Mr. Bhutto's regime. Agriculture production and the other sectors

suffered serious setbacks also, from the devastating floods in 1973. It is expected that the share of primary activities, YAR and YLFR, in total real value added, will decrease only slightly from 31% in 1978 to 30% in 1990. The share of mining and manufacturing will increase from 16.2% to 18.9%.

After comparing the sector-wise annual growth rates prevailing during 1966 to 1978 with growth rates projected for 1979 to 1990, it is apparent that no major structural change is expected. Value added in the major sectors YAR, YLFR, YMMR, YWRR and YTSR, will grow at relatively higher annual rates than previously thus maintaining their shares in GDPR.

We now focus on the sectors whose growth rates are projected to be relatively low as compared to the 1966-78 period. Value added in the electricity and gas sector (YEGR) is projected to increase by 8.2% during 1978 to 1990, compared to a growth rate of 16.6% during 1966 to 1978. In 1978, this sector contributed 2.8% to GDPR; by 1990, it is projected to contribute approximately 4%. Therefore, although YEGR will have a lower growth rate than before, the trend towards an increased share in GDPR will continue. While the electricity and gas sector used to be an insignificant part of the economy, over the years its growth has been spurred on by significant findings of natural gas and increased exploration for oil, in line with the country's resolve to reduce its dependence on imported oil and related products. Starting from a low base, the annual growth was substantial but as the base increases, it is to be expected that the growth rate will fall. In relation to other sectors, the electricity and gas sector will continue growing at relatively high rates.

Value added in public administration and defence (YPADR) is projected to have an annual growth rate of 4.1%, compared to 5.4% during 1966-1978. Since the country is no longer at war, as it was in 1966 and 1972, expenditures on defence are expected to be curtailed and thus a lower growth rate seems plausible. Value added in construction will have a lower growth rate since massive construction projects (Tarbela Dam, Heavy Machinery Complex, etc.), were completed during the mid-seventies and no further projects on such a scale are planned in the future.

The main conclusions that emerge from the initial forecast on the output side are that trends apparent during 1966 to 1978 are modified somewhat in light of the forecast. The primary sector, often thought to be declining relative to other sectors, will remain dominant, declining only slightly. The share of manufacturing and mining will increase very gradually. The electricity and gas sector will grow fastest, increasing its share of value added in GDPR by 42.9%. The other sectors will retain their shares except for the public administration and defence, and construction sectors.

On the expenditures side, real private consumption expenditure (CPR) will grow at an annual rate of 5.5% during 1978 to 1990, compared to a growth rate of 6.2% during 1966 to 1978. With disposable income growing at approximately the same rate, the long-run consumption-disposable income ratio will be constant. In 1990, the private consumption to disposable income ratio will be 95%. Aggregate consumption (CR), as noticed in Table 7.3, will, however, increase by 5.3% annually, somewhat below the 5.4% growth of GNPR. The rate of growth in CR will be less than the preceding twelve years, primarily due to a lower growth in CPR.

Public consumption (CGR) is projected to increase at an annual rate of 3.4% during 1979 to 1990, in contrast to a 2.4% growth rate during 1966 to 1978. The increase in CGR will be based on the need to provide services and amenities for a growing population which will be increasing at a rate of 2.53% annually. With less foreign aid coming in there will be less pressure on the government to curb domestic expenditures.

Aggregate gross real investment is projected to grow annually at a comparable rate to the one experienced during the period 1966 to 1978 (4.1%). Real public investment is projected to grow at a rate of 4.2%, while growth in real private investment will be 3.9%. During 1966 to 1978 private real investment hardly grew at all and actually fell between 1970 to 1978. Gross real public investment on the other hand grew at an annual rate of 10%. Although nominal public investment will grow at a rate of 11% a rate of inflation of 6.3% will limit real expansion. Private real investment's share in total investment will increase slightly, and in 1990 it will comprise 32% of total investment (compared to 30% in 1978). It is quite possible that private real investment would grow at rates higher than the one projected, depending upon credit expansion which is a policy variable. With private investment dynamically related to output and also an income generating force in all sectors, the implications of a higher credit expansion for the economy would be interesting and will be traced later on in the chapter.

Large public sector deficits have been recurrent problems of most developing countries. The public sector in Pakistan is projected to have deficits increasing at an annual rate of 13% during

the period 1979-1990. In the government budget equation there is an item for short-term loans and accomodation items (SDIS), assumed to be fixed at a level of two billion rupees for the initial forecast. The figure has been obtained as an average of SDIS over the estimation period and agrees with the Planning Commission's estimates for 1978 to 1983. In 1978 (final year of the estimation period) SDIS was approximately six billion rupees, a figure which is two and a half-times the average figure assumed for projection. Therefore government deficit is much larger, being two and a half-times the value in 1978 and this shows up in the first year of the forecast. We have assumed realistically that the public sector will not have recourse to such large short-term accomodation indefinitely but will have to issue long-term securities held primarily by the central bank.

The increasing deficit will lead to a rapid expansion in the money supply over and beyond what is needed for an expanding economy, thus contributing to an inflation rate of 6.3%. While the economy will be growing, revenues and taxes will not increase proportionately. Total nominal government tax and non-tax revenues (GRC) are projected to increase by 10.5% annually, while nominal GDP (GDPC) will be increasing at a rate of 12.2%. During 1966 to 1978, GDPC increased at a rate of 15.1% annually, while GRC increased at an annual rate of 12.5%. Though the elasticity of total public revenues to nominal GDP will increase slightly, as a whole, it will still be less than unity.

Adding to and compounding further the public sector's difficulties will be the servicing of domestic and foreign debts. With increasing deficits every year, the public sector's permanent domestic

debt (GDEBTC) will increase annually at a rate of 18% during 1979 to 1990. Interest payments on domestic debt (INTDC) will thus be growing at approximately the same rate (17%). In 1990 INTDC as a ratio of GRC will be approximately 11%, in contrast to 5.5% in 1978. Net foreign debt held by the government (TFDC) will be increasing at an annual rate of 11%, occasioning interest payments on foreign debt (REDC) to grow annually at the same rate. In 1990 they will be 5.8% of GRC, roughly equivalent to the ratio prevailing in 1978. Since RFDC have to be paid in foreign exchange the absolute amount will constitute a severe drain on the foreign exchange reserves (FERC).

According to the projections the trade sector and the associated balance of payments account will be a source of continuing anxiety for Pakistan, as it has in the past. On the positive side exports of goods and services are projected to increase annually at a rate of 5.5% during the forecast period, while imports of goods and services (not including food-grains) are projected to grow annually at a lower rate of 4.1%. The increased growth in exports is expected to result from growth in GNP of importing countries (GNPW), competitive prices of cotton textiles relative to synthetic materials (which depend on oil), and increased supplies of raw cotton (due to rapid growth in the major crop sector (YAR)).

Higher growth in YAR relative to growth in population will lead to a decrease in food-grain imports. They will fall throughout the forecast period and will be minimal by 1990. Thus, Pakistan is expected to be self-sufficient in food by 1990. The overall trend in the current account is projected to be an optimistic one. In 1978 exports of goods and services were 48% of total imports of

goods and services. In 1990 they are expected to be 61%. Although the ratio of exports to imports will rise there will still be a sizable trade gap. This gap will not be filled by the assumed inflows of net foreign aid (FINC), as interest payments on the foreign debt (RFDC) will also increase. In 1990 RFDC is projected to be 37% of net foreign aid, in contrast to 21% in 1978.[5] The outlook for foreign debt servicing appears to be gloomy and Pakistan will have to reschedule debt repayments to maintain sufficient foreign exchange reserves to pay for essential imports.

Our projections highlight among other factors outlined above two of the main problems that have plagued Pakistan for the past twenty odd years. They constitute comtinuing balance of payments and public sector deficits. The latter occasioning rapid increases in the money supply, and thereby fueling inflation.

7.4 Comparison with Fifth Five-Year Plan Targets

In this section growth targets for major economic variables as formulated by the Planning Commission for the Fifth Five-Year Plan (1978-1983), are compared with the model's projections. Also actual values for some variables for the years 1979 and 1980 have become available, thus allowing a comparison of the projected values with them. Table 7.4 lists the Planning Commission's target annual growth rates from 1978 to 1983, the actual annual growth rates from 1978 to 1980 and the projected growth rates from 1978 to 1983 for selected variables.

The Planning Commission had fixed a growth target of 7% for real GDP at factor cost, based on physical production targets of 7%

for the major crops sector (YAR), 10% for the manufacturing sector (YMMR), 8.4% for the construction sector (YCONR), 7.7% for combined wholesale and retail trade (YWRR), transport, storage and communication (YTSR) sectors, and 4.9% for the services sector. These targets were fixed on the basis of real gross domestic capital formation (IR) growing annually at a rate of 10.8%. As will be noticed in Table 7.4 our projections indicate that the target rates for the major sectors were generally optimistic.

The projections also indicate that growth in real GDP (GDPR) will be 6.2%, 11% less than the growth target. Similarly growth in the other sectors will generally be less than the targets, except for the service sectors comprising of ownership of dwellings (YODR), services (YSRVR), public administration and defence (YPADR), and electricity and gas sectors (YEGR). These sectors combined will have an annual growth of 5.8% in contrast to the target growth of 4.9% fixed by the Planning Commission.

It was assumed by the Planning Commission that there would be no inflation during the plan period. This is surprising considering that the general price level was increasing at an annual rate of 15% between 1973 and 1978.[6] The rationale for the assumption of no inflation was that the government deficit would be minimal and growth in money supply would be 7.5%. This growth would be in line with growth in real GNP (GNPR). Therefore no abnormal effects on prices would occur. Although money supply is a factor in determining prices the price level is also linked to prices of imports (especially raw materials which are a cost element). The Planning Commission assumed that the government would contain its deficit while at the same time it also stated:

> "The total non-inflationary domestic resources for the Fifth-Plan period on existing basis amount to Rs. 40.54 billion including the additional effort of autonomous bodies. The safe limit of budgetory support projected for the Fifth-Plan period is Rs. 10.00 billion. This would involve bringing down the level of deficit financing to half of what it was in 1977-78 and one third compared to 1976-77. As a percentage of the total public sector outlay, deficit financing during the Plan is expected to finance about 7.8% percent of the development expenditure as against more than 25 percent during the last few years. Inclusive of deficit financing, total domestic resources would add up to Rs. 50.54 billion. This still leaves a gap of Rs. 20.46 billion to be covered by appropriate measures for mobilising additional resources." (Planning Commission 1978, p. 121)

As will be noticed from the above statement the Planning Commission fully realised that over the Fifth-Plan period the budgetary gap would amount to Rs. 30.46 billion, whereas only Rs. 10 billion were provisioned for deficit financing. The initial forecast in Table 7.2 shows that over 1979 to 1983 the total public deifict (GDEFC) would amount to Rs. 51.73 billion. Thus carrying out a development program requiring a 10.8% annual increase in public investment (IGR) would leave a budgetary gap of Rs. 51.73 billion, 70% more then what the Planning Commission had admitted to above. The deficit in public sector operations would be caused by inelasticity of revenue receipts and the inability to cut down on general consumption expenditures and debt services.

Since the Planning Commission did not foresee increases in the general price level, target growth for nominal GDP (GDPC) was the same as real GDP (GDPR). The model did incorporate the effects of increasing government deficits on the money supply and consequently prices. Target growth for money supply was set by the Planning Commission at 7.5% annually. In contrast our forecast indicates a 16.7% annual increase in the money stock.

Inflation is projected to hover around 6.8% annually, the outcome of which will be the erosion of nominal public investment, curtailing it to a real rate of 3.7%. Nominal public investment is exogenous in the model, based on the Planning Commission's target annual growth of 10.8%. As price increases were not allowed for they presumed nominal and real public investment (IGR) would be the same.

The Planning Commission's assumption of no inflation in the economy, carried over to private gross investment (IPR) where nominal credit expansion was expected to assist real private investment to grow annually at 10.8%. Nominal credit expansion is exogenous in the model but it is real credit expansion which is of significance to the private sector. Taking inflation into account, IPR is projected to grow annually at a rate of 7%, in contrast to the target set for 10.8%. Growth in real private gross investment (IPR) is not discounted fully by inflation, as in the case of IGR. This is due to growth effects of GDPR on IPR and also by the fact that credit alone would not finance all of IPR, but also retained earnings of the private sector.

Private consumption (CPR) is targeted by the Planning Commission, to grow annually by 6.2% compared to the projected annual growth of 6.5%.

Presumably the difference can be explained by:

> The strategy in the Fifth Plan is to discourage the consumption of non-essential items by the high income groups."
>
> (Planning Commission 1978, p. 41)

The "strategy" is not outlined. Whether it will take the form of progressive taxation or quantitative controls is open to speculation.

In line with the Planning Commission's target annual growth of GNP set at 7.2% and aggregate consumption expenditures growth fixed at 6.4%, aggregate savings in the economy are targeted to grow annually by 12.4%. The forecast indicates an annual savings growth of 5.7%. This follows from aggregate consumption growing at roughly the same rate as GNP, implying that the savings-GNP ratio will stay constant over the period.

Both the Planning Commission's targets and the projections indicate that real total exports (EXR) will grow at higher rates than real total imports over the period. It might appear from Table 7.4 that government tax and non-tax revenues are projected to increase at higher rates than those set by the Planning Commission. This is because the model allows for price increases, thus creating a divergence between nominal GDP (GDPC) and real GDP (GDPR) growth rates. If price increases were taken into account by the Planning Commission, its targets for tax and non-tax revenues (GRC) would appear to be higher than those projected by the model, and would also be greater than past trends in these revenues.

As mentioned in section 7.3 above, imports of consumer goods are expected to decrease in the future, due to high tariffs and quantitative restrictions. Since the largest share of custom revenues (TXMC) accrues from consumer good imports, TXMC would not grow in line with other taxes.

TXMC is forecast to grow annually by 6.4% in contrast to higher rates for direct and indirect taxes. (Table 7.4)

The Planning Commission's target annual growth for TXMC is 9.6%, which is 50% higher than the projections in spite of:

> "Simultaneously, in order to provide immediate relief to the consumers, excise duties were totally removed from a variety of articles of common use. Exemption/rebate of import duties was also allowed in the case of second-hand clothing and bicycles." (Planning Commission 1978, p. 118)

This would simply have the effect of reducing revenues from custom taxes furthur, as it could be expected that some substitution would take place between new and used articles mentioned above. With the prices of new articles being higher and with import duties levied on them, the incentive would exist to substitute used articles for them, custom free at that.

After comparing the Planning Commission's targets with our projections for the various macroeconomic magnitudes, it is seen that the Planning Commission's targets are generally optimistic about the resources available to the public sector and of the future course of prices. In fact these two are linked, in that, if real resources of the magnitude targeted by the Planning Commission could be mustered for the public sector, then the other targets would be achieved. There is no other inconsistency in the plan as targets for the other variables follow from the assumptions about real public investment. As deficit financing would not have to be resorted to if ample real resources were available, there would be less pressure on prices.

Though consistent it is apparent that the Fifth Five-Year Plan

is not feasible in view of the evolution of the economic and institutional structure of the country over the period 1956 to 1978. In this context it may be added:

> "The present five year plan (1978/79-1982/83) has been effectively ditched, due to resource constraints, technical difficulties and rising costs which have combined to put it behind schedule." (the Economist Intelligence Unit Ltd 1981, p. 8)

We turn now to compare the actual growth rates prevailing during 1978 to 1980 with the projected ones. The comparison will be limited since not all values for the variables in Table 7.4 are available, and also the values which are available are provisional estimates. Nevertheless some indication as to the predictive ability of the model beyond the sample period can be provided by the comparison.

It will be noticed that the model predicts correctly actual growth in GDPR, GNPR, CR, and aggregate savings. Projected growth in the major crops sector (YAR) is 4% lower than actual growth. For YMMR, the model overestimates growth in this sector by 50%, whereas the Planning Commission's target rate is even higher, overestimating it by 75%. The model underestimates growth in gross real investment (IR) by 8%. The Planning Commission's target growth for IR is 77% higher than actual growth. Growth in aggregate exports and imports are understated by the model and also by the Planning Commission. Growth in employment is correctly anticipated by the Planning Commission compared to a higher growth projected by the model. The model fares well for money stock (MSUPC) and the price level (P). Although growth in (MSUPC) is projected to be 19% higher than the actual growth, increase in price (P) is lower than the actual level by 26%.

There appears to be no tendency on the part of the model to consistently either over or underestimate the actual values. Also the model projections compare favorably against the Planning Commission's growth targets in that growth in the major variables is forecast within a low margin of error.

In most forecasting models the intercepts or slope coefficients in individual equations are usually adjusted, so that the forecast values approximate the actual values. The patterns and size of residuals in the periods immediately preceding the forecast period and a priori expectations form the basis of such adjustments. In the case of the present model no such adjustment has been made, partly because it is not biased in any one direction (as noted above). Also changing the intercept or slope in individual equations, given the simultaneous nature of the model, might cause some other predicted values of variables to diverge from their respective actual values.[7]

7.5 Effect of International Factors on the Growth Path

In this section we consider sensitivity of growth in the economy, to international factors. These include the effect of a higher growth rate of real GNP of countries which buy Pakistan's exports, the effect of a one period increase in import over and above the projected requirements, and the effect of a sudden stoppage of all foreign aid. The three sub-sections below will consider these factors respectively and compare their effects on the growth path of the economy with our initial forecast as reported in section 7.3.

7.5.1 The Effect of Higher International Growth

In the initial forecast an annual growth rate of 6% was assumed

for real GNP of countries (GNPW) importing Pakistan goods. This assumption was based on the average actual growth experienced by these countries over the period 1978 to 1980. The sensitivity of the domestic economy to a higher international growth rate was examined by setting annual growth in GNPW to 8%, 33% higher than assumed for the initial forecast.

The results are presented in Tables 7.5 and 7.6. Values of the major endogenous variables for 1978 to 1990 are given in Table 7.5 and their annual growth rates are supplied in Table 7.6. Annual growth rates for the variables during the entire period are in the second last row of Table 7.6, and for comparison purposes, annual growth rates computed in the context of the initial forecast are given in the last row.

A higher growth in GNPW would be expected to lead initially to increased exports (EXR) which would in turn generate expansion in all sectors through the input-output block in the model. Increased income (output) in the various sectors would induce a rise in real private consumption expenditures (CPR) directly, and in real public consumption expenditures (CGR) indirectly. CGR will rise because of the increase in tax and non-tax revenues (GRC) (generated due to increased income and custom revenues). Similarly aggregate real gross investment (IR) would rise due to increased output in the various sectors. Increased capital formation gives the model growth impetus, by increasing employment, and feeding back to value added in all sectors.

Higher exports would also increase foreign exchange earnings and thus improve foreign exchange reserves. These along with rising incomes would, given international prices, increase demand for imports which would tend to reduce output in all sectors through the input-output

block. Whether the net effect on GNP and the other income aggregates is positive depends upon the direct effect of increased exports, balanced against the induced demand for imports. It is expected that the former effect would dominate, given the small propensities to import various goods out of incomes, and foreign exchange reserves.

An increase in foreign exchange reserves would also tend to increase the money supply, thus effecting the price level which feeds back to nominal GDP, real government resources, and public consumption and investment. This then is the basic response of the model to rising incomes in countries importing Pakistani goods. Given the dynamic, non-linear, and simultaneous structure of the model it is not possible to catalogue all the various interactions and feed-backs which would occur. The solution values of the various variables can be compared to the initial forecast to gauge the total response of the economy.

Comparing Table 7.5 with Table 7.2, we notice that value added in all sectors is higher, and generally over the period 1978 to 1990, continues to grow at a higher level than the initial forecast values. The direct effect of increasing exports thus dominates the opposite force of induced imports. As will be noticed in Table 7.5 all the aggregates (GDPR, GNPR and NYDR, CR, IR, etc.) have higher values than in the initial forecast.

As indicated before, imports would be expected to increase, due to rising incomes. This turns out to be the case. The country's foreign exchange reserves continue to decumulate over the period 1978 to 1990, but the outflows are less than in the initial forecast in every year. Government tax and non-tax revenues (GRC) rise so that the deficit is less than in the initial forecast in every year. A lessening of the public

deficit tends to slow down increases in the money supply, but this effect is balanced against the less rapid decumulation of foreign exchange reserves. The former effect however dominates and the money stock is lower than in the initial forecast. From this experiment we see that the scenario sketched out before is very similar to the actual values taken by the major endogenous variables.

We now briefly examine the effect on the growth rates of the various aggregates. As will be noticed from a comparison of the last two rows in Table 7.6, the growth rates in all the sectors are higher than in the initial forecast. GDPR grows at an annual rate of 5.6% compared to 5.5% in the initial forecast. Nominal GDP's (GDPC) growth is not altered significantly. Growth rates for all other aggregates such as NYDR, CR, IR, EXR, MTLFR, and GRC, are slightly altered upwards. Growth in employment, capital formation, and money supply stays invariant.

The main conclusion from this experiment is that a higher growth in international income does not translate to an equivalent growth in income in Pakistan, partly due to the insignificance of total exports relative to GNP (5.8% in 1978), and due to the various leakages like imports. These counteract in part increased income at home.

7.5.2 Effect of Increased Imports in 1983

In this experiment imports of all goods and services were increased by 10%, over and above the projected import requirement in 1983. The objective was to see how sensitive the economy is to a one-shot increase in imports. It is expected that value added in all sectors would initially fall. As imports are a negative factor in income generation (through the input-output block), the impact effect would be decreased income. Also foreign exchange reserves at the beginning of 1984 would

be less than the initial forecast. Decreased income would lessen demand for various sectors, output and imports. Decreased foreign exchange reserves would be expected to constrain imports in the subsequent periods, and also money supply expansion. There would be less pressure on the price level. There would be substitution in demand of domestic goods for foreign consumer goods, increasing income and thereby counter-acting the recessionary effects of imports.

Whether the growth path of the economy is lowered, is invariant, or is raised, depends upon the effects of decreased income on demand, and in turn demand's effect on output. Due to the simultaneous, non-linear nature of the model, all feedbacks and linkages cannot be outlined. The solution values of the major variables can however indicate the net effects. Table 7.7 gives values of major endogenous variables from 1978 till 1990. From 1978 to 1982 all values would be the same as the initial forecast as imports are increased in 1983. Comparing the initial forecast values (Table 7.2) with this experiment's values (Table 7.7), it is seen that value added in all sectors in 1983 are less than their counterpart values in Table 7.2. The relative differences depend upon the size of the coefficients in the input-output block (linking value added to final demand).

In the major crops sector (YAR), value added in 1983 is 97% of the initial forecast value. In 1984 it is 98%. By 1985 it is roughly the same as in the initial forecast. In the following periods, the series on YAR tracks the initial forecast series closely and by 1990 YAR has virtually the same value as the initial forecast value. The same pattern is followed in the case of the other sectors.

The trend noted above carries over to output and income aggregates (GDPR, GNPR and NYDR). They fall in 1983 but regain momentum due to

decreased imports in the subsequent years. On comparing Tables 7.2 with 7.7, it is seen that variables such as EMP, P, KR, EXR, GRC, GDEFC, and MSUPC attain roughly the same values. By 1990 the effect of a bump in imports is not apparent.

The major recessionary effect on the economy is more pronounced in 1983, 1984, and 1985. The economy bounces back rapidly after this and all variables attain values similar to values attained in the initial forecast.

Annual growth rates of the major variables are presented in Table 7.8. The final two rows in the table give average annual growth rates over the period 1978 to 1990, and average annual growth rates in the initial forecast, respectively. Upon inspection of the yearly growth rates in the ten sectors, it is seen that the sectors fail to grow in 1982/83 (except for ownership of dwellings not directly related to imports). Growth rates for real aggregate consumption (CR) and real aggregate investment (IR), also register lower growth rates than the ones prevailing in years before 1982/83. Total imports including food-grains increase by 14% in 1982/83 but have a negative growth rate in 1983/84. During the remaining years, growth in total imports is curbed. It is thus seen that: given the structural characteristics of the economy a higher growth rate in imports cannot be sustained for long as the resulting decline in income and foreign exchange reserves sets forces in motion which counteract it.

The overall effect on the growth rates of the real income aggregates (GDPR, GNPR, and NYDR) is minor. As mentioned previously, growth in these aggregates is checked in 1983 but they rebound back as a result of decreased imports in later years. Growth in these aggregates is also

helped by the fact that as imports increase, government revenues increase due to increased custom revenues, inducing increased public consumption and development expenditures. These being income generating forces, they (through the input-output block) counteract the initial recessionary impulses. The effect on the money supply is more pronounced as both reduced foreign exchange reserves and government deficits tend to curb its growth. The overall effect on employment and aggregate capital stock is negligible.

This experiment was designed to test the sensitivity of the economy to imports. Growth in the economy was retarded by a one-year increase in imports but the full effect over the period 1984 to 1990 was marginal. The recessionary effects were felt for two years subsequent to the increase. The economy can thus counteract an occasional bump in imports, but sustained increases in them have the potential of checking growth in it.

7.5.3 Effect of Termination of Foreign Aid

Most developing countries receive foreign aid in the form of grants and long-term loans at low rates of interest. The rationale behind these capital transfers is that the developing economies cannot spare enough domestic resources to carry out various necessary development schemes, requiring sizable expenditures. Pakistan has been the beneficiary of such foreign transfers since the early sixties (see Chapter 4). The high rates of sectoral growth experienced during the Second Five-Year Plan (1960-1965) were in part attributed to sizable capital inflows.

It would be interesting to observe the effect on the economy of a cessation in total foreign aid (grants and long-term loans). In the

absence of foreign aid nominal public investment would go down. As it is an income-creating and output-generating force in the model, value added in all sectors would fall. Consequently output and income aggregates (GDPR, GNPR and NYDR) would also fall. With less income and foreign exchange reserves (FERC) imports would decline, boosting up sectoral value added.[8] The money stock would increase less rapidly due to a lower level of FERC, and thus less pressure will be put on prices (P).

Also foreign debt would cease to increase thus entailing fixed debt servicing during the remainder of the period. As nominal public investment would be lower and foreign debt servicing a fixed amount, government deficit (GDEFC) would tend to be reduced. This tendency would be balanced against the opposite effect of less tax and non-tax revenues (due to lower GDPC and imports). The net effect on GDEFC would depend upon the size of the coefficients of tax and non-tax revenues. The medium to long-run net effect on the economy would depend upon the relative strength of the various forces.

The outcome of this experiment is reflected in Table 7.9 where values of major endogenous variables are given for the period 1978 to 1990. The values are the same as in the initial forecast till 1982. Value added in the major crops sector (YAR) in 1983, though higher than in 1982, is 94% of the initial forecast value. Value added in other crops, livestock, fishing, and forestry sector (YLFR) is 91%, value added in mining and manufacturing is 92%, and value added in construction (YCONR) is 66%. The low value for YCONR is due to the sector's heavy dependence on investment. Similarly other sectors are affected negatively, the magnitude of the effect depending upon the size of coefficients from the input-output block.

The fall in value added of the various sectors, leads to a fall in GDPR in 1983, which is 93% of its value in the initial forecast. Same is the case with GNPR and NYDR. Aggregate consumption (CR) is 97% of its value in the initial forecast in 1983. Consumption does not fall at the same rate as the income aggregates, due to habit persistence reflected in real private consumption expenditures and the need of government to provide services for an increasing population. Also public consumption is not reduced, as it does not have outside pressures to match foreign funds for investment purposes, thus being able to provide more for basic needs. As expected real, aggregated gross investment falls in 1983, being 81% of its value in the initial forecast.

In the foreign trade sector, imports (MTLFR) in 1983 are 97% of their value in the initial forecast. This is to be expected due to lower income and foreign exchange reserves. Total exports are unaffected since the major part of them depend on external demand. Government tax and non-tax revenues in 1983 are 96% of their value in the initial forecast. By 1990 GRC have risen to 98% of their value. With lower revenues deficits (GDEFC) increase immediately in 1983, being 8.5% higher, than in the initial forecast. They stay at this higher level throughout the remainder of the years, and in 1990 GDEFC is 6.6% higher than in the initial forecast.

Even though interest payments on total foreign debt (RFDC) are constant after 1983, the pressure to maintain public expenditures offsets any respite offered by lower RFDC. In 1990 RFDC is 53% of its former level in the initial forecast. With a higher level of GDEFC, money stock (MSUPC) increases faster. In 1983 it is 8% higher than previously. By 1990 it is 3.5% higher than in the initial fore-

cast. The effect on the price level (P) comes in 1984 when it is 4% higher than its level in the initial forecast.

As real gross domestic capital formation in the economy proceeds at a less rapid rate, aggregate capital stock (KR) in 1984 is 98% of the level prevailing in the initial forecast. Consequently employment requirements (EMP) are less, being 98% of their former level in 1984. In 1990 the level of KR is 91% of its former level, as in the initial forecast whereas EMP is 93%.

In summary then, output in all sectors is influenced negatively in 1983. Over the medium to long-run however, as imports decrease government consumption expenditures, etc. rise and output rebounds back. By 1990 all sectors in the economy have obtained their previous levels as in the initial forecast. Investment activity is reduced and employment is less than in the initial forecast.

Additional insight about the effect on growth in the economy can be gained by comparing Tables 7.3 and 7.10. As noticed in Table 7.10, YLFR, YMMR, YCONR, YWRR, and YODR have negative growth rates in 1982/83 while growth in YAR, YEGR, YTSR, YPADR and YSRVR, though positive, is less than in the initial forecast. As a result real gross domestic product (GDPR) and gross national product (GNPR) have negative growth in 1982/83. Disposable income (NYDR) also has negative growth in that year and aggregate consumption growth is less than previously. Aggregate investment (IR) falls by 16% during 1982/83, thus highlighting the significance of foreign resources in financing development expenditures in the country.

In the final two rows of Table 7.10, the average annual growth rates over 1978 to 1990, due to this experiment and in the initial fore-

cast are given in the final two rows of Table 7.10 respectively. On examining them it is noticed that the growth rates in all sectors except for YCONR, YEGR and YWRR, are very similar to the ones in the initial forecast. This is presumably due to the halving of growth in total imports (MTLFR) and reduction of food-grain imports. Nominal gross domestic product grows at a higher rate due to higher growth in P. The overall growth in GDPR, GNPR, and CR is roughly similar to their growth in the initial forecast.

The findings from this experiment are different than what was expected a priori. A termination of foreign-aid has a recessionary impact on the economy initially. Lower levels of foreign exchange curtail imports which offsets these effects. Over the medium to long-run the economy goes back to its growth path, as in the initial forecast, but with a different composition of final demand. While investment activity is curtailed consumption is increased. The price level (P), money supply (MSUPC), and government deficit grow at higher rates. Employment grows at a less rapid rate than the initial forecast but still higher than growth in the labour force. The short-run effect of cessation of foreign aid is found to be recessionary, but the long-run effect tends to be positive, in that, increased reliance on domestic resources, curtailing of imports, and decreased foreign debt servicing, all combine to bring the economy back to its original growth path (with foreign aid). However the country's rapidly dwindling foreign exchange reserves indicate increased reliance on short-term balance of payment support.

7.6 Effect of Domestic Factors on the Growth Path

Some international factors which could influence growth in the economy during 1980 to 1990 were considered in the previous section. The effect of domestic factors on the gowrth path is investigated in this section. Like the previous section the various outcomes are compared with the initial forecast. Once a model is built there are an abundance of policy measures and assumptions about the likely course of exogenous variables that can be tested. The results of three experiments, considered most relevant to the economy, are presented here.

The Pakistan economy is dominated by the agricultural sector, which is subject to considerable variations in output due to weather conditions and floods. Therefore, the first experiment we consider is to assume agricultural output in 1983 falls due to drought and/or flood. Bank credit extended to the private sector has been a policy instrument in the past, where the government in conjunction with the State Bank has sought to influence the flow of credit. In the second experiment bank credit is allowed to be 20% more than assumed in the initial forecast. Public investment is another major policy variable, through which the government tries to promote and sustain the pace of economic development in the economy. In the final experiment the rate of increase in nominal public gross investment is allowed to be 50% less than that assumed in the initial forecast.

7.6.1 Harvest Failure in 1983

In this experiment a harvest failure in 1983 is assumed. Output in the major crops sector (YAR), other crops, livestock, fishing,

and forestry (YLFR) is effected and is 75% of the output in the initial forecast. The objective is to investigate the vulnerability of the economy to the agricultural sector.

The impact effect in the same year would be the reduction in real gross domestic product (GDPR), real gross national product (GNPR), and real disposable income (NYDR). With lower disposable income, real private consumption and imports would be reduced. Exports would also be reduced as raw cotton exports come from the agricultural sector. Real public consumption expenditures would tend to fall because of decreasing public revenues. However they won't respond fully to decreases in revenues. Therefore the public deficit would increase, expanding the money supply. Upward pressure would be put on the price level. With a decline in agricultural output imports of food-grains would increase, leading to a dwindling of the foreign exchange reserves. This would lead to flow of money abroad, which eventually would have a deflationary impact on the price level.

As real gross investment depends partly upon government revenues and partly on growth in GDPR, it would fall. With aggregate demand falling, the income generating force would be diminished leading to decline in output of other sectors. We have outlined only the impact effect. The net effect would depend upon the nature and size of the various parameters.

Values taken on by the major endogenous variables as a result of this experiment are given in Table 7.11. By comparing these values with the initial forecast values (Table 7.2) the extent of the economy's dependence on the agricultural sector can be gauged. The two agricultural sectors' output in 1983 is 75% of output in the initial forecast. Value

added in manufacturing and mining (YMMR) is 96% of its counterpart value in the initial forecast. Value added in other sectors is also effected as they are all less than their counterpart values in the initial forecast.

By 1990 the effects of a bad harvest have not worn off, as values for all sectors (except electricity and gas) are less than in the initial forecast. Also GDPR, GDPC, GNPR, NYDR, CR, IR, EXR and MTLFR have values which are less than in the initial forecast. Imports of food-grains in 1990 are higher than in the initial forecast, presumably due to less rapid growth in the agricultural sector.

Foreign exchange reserves are depleted less rapidly because import requirements are less than in the initial forecast. By 1990 government tax and non-tax revenues (GRC) are 99% of their value in the initial forecast. Consequently the size of the deficit (GDEFC) and money stock (MSUPC) are larger. The price level is higher in 1990 than in the initial forecast. With less capital formation going on, capital stock (KR) is lower in 1990 and therefore employment (EMP) is less.

It is seen from this experiment that the economy is highly vulnerable to the agricultural sector. A bad harvest in one year can effect crucially income creation, capital formation, and employment generation over a long period of time subsequent to the bad harvest. It also worsens the inflationary situation.

Yearly growth rates of the major variables as a result of this experiment are given in Table 7.12. Also given are the overall growth rates for the period 1978 to 1990 and overall growth rates from the initial forecast.

The dependence of the economy on the agricultural sector is highlighted again by observing the annual growth rates. Growth in all sectors is checked in 1982/83. Value added in mining and manufacturing grows at 50% of growth in the initial forecast. The more seriously effected sectors are YCONR and YODR. They record negative growth during that year. Consequently GDPR, GNPR, and NYDR also have negative growth during 1982/83. Whereas there is a decrease in growth of total imports, decreased output from the agricultural sector necessitates increased imports of food-grains in the subsequent period. A less rapid growth in the income aggregates induces lower growth in aggregate consumption (CR), aggregate investment (IR), and total exports (EXR).

This experiment highlights the vulnerability of the economy to a one period decline in output of the agricultural sector. A bad harvest in one year can lower growth rates of all major variables in the subsequent years.

7.6.2 Increase in Bank Credit

In this experiment nominal bank credit extended to the private sector (CREDC) is allowed to increase by 20% yearly from 1978 onwards, in contrast to the 10% annual increase allowed for in the initial forecast. The impact effect would be on real private gross investment which would increase value added in the various sectors. GDPR, GNPR and NYDR would then increase, leading to an increase in real private consumption. This would strengthen the income-creating impulses from real gross investment. Higher income would lead to increased imports, thus dampening the expansion and increasing the foreign exchange gap. Borrowings of commercial

(scheduled) banks from the central bank (State Bank) would be expected to rise due to increased credit. Consequently money supply (MSUPC) would increase, which will be absorbed partly by output and partly by rising prices.

Higher incomes and imports would increase government tax and non-tax revenues, thereby stimulating real public consumption expenditures. Whether the deficit (GDEFC) will be less would depend upon the propensity to consume out of government revenues and the increase in population. Capital formation (IR) would proceed at a rapid rate generating increased employment. Total exports (EXR) would be expected to increase as more raw cotton becomes available for exports, from higher growth in the major crops sector (YAR).

The resulting values of the major endogenous variables for the period 1979 to 1990 are given in Table 7.13. By comparing these values with values obtained in the initial forecast (Table 7.2), the net effect of this experiment can be assessed. Value added in all sectors in 1979 is higher than in the initial forecast. Value added in major crops sector (YAR) is 2.5% more than in the initial forecast. By 1990 it is 3% higher. Value added in livestock, fishing and forestry (YLFR) is 4% higher in 1979 and by 1990 it is 4.7%. Similarly value added in mining and manufacturing sector (YMMR) is 3.7% greater than its counterpart in 1979 and in 1990 it is 3% more. These trends are repeated for the other sectors. The degree to which these values diverge from their values in the initial forecast is dependent on the coefficients from the input-output block. As an overall measure gross domestic product (GDPR) is 3.1% more in 1979 than in the initial forecast. By 1990 the difference is 2.9%. Similar patterns are repeated for GNPR, NYDR and CR.

As bank credit grows at a faster rate than before, aggregate gross investment (IR) in 1979 is 8% more than in the initial forecast. However in 1990 the difference is only 3%. This is due to increasing prices which limit real credit expansion in the subsequent years. Even though total exports are not effected in the earlier year, by 1990 they show a net increase. Total imports on the other hand go up but not significantly, being constrained by foreign exchange scarcity.

Increased income and activity in the economy is reflected in the government receipts which are 1% more than in the initial forecast. Consequently the government deficit in 1990 is lower being 96% of its value in the initial forecast. Increased credit results in an expansion of the money supply, which in 1990 is 2% higher than in the initial forecast. There is an upward pressure on prices which are 1% higher. The effect on employment is positive as a result of credit expansion. Approximately 1% more people would be employed in 1990 than in the initial forecast. The country's foreign exchange position will be worsened due to a higher import bill. However the country will be importing less food-grains.

It is seen from this experiment that an expansion of net credit results in higher investment, employment, output, imports, and consumption. The government deficit falls but the foreign exchange position is worsened. Both money supply and the price level rise. In the final two rows of Table 7.14, the overall growth rates from this experiment and from the initial forecast are given respectively. The overall growth rates for all sectors are generally higher than in the initial forecast. Similarly growth rates of GDPR, GNPR, NYDR, CR, and IR are higher. The unfavorable effects of increased credit are basically reflected in a higher rate of inflation.

7.6.3 Lower Rate of Growth in Nominal Public Gross Investment

In the initial forecast nominal public gross investment was allowed to increase by 10.8% annually. This was in line with targets set by the Planning Commission in connection with the Fifth Five-Year Plan. In this experiment it is allowed to increase by half that amount (5.4%).

Although lower growth is expected for the economy, the objective is to see whether the economy can grow at an acceptable rate without generating sizable government and foreign trade deficits of the kind witnessed in the initial forecast. The mechanism by which a lower rate of growth in nominal public gross investment manifests itself on the economy is the opposite of experiment 7.6.2, where real private gross investment was stimulated through an expansion in nominal bank credit. A lowering of nominal gross investment would lead to less deficit financing. We can therefore go directly to Table 7.15 which lists the resultant values of the major endogenous variables for the period 1978 to 1990.

As expected, value added in all sectors from 1978 to 1990 is less than in the initial forecast. Real gross domestic product in 1990 is 85% of its value in the initial forecast. GNPR, NYDR, CR, and IR also have lower values. Nominal GDP in 1990 is 67% of its value in the initial forecast. From 1979 onward, government deficit starts decreasing and in 1990 is one tenth of its value as in the initial forecast. Consequently the money stock in 1990 is 40% of its value in the initial forecast. With less rapid growth in the money stock, there is less pressure on the price level (P).

Lower prices boost real private investment and therefore real aggregate gross capital formation (IR) does not fall drastically. The economy's real aggregate capital stock in 1990 is 93% of its value in the

initial forecast. Employment (EMP) in1990, is 94% of employment in the initial forecast. There is still a deficit in the country's foreign exchange position (FERC) but it is cut sizably in comparison to the initial forecast. Total exports are effected marginally and in 1990 are 99.8% of their value as in the initial forecast. Total imports less food-grains in 1990, on the other hand are 95%. The country would still be importing food-grains (MFR) in 1990 but the trend would be downwards. In 1990 MFR would be 20% of its value in 1978.

Yearly growth rates of the major endogenous variables are given in Table 7.16. Also given are the overall annual growth rates for the period 1978 to 1990 and overall annual growth rates from the initial forecast. In comparison to the initial forecast growth rates, sectoral growth rates are less. Real gross domestic product (GDPR) has an annual growth rate of 4.1% in comparison to an annual growth of 5.5% in the initial forecast. Similarly GNPR and NYDR also grow at the same rate. Aggregate real consumption has an annual growth rate of 4.2% in comparison to the initial forecast gorwth of 5.3%. With population increasing at a rate of 2.53%, per-capita consumption increases at an annual rate of 1.48%.

While growth in total exports (EXR) is effected marginally (being 5.4% instead of 5.5% as in the initial forecast) total imports growth is reduced significantly from 4.1% in the initial forecast to 3.6%. Annual growth in nominal government tax and non-tax revenues (GRC) is 8.7% in contrast to 10.5% in the initial forecast. Government deficits show negative growth in every year due to lower nominal public gross investment.

The slowdown of growth in the money stock (MSUPC) is noteworthy. The annual growth rate is 5.6% during 1978 to 1990, compared to 14.3% in

the initial forecast. Since MSUPC growth is higher than growth in GDPR there is still an upward pressure on prices (P), which grow at a rate of 4.4% in contrast to 6.3% in the initial forecast. Growth in capital stock (KR) is not affected significantly and it grows annually at a rate of 4.3% in contrast to 4.4% in the initial forecast. This is presumably due to increased real private investment in light of a less rapid growth in the price level. Employment grows at a rate of 3.3% annually, in contrast to 3.9% in the initial forecast.

In this experiment it is seen that if growth in nominal public investment is in line with resources available to the government, growth in sectoral income and in GDPR will be less. However it would be higher than growth in population. There will be a slowdown of growth in employment, but it will still be higher than population growth. The benefits will revolve around lower government deficits, less rapid increases in the money supply, lower rates of inflation, and less severe balance of payment problems.

7.7 Summary and Conclusion

In this chapter the forecasting ability of the estimated model was evaluated on the basis of its ability to replicate the actual values of the endogenous variables in a historical simulation context. The model was then used to forecast annual values for them up to and including 1990. Finally the effect on their growth path of alternate assumptions about the course of international and domestic factors was examined.

In the historical simulation, for approximately 71% of the endogenous variables, the mean absolute percentage error (MAPE) was below 9%. All the major endogenous variables, such as the value added in the ten sectors,

gross domestic product and related aggregates, aggregate consumption, employment, price level and the aggregate and sectoral capital stocks, had MAPE's below 8%. Variables such as domestic and foreign interest payments and trade variables, had higher MAPE's. However in the six years preceding 1978, they came to within 5% of their actual values.

The first forecast with the model from 1978 to 1990 was based partly on the actual values of exogenous variables before 1980 and partly on the assumptions made by the Planning Commission in deriving its targets for Pakistan's Fifth Five-Year Plan (1978-1983). This forecast highlighted the problems of deficits in the country's balance of payments and the government budgets. It was found that the Planning Commission's targets were generally optimistic: although the plan was consistent, it was not feasible in terms of resources required to carry it out. It is noteworthy that the targets were discarded at about the same time that this result was obtained.

The experiment which assumed a 33% higher growth rate in international income than in the initial forecast was seen not to translate into equivalent growth in Pakistan. This was due to the fact that exports, which are the link to international growth, constitute an insigificant portion of GNP, and also to the fact that the induced increase in imports would limit expansion.

An experiment involving a sudden surge in imports of 10% over and above the projected requirements was seen to create recessionary effects for two years subsequently, but the effect on the long run growth path was marginal. This was due to the automatic tendency of the economy to limit imports in the following years in light of the tight foreign exchange position.

The results from the assumed termination of all foreign aid is

surprising. The immediate impact is seen to be recessionary in that output and income fall. In the longer run, however, it is seen that the economy rebounds back but with a different composition of final demand in that growth in investment is curtailed but is balanced by increased growth in consumption. Growth in employment and capital stock is reduced, and the country's balance of payments position is worsened.

The dependence of the economy on the agricultural sector is highlighted in an experiment, in which a harvest failure in 1983 is assumed. It is seen that a bad harvest in one year can set in motion recessionary tendencies which take a long time to work out. By 1990, the economy is seen to be experiencing the negative consequences of the harvest failure. Increasing of credit available to the private sector is seen to have favorable effects on the growth path which must be balanced against their unfavorable effects on inflation and the balance of payments position. Government deficits increase at a less rapid rate, which ameliorates some of the inflationary tendencies.

In the final experiment, a more realistic growth path of public investment was imposed on the model in light of the resources available. It is seen that though GDP and the associated output aggregates will grow at a rate of 4.1% (compared to 5.5% in the initial forecast) this growth will not occasion massive public sector deficits and worsening of the balance of payments position. There will be thus less inflationary tendencies in the economy. This last experiment, incidentally, helps identify a realistic course of action for the policy makers in light of the domestic resources and structural characteristics of the economy.

Table 7.1-Historical Solution Value of Selected Variables 1958-1978

YEAR	YAR	YLFR	YMMR	YCONR	YEGR	YTSR	YARR	YDDR	YPROR	YSRVR
1958	1915.38	4721.59	1589.79	220.82	34.30	836.49	1796.15	729.43	925.30	1241.27
1959	2112.27	5221.58	1715.35	346.44	42.51	986.79	1921.42	802.62	1017.23	1416.97
1960	1940.38	4833.01	1953.83	391.70	64.61	900.45	1855.68	735.54	922.74	1379.97
1961	2187.91	5252.04	2349.81	372.44	89.34	1020.49	2101.05	813.08	1052.69	1553.53
1962	2068.54	4893.15	2365.16	667.17	65.26	996.91	2249.95	755.34	1009.13	1549.55
1963	2325.11	5564.32	2842.49	777.52	111.53	1182.52	2549.92	863.97	1188.01	1857.28
1964	2416.39	5346.23	3037.31	1021.77	123.29	1220.43	2602.34	838.22	1186.97	1818.10
1965	2694.79	6480.26	3903.30	1252.73	189.37	1637.56	3145.45	993.45	1402.12	2150.93
1966	2803.38	6835.58	4235.89	1509.23	212.46	1850.41	3604.69	1043.31	2428.55	2247.48
1967	3186.17	6885.03	4319.13	1361.59	217.50	1810.74	3762.30	1095.03	2221.33	2384.15
1968	3143.71	6066.54	4119.13	1272.12	184.80	1669.22	3567.91	1000.00	1959.76	2164.60
1969	3463.93	6695.54	4620.13	1001.24	233.02	1851.59	3846.18	1090.48	2921.63	2377.25
1970	3639.78	6679.15	5140.51	1395.64	628.70	1566.19	4205.92	1022.49	2901.54	2436.32
1971	3982.37	7601.41	5691.85	1427.95	765.72	2035.94	4528.54	1162.87	2183.30	2903.56
1972	4217.30	8005.09	6105.56	1438.75	836.31	2266.41	4635.34	1216.01	2752.74	3195.89
1973	4677.40	8430.63	6085.57	1163.55	938.37	2457.72	4904.48	1297.08	3228.79	3526.20
1974	4604.13	8144.14	6066.78	1494.83	1171.77	2500.81	5482.68	1305.57	3498.22	3540.26
1975	5219.38	9414.30	6864.19	1720.14	1027.86	2809.46	6011.39	1481.14	3969.79	4223.05
1976	5566.35	9880.60	7498.33	2435.88	1087.46	2984.97	6251.78	1541.96	4211.75	4454.35
1977	5969.24	10838.75	8021.50	2326.01	1268.05	3213.59	6494.95	1711.11	4577.30	4865.00
1978	5295.31	9411.85	7584.25	2435.17	1306.46	3207.66	6413.36	1572.69	4829.74	4791.83
MAPE	.088	.085	.084	.155	.126	.066	.0557	.074	.085	.068
MPE	.024	.026	.031	.030	.101	.030	.025	.038	.013	.031

YEAR	GDPR	GDPC	GNPR	NYR	NYDR	CPR	IPR	CGR	IGR	INTDC
1958	14010.24	13435.89	14951.94	12088.65	11681.02	11781.30	856.43	1889.83	807.50	93.37
1959	15583.17	15066.01	16529.59	13656.71	13282.36	13344.90	906.45	1974.19	1014.22	87.18
1960	14979.11	15528.62	16195.57	12875.98	12543.73	11993.36	1163.92	1977.44	995.69	118.32
1961	16792.37	17792.17	17881.59	14725.44	14376.77	14028.73	714.91	2076.95	2271.54	129.39
1962	16627.15	18309.90	17811.39	14783.61	14431.83	13318.51	1552.32	2168.86	2132.47	156.05
1963	19309.58	22004.85	20782.23	17407.18	17059.21	16073.09	1646.37	2249.31	2389.20	183.27
1964	19811.65	23293.01	21404.32	17719.35	17392.74	15841.08	2505.14	2482.50	2830.50	218.05
1965	24350.55	29251.18	26141.47	22137.49	21773.30	19754.44	2942.28	2812.51	2805.50	254.70
1966	26671.83	32602.29	28643.24	23667.59	22969.15	20514.71	3755.99	3857.86	2338.56	311.15
1967	27242.67	34034.51	29557.48	24442.07	24128.87	23154.68	3446.23	3072.31	2343.38	372.59
1968	25167.79	31653.64	27404.83	22826.53	22553.24	21844.90	3380.39	2773.35	2310.16	394.81
1969	27203.98	34468.06	29502.40	25349.17	25075.74	24270.68	2771.58	3048.56	2287.17	450.91
1970	28911.33	37158.70	31416.19	27347.95	27048.96	24789.02	3491.05	3399.30	2528.51	527.61
1971	32283.51	42956.95	35039.33	30308.74	29926.35	28218.00	3613.36	3664.37	2505.36	435.37
1972	34669.62	47863.65	38075.22	31680.55	31412.21	28912.28	3633.70	4666.58	2439.79	777.10
1973	36706.82	50067.90	40708.38	33222.31	32740.59	31612.53	2570.67	4383.31	2617.33	363.55
1974	37808.19	78402.42	40872.85	34815.31	34598.10	32172.68	2466.84	4482.50	2771.35	1318.63
1975	42737.31	105783.19	46234.78	39732.54	39423.43	36687.06	2005.38	4812.30	3331.57	1142.97
1976	45912.53	127252.39	50352.33	42575.91	42219.13	38579.96	2653.88	4898.15	4613.36	1257.44
1977	49247.10	151000.25	54907.29	45882.53	45498.92	42874.70	2783.15	5093.31	5998.36	1431.60
1978	46839.33	158393.49	53223.57	44788.44	44382.79	42569.61	2899.91	5445.61	6297.31	1562.51
MAPE	0.073	0.058	0.072	0.073	0.071	0.068	0.186	0.047	0.125	0.3[illegible]
MPE	0.029	0.013	0.030	0.030	0.029	0.027	0.031	0.008	0.019	0.1[illegible]

YEAR	RFDC	GDEBTC	TIC	TXPC	TDC	TDC	GRC	GDEPC	CR	IR
1958	.54	1857.26	378.56	528.27	434.30	737.38	1902.23	933.26	13671.13	1920.26
1959	.77	2520.60	517.12	445.33	463.53	752.46	2175.34	663.34	15319.09	1849.31
1960	16.93	2756.48	859.19	437.89	462.76	818.22	2526.83	235.89	13970.80	2497.66
1961	69.27	3324.37	694.11	514.45	498.82	894.97	2425.38	567.89	16105.57	2600.69
1962	74.34	3904.30	802.77	587.22	521.41	929.14	2825.40	579.93	15487.39	3703.32
1963	84.38	4445.14	1064.23	717.68	579.81	995.18	3093.72	743.84	18321.41	4140.07
1964	120.20	5638.84	1199.37	771.37	602.06	1113.49	3924.32	993.70	16323.58	4970.85
1965	147.50	6628.52	1626.52	824.53	702.18	1276.55	4719.29	989.56	22566.34	5560.46
1966	132.39	7937.34	2153.39	821.58	1164.89	1785.87	5837.55	1308.82	24372.57	5539.17
1967	166.15	8410.65	2204.74	968.37	763.88	1584.91	5568.59	473.31	25226.98	5590.13
1968	281.31	9605.82	2058.41	995.15	742.43	1731.03	5469.39	1195.16	24618.35	5509.56
1969	377.51	11239.84	2194.53	977.47	797.40	1841.03	5917.40	1634.02	27319.24	4827.93
1970	442.72	14161.73	2415.41	1046.33	862.27	2080.88	6577.98	2321.59	29188.32	6041.43
1971	362.30	16554.68	2835.92	1112.51	944.19	2223.40	7149.52	2392.35	31882.37	6157.23
1972	543.35	20958.02	3725.34	1109.23	1423.67	2171.12	8516.39	4403.34	33578.36	5856.15
1973	-.30	21699.96	4069.38	2735.40	1151.36	2362.13	10435.84	741.94	35992.34	4890.19
1974	658.36	24348.92	4606.48	4351.22	1459.65	3312.53	13962.36	2648.95	38655.38	5739.31
1975	765.31	26787.50	5778.39	5192.50	1908.07	4505.62	18031.47	2438.57	41499.36	6240.00
1976	1015.27	30497.62	8619.18	5215.00	2246.28	5321.68	21309.47	3713.12	43479.11	6231.62
1977	1270.46	33286.48	10416.33	6075.80	2607.72	6014.68	25122.36	2789.36	47967.71	6542.42
1978	1633.30	34787.57	11100.72	7778.41	2934.27	7625.32	29510.31	1501.13	48015.22	5825.19
MAPE	0.254	0.164	0.127	0.194	0.110	0.090	0.093	0.432	0.064	0.091
MPE	0.00	0.162	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7.1-Continued

YEAR	ECTR	ECTTR	EOSR	EXR	MCLFR	MFR	MKR	MRR	MSR	PERC
1958	289.20	119.47	399.38	1456.82	300.63	181.52	778.11	451.72	132.19	1207.38
1959	285.39	207.55	403.16	1641.77	274.19	224.84	665.16	463.09	170.34	975.75
1960	292.14	224.40	456.73	1572.22	246.16	189.02	606.91	471.32	166.85	862.76
1961	286.53	177.09	524.60	1711.52	235.54	170.66	841.39	553.37	222.47	1359.95
1962	293.33	36.71	597.53	1772.97	287.59	201.91	1281.32	548.50	239.89	2129.15
1963	290.50	76.58	672.17	1995.35	381.70	250.37	1345.45	716.44	331.35	1975.09
1964	300.00	210.08	749.15	2227.85	393.94	455.30	1599.48	768.00	384.34	2017.13
1965	298.88	283.77	825.41	2277.83	427.32	496.62	1563.27	817.51	548.57	1403.38
1966	305.34	247.36	902.36	2605.09	395.32	237.80	1977.94	914.14	686.51	1372.65
1967	309.27	228.74	978.36	2641.16	440.25	472.94	2256.52	755.28	763.35	1913.84
1968	314.93	314.20	1057.47	2825.10	443.12	401.65	2244.41	828.10	728.52	1438.22
1969	314.71	397.52	1137.99	3137.40	416.10	202.65	1950.83	853.51	778.31	732.30
1970	321.49	415.54	1218.35	3522.11	350.35	183.84	2080.82	928.21	852.35	1086.37
1971	323.18	589.18	1298.38	3428.40	376.24	194.76	2256.92	1002.10	948.54	976.57
1972	327.29	698.42	1591.67	2617.39	475.30	402.20	1387.98	958.48	841.62	283.20
1973	335.94	1066.14	1961.42	3363.50	417.80	386.58	1384.69	1390.84	423.93	2494.28
1974	340.36	449.62	1943.77	2733.45	466.35	346.86	1320.74	1603.17	410.71	3519.38
1975	340.30	640.37	1988.31	2968.93	483.22	416.02	1119.83	1735.51	560.38	1567.79
1976	351.46	709.07	2081.91	3142.44	479.57	367.18	1405.91	1886.84	721.14	3504.85
1977	363.83	621.32	2190.26	3175.41	549.08	124.12	1864.78	2043.36	891.40	5598.92
1978	372.11	534.06	2305.35	3211.52	810.33	291.39	2260.28	2592.67	884.90	6467.72
MAPE	0.731	0.392	0.102	0.073	0.210	0.453	0.175	0.116	0.259	0.212
MPE	0.029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00

YEAR	KR	DEPR	KAR	KLFR	KMRR	KCONR	KEGR	KTSR	KWRR	KOOR
1958	47055.87	1882.23	9276.85	7949.63	4847.80	258.92	1010.78	4428.23	3206.45	11864.85
1959	47093.30	1883.76	9535.30	8198.49	4360.44	181.06	859.48	4513.38	3375.34	12136.12
1960	46859.45	1874.38	9421.36	8119.89	4213.51	254.39	731.93	4765.33	3233.70	11959.43
1961	47482.73	1899.31	9180.65	7973.63	5091.78	305.15	1180.35	4616.28	3313.72	11648.32
1962	48184.11	1927.36	9303.14	7785.98	5502.53	260.72	1466.57	4701.00	3370.94	11949.62
1963	49960.37	1998.40	9478.21	7816.93	5968.33	503.28	1154.40	4948.77	3884.81	11715.27
1964	52101.74	2084.07	9536.80	7957.12	6420.76	525.03	1766.33	5254.69	4318.98	11838.41
1965	54988.32	2199.54	10280.13	7927.86	7114.46	715.47	2024.46	5623.64	4497.37	11910.18
1966	58469.44	2338.78	9927.14	8322.92	7920.01	759.75	2693.10	6535.46	4372.15	12225.81
1967	61769.34	2470.79	10076.24	8564.15	8382.95	892.91	2947.54	7203.96	4887.49	12524.81
1968	64989.18	2599.57	11613.12	8749.25	8869.74	817.03	3060.48	7150.18	5173.84	13333.42
1969	67899.17	2715.97	12901.37	8680.03	9309.53	859.47	2927.80	7510.34	5524.87	13709.72
1970	70011.14	2800.45	13331.77	8984.43	9792.68	634.41	3462.26	7720.47	5585.50	14020.77
1971	73252.13	2930.09	13383.33	8812.17	10409.12	844.82	8924.30	6238.82	5835.18	12559.48
1972	76479.28	3059.17	13414.23	8926.93	10558.58	791.87	9957.42	7429.66	5755.57	13085.44
1973	79276.26	3171.05	13713.57	9075.42	10933.95	770.22	10498.75	7985.66	5867.30	13209.56
1974	80995.40	3239.82	14452.86	9382.25	10355.69	590.37	11193.75	8227.38	5718.15	13389.12
1975	83494.89	3339.80	14045.20	8661.84	10192.18	752.74	13799.98	8264.95	6310.84	13254.06
1976	86395.09	3455.80	15059.50	9476.30	10914.32	817.60	11456.51	8787.57	6548.38	14285.55
1977	91170.90	3646.84	15958.51	9876.72	11839.16	1149.77	12036.82	9271.83	6763.37	14789.26
1978	96186.48	3846.66	16547.52	10475.58	12246.10	1061.54	13570.78	9551.26	6751.81	15846.31
MAPE	0.017	0.017	0.036	0.038	0.043	0.151	0.091	0.031	0.022	0.030
MPE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

YEAR	KPAJR	KSRVR	EMP	MSJPC	P	WORC
1958	1799.37	2413.00	14.11	5771.40	.96	8.12
1959	1751.72	2378.57	14.12	5473.94	1.01	-33.88
1960	1725.22	2431.71	15.12	4563.12	1.04	-60.00
1961	1663.34	2512.52	15.23	4404.34	1.06	82.51
1962	1702.31	2541.61	15.35	6558.48	1.10	215.12
1963	1758.23	2731.84	15.56	6787.72	1.14	397.93
1964	1852.35	2931.06	16.03	7765.73	1.18	630.46
1965	1919.57	2975.29	16.54	8307.19	1.20	943.88
1966	2664.41	3048.69	17.79	9037.07	1.22	1003.60
1967	3181.80	3107.49	17.72	10318.69	1.25	1185.75
1968	3078.62	3343.50	18.28	7498.00	1.26	1405.72
1969	3058.16	3417.91	18.79	9081.62	1.27	1460.35
1970	2958.57	3520.32	19.16	11566.92	1.29	1865.64
1971	2795.52	3446.68	19.72	14874.24	1.33	1907.28
1972	2795.40	3763.08	20.93	15217.36	1.36	3116.26
1973	3433.64	3998.49	20.77	22617.95	1.64	2784.72
1974	3793.60	4192.22	21.37	16636.49	2.03	3815.11
1975	4057.30	4155.31	21.51	19805.77	2.48	4080.64
1976	4358.10	4691.15	22.02	23247.32	2.77	4830.09
1977	4591.67	4913.80	22.85	31632.44	3.07	5850.02
1978	4825.51	5190.08	22.75	43513.77	3.38	6352.21
MAPE	0.058	0.018	0.026	0.212	0.051	1.235
MPE	0.00	0.00	0.00	0.00	0.00	0.00

Absolute Percentage Error

Table 7.2-Initial Forecast-Values of Major Endogenous Variables-1979-1990

YEAR	YAR	YLFR	YMFR	YCONR	YEGR	YTSR	YMRR	YODR	YPADR	YSRVR
1979	5022.53	8959.97	8082.49	2587.96	1459.57	3256.90	6531.91	1446.59	5082.39	4747.12
1980	5307.68	9186.01	8815.46	2770.23	1631.49	3469.20	6912.53	1467.65	5383.84	4991.22
1981	5711.78	9655.60	9550.51	2867.46	1816.75	3701.16	7327.88	1526.01	5648.40	5291.71
1982	6086.00	9986.53	10208.66	3049.95	1990.03	3898.36	7695.64	1571.59	5874.19	5540.39
1983	6547.74	10586.78	10947.11	3194.87	2175.52	4135.44	8131.95	1658.19	6131.03	5864.30
1984	6961.55	11071.15	11616.69	3372.05	2344.03	4342.91	8523.49	1730.85	6343.49	6139.09
1985	7446.89	11782.64	12355.72	3520.11	2521.22	4587.51	8974.17	1839.19	6590.79	6480.81
1986	7878.90	12366.88	13028.08	3696.35	2681.32	4802.11	9377.28	1930.32	6797.54	6764.50
1987	8380.82	13167.70	13773.44	3844.57	2851.80	5053.76	9839.48	2054.69	7042.34	7123.22
1988	8822.51	13817.96	14439.43	4016.69	3005.83	5272.85	10249.32	2158.51	7246.79	7418.99
1989	9332.32	14674.10	15178.79	4157.74	3172.60	5527.84	10715.35	2293.12	7489.71	7777.07
1990	9782.26	15375.43	15843.44	4323.73	3325.17	5750.06	11128.76	2405.57	7693.17	8076.33

YEAR	GDPR	GDPC	GNPR	NYUR	CR	IR	EXR	MTLFR	MSR	EGBG
1979	47177.43	171560.56	53623.64	45257.89	47872.10	9342.43	3393.22	6046.04	231.67	-357.46
1980	49915.33	196572.05	56691.47	48070.44	50686.82	9872.26	3584.54	6265.85	229.52	-3013.67
1981	53117.30	224263.96	60258.51	51112.51	54018.92	10217.65	3771.32	6544.00	228.10	-5600.32
1982	55901.33	251444.62	63372.20	53753.86	56756.46	10665.20	3965.40	6818.64	205.60	-8428.26
1983	59372.86	283862.97	67148.27	57036.50	60208.06	11088.11	4166.14	7108.05	195.04	-11263.16
1984	62445.31	316393.35	70528.04	59899.66	63126.40	11585.18	4372.69	7404.02	167.43	-14306.26
1985	66099.05	354965.23	74531.42	63249.42	66703.46	11985.95	4582.73	7718.84	152.31	-17372.61
1986	69328.29	394241.53	78080.00	66187.65	69725.75	12472.13	4801.34	8035.99	122.42	-20695.10
1987	73131.82	440476.72	82237.37	69618.84	73399.75	12866.90	5026.24	8372.09	105.82	-23986.67
1988	76448.88	487971.25	85875.59	72583.36	76482.67	13336.42	5260.57	8723.38	74.00	-27416.86
1989	80318.63	543744.65	90100.12	76026.84	80195.29	13706.92	5504.33	9082.59	56.24	-31002.73
1990	83703.93	601492.95	93803.57	79015.68	83310.38	14156.03	5758.07	9447.69	23.64	-34707.87

YEAR	GRC	GDEFC	YFDC	RFDC	MSUPC	P	KR	EMP
1979	31563.48	8099.70	56834.00	1865.55	35478.29	3.84	100500.63	23.51
1980	35806.16	8945.33	64488.00	2112.83	58916.00	3.94	105823.03	24.44
1981	39979.42	10035.41	72571.00	2373.96	65326.24	4.22	111462.37	25.42
1982	44225.85	11427.15	81107.00	2649.73	72705.03	4.50	117221.52	26.43
1983	48957.18	13218.51	90120.00	2940.96	81350.97	4.78	123217.66	27.47
1984	53905.89	15230.57	99638.00	3248.46	91464.06	5.07	129377.26	28.55
1985	59505.37	17369.49	109689.00	3573.19	102409.06	5.37	135787.35	29.67
1986	65378.29	19645.09	120303.00	3916.10	113987.19	5.69	142341.81	30.81
1987	72030.85	22739.65	131512.00	4278.23	127206.54	6.02	149120.27	31.99
1988	79074.58	26057.59	143348.00	4660.65	141450.71	6.38	156022.36	33.20
1989	87062.96	29678.08	155847.00	5064.46	157646.80	6.77	163117.89	34.44
1990	95532.45	33950.24	169046.00	5490.89	175232.01	7.19	170300.09	35.69

Table 7.3-Annual Percentage Growth Rates of Major Endogenous Variables-1978/79 - 1989/90

YEAR	YAR	YLFY	YMMR	YCONM	YEGR	YTSH	YMRK	YODR	YPADC	YSRVR
1978/79	.057	.064	.116	.071	.135	.086	.071	.013	.073	.062
1979/80	.057	.025	.091	.070	.118	.065	.059	.015	.055	.051
1980/81	.076	.051	.083	.042	.114	.067	.060	.040	.053	.060
1981/82	.066	.034	.069	.056	.095	.053	.053	.030	.040	.047
1982/83	.076	.060	.072	.048	.093	.061	.057	.055	.044	.058
1983/84	.063	.046	.061	.055	.077	.050	.048	.044	.035	.047
1984/85	.070	.064	.064	.044	.076	.056	.053	.063	.039	.056
1985/86	.058	.050	.054	.050	.064	.047	.045	.050	.031	.045
1986/87	.064	.065	.057	.040	.064	.052	.049	.064	.036	.052
1987/88	.053	.049	.048	.045	.054	.043	.042	.051	.029	.042
1988/89	.058	.062	.051	.035	.055	.048	.045	.062	.034	.048
1989/90	.048	.048	.044	.040	.048	.040	.039	.049	.027	.038
1978/1990	.062	.052	.065	.051	.082	.056	.051	.045	.041	.051
1966/1978	.057	.026	.049	.063	.166	.049	.049	.033	.05-	.0c-

YEAR	GDPR	GDPC	GNPR	NYDR	CR	IR	EXR	NTLFR	NFR
1978/79	.076	.139	.073	.086	.071	.067	.116	.030	-.418
1979/80	.058	.146	.057	.062	.059	.057	.056	.036	-.004
1980/81	.064	.141	.063	.063	.066	.035	.053	.044	-.006
1981/82	.052	.121	.052	.052	.051	.046	.052	.042	-.094
1982/83	.062	.128	.060	.061	.061	.038	.050	.042	-.051
1983/84	.052	.115	.050	.050	.048	.045	.049	.042	-.142
1984/85	.059	.122	.057	.056	.057	.035	.048	.043	-.090
1985/86	.049	.111	.048	.046	.045	.041	.046	.041	-.196
1986/87	.055	.117	.053	.052	.053	.032	.047	.042	-.136
1987/88	.045	.108	.044	.043	.042	.036	.047	.042	-.301
1988/89	.051	.114	.049	.047	.049	.028	.046	.041	-.240
1989/90	.042	.106	.041	.039	.039	.033	.046	.040	-.580
1978/1990	.055	.122	.054	.055	.053	.042	.055	.041	-
1966/1978	.049	.151	.054	.056	.062	.043	.033	.038	-

YEAR	GRC	GDEFC	TFDC	RFDC	MSUPC	P	KR	EMP
1978/79	.091	2.526	.146	.142	-.059	.059	.052	.038
1979/80	.134	.104	.135	.133	.061	.083	.053	.040
1980/81	.117	.122	.125	.124	.109	.072	.053	.040
1981/82	.106	.139	.118	.116	.113	.065	.052	.040
1982/83	.107	.157	.111	.110	.119	.062	.051	.040
1983/84	.101	.152	.106	.105	.124	.061	.050	.039
1984/85	.104	.140	.101	.100	.120	.060	.050	.039
1985/86	.099	.148	.097	.096	.113	.059	.048	.039
1986/87	.102	.140	.093	.092	.116	.059	.048	.038
1987/88	.098	.146	.090	.089	.112	.060	.046	.038
1988/89	.101	.139	.087	.087	.114	.061	.045	.037
1989/90	.097	.144	.085	.084	.112	.061	.044	.036
1978/1990	.105	-	.104	.103	.143	.063	.049	.039
1966/1978	.125	-	.213	.207	.162	.096	.039	.020

Table 7.4

COMPARISON OF ANNUAL GROWTH RATES

(Percent)

	Fifth Plan (1978/83)	Actual (1978/30)	Forecast (1978/83)
YAR	7.0	7.0	6.7
YLFR	4.8	N.A.	4.7
YMMR	10.0	5.7	8.6
YCONR	8.4	N.A.	5.7
YWRR+YTSR	7.7	N.A.	6.1
Service Sectors	4.9	N.A.	5.8
GDPR	7.0	6.0	6.2
GDPC	7.0	16.0	13.5
GNPR	7.2	6.0	6.1
CPR	6.2	5.9	6.5
CGR	8.2	1.0	3.4
CR	6.4	6.0	6.0
IPR	10.8	N.A.	7.0
IGR	10.8	N.A.	3.7
IR	10.8	6.1	5.6
TXMC	9.6	N.A.	6.4
TDC	10.0	N.A.	13.0
TIC	12.1	N.A.	14.7
GRC	9.8	14.5	11.2
EXR	11.0	15.4	6.5
MTLFR	6.3	10.9	3.8
Savings	12.4	5.7	5.7
EMP	2.9	2.9	3.9
MSUPC	7.5	14.0	16.7
P	0.0	9.3	6.8

Notes: (1) N.A. means not available
(2) Service Sectors includes YODR, YPADR, YSRVR, and YEGR

Sources: (1) Planning Commission, 1978
(2) International Financial Statistics, International Monetary Fund, Washington, D.C., April, 1981
(3) Quarterly Economic Review of Pakistan, Bangladesh, Afghanistan, The Economist Intelligence Unit Ltd., London, 2nd Quarter, 1981
(4) Annual Supplement: Pakistan, Bangladesh and Afghanistan, The Economist Intelligence Unit Ltd., London, 1980

Table 7.5 - Higher International Growth Rate - Values of Major Endogenous Variables 1979-1990

YEAR	YAR	YLFR	YMMR	YCONR	YEGR	YTSR	YWRR	YODR	YPADR	YSRVR
1979	5031.86	8974.15	8089.48	2588.08	1460.13	3259.27	6537.33	1447.56	5083.91	4749.72
1980	5330.56	9220.18	8828.36	2771.89	1631.97	3475.13	6926.82	1470.47	5368.12	4999.33
1981	5749.24	9709.27	9562.91	2890.04	1815.78	3710.90	7352.22	1530.90	5655.76	5303.72
1982	6138.24	10057.96	10214.88	3052.95	1986.36	3911.89	7730.37	1576.52	5884.48	5556.92
1983	6615.44	10675.44	10943.81	3198.40	2164.22	4152.84	8177.54	1667.03	6144.05	5885.02
1984	7045.62	11177.04	11601.69	3378.51	2332.61	4364.34	8580.62	1741.67	6359.13	6163.77
1985	7548.60	11906.24	12326.97	3525.85	2505.24	4613.16	9043.74	1851.94	6606.98	6509.36
1986	7999.73	12508.63	12983.26	3703.68	2660.68	4832.21	9460.38	1945.02	6818.26	6801.86
1987	8522.27	13327.78	13709.35	3853.80	2826.19	5088.52	9937.25	2071.33	7065.54	7159.26
1988	8985.94	13996.05	14352.63	4028.07	2975.30	5312.42	10362.82	2177.03	7272.36	7456.51
1989	9518.75	14868.97	15064.59	4171.57	3136.84	5572.25	10845.45	2313.39	7517.41	7819.64
1990	9993.57	15586.94	15698.05	4340.24	3284.41	5799.51	11276.80	2427.49	7722.83	8121.69

YEAR	GDPR	GDPC	GNPR	NYUR	CR	IR	EXR	MTLFR	MFR	FERC
1979	47221.50	171719.58	53671.45	45297.81	47895.25	9342.49	3416.74	6048.21	232.16	-357.46
1980	50021.81	196984.33	56808.23	48165.80	50752.50	9876.30	3638.38	6282.76	229.42	-2895.89
1981	53280.75	224932.69	60441.61	51256.30	54132.78	10223.83	3862.72	6589.44	226.76	-5261.02
1982	56112.58	252344.24	63614.60	53936.43	56916.28	10692.06	4098.44	6901.69	202.75	-7797.75
1983	59627.80	284778.81	67447.49	57253.55	60410.82	11096.01	4344.26	7234.12	190.60	-10283.84
1984	62743.00	317720.36	70884.41	60149.53	63370.09	11595.29	4600.43	7578.09	161.30	-12914.07
1985	66440.08	356500.04	74946.95	63531.57	66987.24	11999.29	4868.48	7946.52	144.35	-15483.30
1986	69713.72	395981.51	78557.44	66501.28	70049.31	12489.65	5152.57	8324.22	112.44	-18214.93
1987	73561.30	442401.29	82778.14	69962.00	73762.34	12889.48	5451.06	8729.27	93.61	-20799.77
1988	76921.14	490055.00	86480.29	72952.79	76882.65	13364.84	5767.30	9158.26	59.31	-23384.13
1989	80828.84	545915.91	90765.53	76416.47	80629.02	13742.06	6101.20	9605.02	38.81	-25977.82
1990	84251.53	603708.66	94531.05	79422.91	83775.34	14198.61	6456.35	10067.59	3.31	-28523.88

YEAR	GRC	GDEFC	TFDC	RFDC	MSUPC	P	KR	EMP
1979	31578.48	8090.90	56834.00	1865.55	35473.38	3.64	100500.63	23.51
1980	35349.86	8919.16	64488.00	2112.83	58893.87	3.94	105823.10	24.44
1981	40065.83	9982.60	72571.00	2373.96	65272.26	4.22	111466.47	25.42
1982	44367.22	11338.79	81107.00	2649.73	72595.64	4.50	117231.65	26.43
1983	49164.77	13085.68	90120.00	2940.96	81161.62	4.78	123234.44	27.47
1984	54190.65	15043.97	99638.00	3248.45	91171.52	5.06	129401.08	28.55
1985	59850.02	17118.21	109689.00	3573.19	101990.62	5.37	135620.32	29.67
1986	65858.23	19615.96	120303.00	3916.10	113416.39	5.68	142386.60	30.82
1987	72633.47	22317.53	131512.00	4278.23	126452.27	6.01	149180.98	32.00
1988	79820.35	25524.54	143348.00	4660.65	140476.83	6.37	156103.21	33.21
1989	87972.15	29015.12	155847.00	5064.45	156409.54	6.75	163223.92	34.49
1990	96631.05	33133.82	169046.00	5490.89	173683.98	7.17	170437.02	35.71

Table 7.6-Higher International Growth Rate-Annual Percentage Growth Rates of Major Endogenous Variables-1978/79-1989/90

YEAR	YAR	YLFX	YMMR	YCONX	YEGR	YTSR	YWRR	YOOR	YPAOR	YSRVR
1978/79	.059	.066	.117	.071	.136	.087	.072	.014	.074	.062
1979/80	.059	.027	.091	.071	.118	.066	.060	.016	.056	.052
1980/81	.079	.053	.083	.043	.113	.068	.061	.041	.054	.061
1981/82	.068	.036	.068	.056	.094	.054	.051	.031	.040	.048
1982/83	.078	.061	.071	.048	.092	.062	.058	.056	.044	.059
1983/84	.065	.047	.060	.056	.076	.051	.049	.045	.035	.047
1984/85	.071	.065	.063	.044	.074	.057	.054	.063	.039	.056
1985/86	.060	.051	.053	.050	.062	.047	.046	.050	.032	.045
1986/87	.065	.065	.056	.041	.062	.053	.050	.065	.036	.053
1987/88	.054	.050	.047	.045	.053	.044	.043	.051	.029	.042
1988/89	.059	.062	.050	.038	.054	.049	.047	.063	.034	.048
1989/90	.050	.048	.042	.040	.047	.041	.040	.049	.027	.039
1978/1990	.064	.053	.067	.050	.081	.057	.053	.045	.042	.051
1978/1990 (Initial Forecast)	.062	.052	.065	.051	.082	.056	.051	.045	.041	.051

YEAR	GDPR	GDPC	GNPR	NYOR	CR	IR	EXR	NTLFR	NPR
1978/79	.077	.140	.074	.067	.072	.067	.124	.031	-.417
1979/80	.059	.147	.058	.063	.060	.057	.063	.039	-.012
1980/81	.065	.142	.064	.064	.067	.035	.062	.049	-.012
1981/82	.053	.122	.052	.052	.051	.046	.061	.047	-.106
1982/83	.063	.129	.060	.062	.061	.038	.060	.048	-.060
1983/84	.052	.116	.051	.051	.049	.045	.059	.048	-.154
1984/85	.059	.122	.057	.056	.057	.035	.054	.049	-.105
1985/86	.049	.111	.048	.047	.046	.041	.056	.048	-.221
1986/87	.055	.117	.054	.052	.053	.032	.056	.049	-.167
1987/88	.046	.108	.045	.043	.042	.037	.054	.049	-.366
1988/89	.051	.114	.050	.047	.049	.028	.058	.049	-.346
1989/90	.042	.108	.041	.039	.039	.033	.053	.048	-.415
1978/1990	.056	.123	.055	.055	.054	.041	.065	.046	-
1978/1990 (Initial Forecast)	.055	.122	.054	.055	.053	.042	.055	.041	-

YEAR	GRC	GDEFC	TFOC	RFOC	MSUPC	P	RR	EMP
1978/79	.092	2.522	.146	.142	-.059	.059	.052	.038
1979/80	.135	.102	.135	.133	.660	.083	.053	.040
1980/81	.118	.119	.125	.124	.108	.072	.053	.040
1981/82	.107	.136	.118	.116	.112	.065	.052	.040
1982/83	.108	.154	.111	.110	.118	.062	.051	.040
1983/84	.102	.150	.106	.105	.123	.060	.050	.039
1984/85	.105	.138	.101	.100	.119	.060	.050	.039
1985/86	.100	.146	.097	.096	.112	.059	.048	.039
1986/87	.103	.136	.093	.092	.115	.059	.048	.038
1987/88	.099	.144	.090	.089	.111	.059	.046	.038
1988/89	.102	.137	.087	.087	.113	.060	.046	.037
1989/90	.098	.142	.085	.084	.110	.061	.044	.037
1978/1990	.106	-	.104	.103	.136	.063	.049	.039
1978/1990	.105	-	.104	.103	.143	.063	.049	.039

Table 7.7-Increased Imports (10%) in 1983-Values of Major Endogenous Variables 1979-1990

E Y	YAK	YLFR	YMPK	YCUMK	YEGK	YTSR	YWKR	YUDK	YPAUK	YSKYK
1979	5022.53	8959.97	8082.49	2587.96	1459.57	3256.90	6531.91	1446.59	5082.39	4747.12
1980	5307.68	9186.01	8815.46	2770.23	1631.49	3469.20	6912.53	1467.65	5363.84	4991.22
1981	5711.78	9659.60	9550.51	2887.46	1816.75	3701.16	7327.88	1526.01	5648.40	5291.73
1982	6086.00	9986.53	10208.66	3049.95	1990.03	3898.36	7695.64	1571.59	5874.19	5540.39
1983	6348.02	10112.12	10477.95	3191.90	2147.70	4074.27	8056.59	1623.41	6077.77	5771.36
1984	6849.62	10818.98	11485.79	3330.81	2356.64	4300.86	8426.15	1698.91	6292.72	6059.90
1985	7446.95	11798.05	12492.21	3541.99	2561.05	4501.89	8949.73	1826.87	6574.56	6460.78
1986	7921.38	12467.44	13185.53	3725.28	2717.34	4812.67	9395.79	1933.37	6805.17	6785.53
1987	8414.09	13237.12	13846.38	3852.21	2872.42	5063.64	9861.54	2061.23	7054.85	7144.19
1988	8836.89	13841.65	14447.56	4011.04	3014.80	5277.90	10261.68	2162.83	7255.28	7432.26
1989	9337.32	14675.53	15168.72	4151.12	3176.56	5530.20	10720.77	2295.09	7494.11	7783.81
1990	9786.76	15381.31	15840.10	4320.70	3327.77	5752.21	11132.58	2406.78	7696.07	8080.98

YEAR	GDPR	GDPC	GNPR	NYDR	CR	IR	EXR	MILFR	MFR	FERC
1979	47177.43	171560.56	53623.64	45257.89	47872.10	9342.43	3393.22	6046.04	231.67	-357.46
1980	49915.33	196572.05	56691.47	48070.44	50686.82	9872.26	3584.54	6265.85	229.52	-3013.67
1981	53117.30	224263.96	60256.51	51112.51	54018.92	10217.65	3773.32	6544.00	228.10	-5600.32
1982	55901.33	251444.62	63372.20	53753.86	56756.46	10685.20	3966.40	6818.64	209.60	-8428.26
1983	57881.10	276514.55	65722.91	55501.28	59403.07	11088.95	4168.14	7794.92	195.78	-11263.16
1984	61618.37	311806.32	69663.99	59158.24	62334.58	11474.52	4368.41	7267.59	185.47	-18365.18
1985	66234.08	355355.45	74603.53	63453.35	66436.11	12052.73	4580.36	7357.68	170.02	-20739.31
1986	69749.50	396564.14	78458.42	66625.85	69834.58	12555.00	4801.36	7822.66	127.78	-21927.80
1987	73407.68	442280.36	82497.42	69883.51	73592.67	12886.84	5027.15	8335.84	103.29	-23881.99
1988	76541.87	488783.50	85968.83	72664.35	76616.59	13318.41	5261.28	8761.10	70.47	-27046.37
1989	80336.23	544056.17	90122.52	76040.88	80265.58	13686.84	5504.63	9116.63	54.45	-30860.74
1990	83725.27	601777.68	93826.79	79039.72	83356.13	14146.69	5758.17	9457.82	23.26	-34790.62

YEAR	GRC	GDEFC	TFOC	RFOC	MSUPC	P	KR	EMP
1979	31563.48	8099.70	56834.00	1865.55	35478.29	3.64	100500.63	23.51
1980	35806.16	8945.33	64488.00	2112.83	58916.00	3.94	105823.03	24.44
1981	39979.42	10035.41	72571.00	2373.96	65326.24	4.22	111462.37	25.42
1982	44225.85	11427.15	81107.00	2649.73	72705.03	4.50	117221.52	26.43
1983	49162.51	13097.99	90120.00	2940.96	81283.67	4.78	123217.66	27.47
1984	53621.01	15377.72	99638.00	3248.46	90337.19	5.06	129378.10	28.55
1985	59156.27	17563.63	109689.00	3573.19	102370.68	5.37	135677.49	29.65
1986	65171.11	20074.04	120303.00	3916.10	114491.54	5.69	142303.13	30.80
1987	71977.19	22791.70	131512.00	4278.23	127703.28	6.02	149166.00	32.00
1988	79107.63	26063.71	143348.00	4660.65	141706.75	6.39	156086.20	33.21
1989	87117.43	29671.08	155847.00	5064.46	157691.81	6.77	163161.17	34.44
1990	95577.09	33946.80	169046.00	5490.89	175189.70	7.19	170321.56	35.69

Table 7.8-Increased (10%) in 1983-Annual Percentage Growth Rates of Major Endogenous Variables-1978/79-1989/90

YEAR	YAR	YLFR	YMMR	YCONR	YEGR	YTSR	YWRR	YDOR	YPADR	YSRVR
1978/79	.057	.064	.116	.071	.135	.086	.071	.013	.073	.062
1979/80	.057	.025	.091	.070	.118	.065	.058	.015	.055	.051
1980/81	.076	.051	.083	.042	.114	.067	.060	.040	.053	.060
1981/82	.066	.034	.069	.056	.095	.053	.050	.030	.040	.047
1982/83	.043	.013	.026	.047	.079	.045	.047	.033	.035	.042
1983/84	.079	.070	.096	.044	.097	.056	.046	.045	.035	.050
1984/85	.087	.090	.088	.063	.087	.065	.062	.077	.045	.066
1985/86	.064	.057	.055	.052	.061	.050	.050	.058	.035	.050
1986/87	.062	.062	.050	.034	.057	.052	.050	.066	.037	.053
1987/88	.050	.046	.043	.041	.050	.042	.041	.049	.028	.040
1988/89	.057	.060	.050	.035	.054	.048	.045	.061	.033	.047
1989/90	.048	.048	.044	.041	.048	.040	.038	.049	.027	.038
1978/1990	.062	.052	.068	.050	.083	.056	.051	.045	.041	.051
1978/1990 (Initial Forecast)	.062	.052	.065	.051	.082	.056	.051	.045	.041	.051

YEAR	GDPR	GDPC	GNPR	NTDR	CR	IR	EXR	NTLFR	MFA
1978/79	.076	.139	.073	.086	.071	.067	.116	.030	-.418
1979/80	.058	.146	.057	.062	.059	.057	.056	.036	-.009
1980/81	.084	.141	.063	.063	.086	.035	.053	.044	-.006
1981/82	.052	.121	.052	.052	.051	.046	.052	.042	-.099
1982/83	.035	.100	.037	.033	.047	.038	.050	.143	-.046
1983/84	.065	.128	.060	.066	.049	.035	.048	-.068	-.053
1984/85	.075	.140	.071	.073	.066	.050	.049	.012	-.083
1985/86	.053	.116	.052	.050	.051	.042	.048	.063	-.248
1986/87	.052	.115	.051	.049	.054	.026	.047	.066	-.192
1987/88	.043	.105	.042	.040	.041	.033	.047	.051	-.318
1988/89	.050	.113	.048	.046	.048	.028	.046	.041	-.227
1989/90	.042	.106	.041	.039	.039	.034	.046	.037	-.573
1978/1990	.055	.122	.054	.054	.053	.042	.055	.040	-
1978/1990 (Initial Forecast)	.055	.122	.054	.055	.053	.042	.055	.041	-

YEAR	GRC	GDEFC	TFOC	RFOC	MSUPC	P	ER	EMP
1978/79	.091	2.526	.146	.142	-.059	.059	.052	.038
1979/80	.134	.104	.135	.133	.061	.083	.053	.040
1980/81	.117	.122	.125	.124	.109	.072	.053	.040
1981/82	.106	.139	.118	.116	.113	.065	.052	.040
1982/83	.112	.146	.111	.110	.118	.062	.051	.040
1983/84	.091	.174	.106	.105	.111	.059	.050.	.039
1984/85	.103	.142	.101	.100	.133	.060	.049	.039
1985/86	.102	.143	.097	.096	.118	.060	.049	.039
1986/87	.104	.135	.093	.092	.115	.060	.048	.039
1987/88	.099	.144	.090	.089	.110	.060	.046	.038
1988/89	.101	.138	.087	.087	.113	.061	.045	.037
1989/90	.097	.144	.085	.084	.111	.061	.044	.036
1978/1990	.105	-	.104	.103	.137	.063	.049	039
1978/1990 (Initial Forecast)	.105	-	.104	.103	.143	.063	.049	.039

Table 7.9 - No Foreign Aid from 1983-1990 - Value of Major Endogenous Variables 1979-1990

YEAR	YAR	YLFR	YNNR	YDNR	YEGR	YTSR	YWZR	YJDR	YPAJR	YSRYR
1979	5022.53	8499.97	8082.49	2557.95	1454.57	3256.90	6531.91	1446.59	5082.39	4747.12
1980	5307.68	9186.01	8815.46	2770.23	1631.49	3469.20	6912.53	1467.65	5363.84	4991.22
1981	5711.78	9665.60	9553.51	2897.46	1816.75	3701.16	7327.88	1526.01	5648.40	5291.73
1982	6085.00	9986.53	10209.66	3049.95	1990.03	3898.36	7695.84	1571.59	5874.19	5540.39
1983	6191.48	9653.83	10162.74	2447.33	2111.58	3966.15	7658.49	1567.90	5993.04	5630.73
1984	6574.68	10115.95	11013.31	2498.15	2304.67	4146.48	7932.49	1612.23	6167.02	5854.56
1985	7189.05	11158.95	12178.19	2734.84	2496.09	4421.11	8442.85	1731.74	6439.55	6249.43
1986	7752.07	12045.89	13083.35	2938.00	2616.87	4674.17	8934.86	1851.42	6697.59	6625.01
1987	8348.45	13056.87	13883.69	3071.33	2706.68	4958.68	9472.31	2003.96	6991.61	7057.85
1988	8872.30	13993.94	14568.16	3229.14	2762.14	5210.32	9951.21	2134.28	7241.07	7425.68
1989	9478.37	14977.56	15364.75	3370.89	2825.40	5504.41	10494.92	2298.08	7531.82	7860.90
1990	10048.93	15967.95	16139.41	3550.42	2876.20	5775.32	11002.64	2445.78	7791.20	8259.41

YEAR	GDPR	GDPC	GNPR	YFDR	CP	IR	EXR	RTLFR	RFR	FERC
1979	47177.43	171560.[illegible]	53623.64	45257.83	47872.10	9342.43	3393.22	6046.04	231.67	-357.46
1980	49915.33	196572.[illegible]	54691.47	48770.44	50686.82	9872.26	3584.54	6255.85	229.52	-3013.67
1981	53117.30	224263.[illegible]	60252.51	51112.51	54018.92	10217.65	3773.32	6544.00	228.10	-5600.32
1982	55901.33	251444.[illegible]	[illegible]372.20	53753.85	56756.46	10695.20	3968.40	5818.64	205.60	-8423.26
1983	59183.27	264794.41	[illegible]2907.84	53456.15	58116.41	8938.05	4168.14	6899.91	151.11	-11263.16
1984	58219.56	296315.66	[illegible]5821.74	56414.13	60414.56	9074.84	4365.05	6284.93	173.07	-23063.07
1985	63041.81	342474.65	[illegible]0893.62	61208.51	64353.80	9729.13	4574.36	5935.42	179.83	-30235.58
1986	67216.33	388607.46	[illegible]5143.07	65302.71	68167.84	10284.32	4795.61	6081.02	146.59	-34045.41
1987	71551.48	439534.74	[illegible]0044.63	69465.45	72610.62	10626.90	5023.23	6484.74	121.17	-37006.48
1988	75299.24	490793.84	[illegible]4134.13	73059.37	76398.65	11046.38	5259.54	6917.81	84.24	-40782.43
1989	79707.08	550984.02	[illegible]3943.12	77261.61	80856.92	11410.10	5505.06	7299.27	64.62	-45546.07
1990	83647.25	614365.55	[illegible]3443.58	81138.48	84841.14	11888.41	5760.87	7645.53	30.58	-50952.92

YEAR	GRC	GDEFC	TFDC	RFDC	MSUPC	P	KR	EMP
1979	31563.48	8099.70	56834.00	1865.55	35478.29	3.64	100500.63	23.51
1980	35806.16	8945.33	64488.00	2112.83	58916.00	3.94	105823.03	24.44
1981	39979.42	10035.41	72571.00	2373.96	65326.24	4.22	111462.37	25.42
1982	44225.85	11427.15	81107.00	2649.73	72705.03	4.50	117221.52	26.43
1983	47021.96	14354.36	81107.00	2940.96	81985.23	4.78	123217.86	27.47
1984	51333.78	17876.19	81107.00	2940.96	95169.89	5.09	127227.20	28.17
1985	56651.86	20192.91	81107.00	2940.96	110644.90	5.43	131212.96	28.87
1986	62476.10	22793.77	81107.00	2940.95	122758.21	5.78	135693.57	29.65
1987	69262.81	25489.01	81107.00	2940.96	136074.51	6.14	140550.15	30.50
1988	76507.80	28639.54	81107.00	2940.96	149810.92	6.52	145555.05	31.37
1989	84705.53	32038.84	81107.00	2940.95	165061.96	6.91	150773.23	32.28
1990	93379.54	36062.92	81107.00	2940.96	181424.05	7.33	156158.16	33.22

Table 7.10 No Foreign Aid for 1983 to 1990 - Annual Percentage Growth Rates of Major Endogenous Variables - 1978/79--1989/90

YEAR	YAR	YLFR	YPHR	YCUNR	YEXR	YTSR	YARR	YDOR	YPADR	YSRVR
1979/79	.057	.064	.116	.071	.135	.086	.071	.013	.073	.062
1979/80	.057	.029	.091	.073	.118	.065	.058	.015	.055	.051
1980/81	.076	.051	.083	.042	.114	.067	.060	.040	.053	.060
1981/82	.066	.034	.069	.056	.095	.053	.050	.030	.040	.047
1982/83	.017	-.033	-.006	-.179	.061	.017	-.005	-.002	.020	.016
1983/84	.062	.048	.084	.021	.091	.045	.036	.028	.029	.043
1984/85	.093	.103	.106	.095	.083	.066	.064	.074	.044	.067
1985/86	.079	.079	.074	.074	.048	.057	.058	.059	.040	.060
1986/87	.077	.084	.061	.045	.034	.041	.060	.082	.044	.065
1987/88	.063	.064	.049	.051	.020	.051	.051	.065	.036	.052
1988/89	.066	.078	.045	.044	.023	.056	.055	.077	.040	.059
1989/90	.060	.064	.050	.053	.018	.049	.048	.064	.034	.050
1978/1990	.064	.055	.069	.033	.069	.056	.050	.046	.042	.053
1978/1990 (Initial Forecast)	.062	.052	.065	.051	.062	.056	.051	.045	.041	.051

YEAR	GDPR	GDPC	CNPR	IYDR	CR	IR	EXR	YTLFR	YPR
1979/79	.074	.139	.073	.035	.071	.067	.115	.030	-.418
1979/80	.056	.146	.057	.052	.059	.057	.059	.038	-.309
1980/81	.064	.141	.063	.063	.066	.035	.053	.044	-.036
1981/82	.052	.121	.052	.052	.051	.044	.052	.042	-.399
1982/83	-.009	.053	-.009	-.035	.024	-.164	.050	.312	-.285
1983/84	.051	.119	.044	.055	.040	.015	.047	-.389	.195
1984/85	.083	.154	.077	.095	.065	.072	.048	-.355	.039
1985/86	.066	.135	.063	.057	.059	.057	.048	.325	-.135
1986/87	.064	.131	.062	.054	.065	.011	.047	.365	-.173
1987/88	.052	.117	.051	.052	.052	.039	.047	.367	-.305
1988/89	.059	.123	.057	.058	.058	.033	.047	.355	-.233
1989/90	.052	.115	.051	.051	.049	.042	.046	.347	-.327
1978/1990	.056	.126	.054	.057	.055	.026	.055	.322	-
1978/1990 (Initial Forecast)	.055	.122	.054	.055	.053	.042	.055	.281	-

YEAR	GAC	GDEFC	TFPC	PFPC	PSUPC	P	RA	EMP
1979/79	.091	2.525	.146	.142	-.059	.059	.052	.038
1979/80	.139	.104	.135	.133	.561	.083	.057	.040
1980/81	.117	.122	.125	.124	.109	.072	.053	.040
1981/82	.134	.139	.114	.115	.113	.059	.052	.043
1982/83	.263	.256	0.000	.113	.128	.063	.051	.040
1983/84	.032	.245	0.000	0.000	.161	.043	.033	.025
1984/85	.124	.130	0.000	0.000	.143	.057	.031	.025
1985/86	.101	.129	0.000	0.000	.129	.064	.034	.027
1986/87	.109	.119	0.000	0.000	.124	.053	.035	.029
1987/88	.105	.121	0.000	0.000	.101	.051	.035	.029
1988/89	.107	.119	0.000	0.000	.102	.052	.035	.029
1989/90	.102	.125	0.000	0.000	.099	.050	.035	.029
1978/1990	.133	-	-	-	.139	.067	.042	.032
1978/1990 (Initial Forecast)	.125	-	.104	.103	.143	.063	.049	.039

Table 7.11 - Harvest Failure in 1983 - Values of Major Endogenous Variabl
1979/1990

YEAR	YAR	YLFR	YMMR	YCONR	YEGR	YTSR	YWRR	YOUR	YPADR	YSRVR
1979	5022.53	8959.97	8082.49	2587.96	1459.57	3256.90	6531.91	1446.59	5082.39	4747.12
1980	5307.68	9186.01	8815.46	2770.23	1631.49	3469.20	6912.53	1467.65	5363.84	4991.22
1981	5711.78	9655.60	9550.51	2887.45	1816.75	3701.16	7327.88	1526.01	5648.40	5291.73
1982	6086.00	9986.53	10208.66	3049.95	1990.03	3898.36	7695.64	1571.59	5874.19	5540.39
1983	4967.98	7702.96	10583.88	3180.10	2138.49	3951.41	7787.87	1519.00	5924.49	5544.97
1984	6296.06	9730.64	11203.46	3167.18	2459.34	4150.83	8084.15	1577.58	6113.59	5774.15
1985	6988.85	10725.67	12072.55	3543.35	2692.43	4417.09	8661.47	1702.00	6393.19	6173.46
1986	7461.43	11313.82	12654.17	3686.97	2860.50	4630.27	9077.02	1798.25	6613.58	6483.48
1987	7970.77	12109.55	13329.70	3798.82	3033.51	4880.15	9533.87	1922.34	6862.33	6843.89
1988	8423.80	12772.55	13978.86	3966.70	3188.26	5102.44	9949.10	2026.72	7071.11	7147.80
1989	8946.47	13652.11	14717.34	4109.87	3353.68	5362.09	10424.21	2162.97	7319.29	7515.19
1990	9406.94	14371.74	15380.87	4275.99	3500.37	5588.44	10845.62	2277.29	7527.64	7822.72

YEAR	GDPR	GDPC	GNPR	NYDR	CR	IR	EXR	MTLFR	MFR	FERC
1979	47177.43	171560.56	53623.64	45257.89	47872.10	9342.43	3393.22	6046.04	231.67	-357.46
1980	49915.33	196572.05	56691.47	48070.44	50686.82	9872.26	3584.54	6265.85	229.52	-3013.67
1981	53117.30	224263.96	60258.51	51112.51	54018.92	10217.65	3773.32	6544.00	228.10	-5600.32
1982	55901.33	251444.62	63372.20	53753.86	56756.46	10685.20	3968.40	6818.64	205.60	-8428.26
1983	53301.15	254773.03	60849.74	51227.08	56982.78	11083.06	4168.14	6853.02	123.75	-11263.16
1984	58556.97	297880.43	66379.20	56146.36	59555.60	11031.18	4338.87	7141.05	336.02	-12383.02
1985	63370.00	342622.25	71655.37	60582.83	63617.85	12089.81	4568.41	7540.37	210.01	-15099.38
1986	66579.50	381455.09	75200.57	63547.87	66858.98	12478.58	4791.41	7965.88	152.26	-17764.07
1987	70284.95	426666.68	79261.33	66921.00	70598.58	12766.73	5017.17	8327.39	129.44	-20869.03
1988	73627.32	473785.58	82928.42	69952.09	73748.83	13223.13	5251.66	8667.28	97.42	-24224.26
1989	77563.22	529435.57	87223.23	73487.84	77542.93	13598.84	5495.67	9021.41	79.26	-27654.62
1990	80997.63	586888.74	90979.54	76548.06	80734.33	14047.44	5749.68	9392.07	45.79	-31159.49

YEAR	GRC	GDEFC	TFDC	RFDC	MSUPC	P	KR	EMP
1979	31563.48	8099.70	56834.00	1845.55	35478.29	3.64	100500.63	23.51
1980	35806.16	8945.33	64488.00	2112.83	58916.00	3.94	105823.03	24.44
1981	39979.42	10035.41	72571.00	2373.96	65326.24	4.22	111462.37	25.42
1982	44225.85	11427.15	81107.00	2649.73	72705.03	4.50	117221.52	26.43
1983	47717.26	13946.26	90120.00	2940.96	81757.35	4.78	123217.86	27.47
1984	52489.84	16132.78	99638.00	3248.46	94865.45	5.09	129372.21	28.55
1985	58819.83	17923.42	109689.00	3573.19	106288.45	5.41	135228.50	29.57
1986	64787.60	20485.26	120303.00	3916.10	116780.23	5.73	141909.16	30.73
1987	71439.01	23318.80	131512.00	4278.23	130010.44	6.07	148711.38	31.92
1988	78507.80	26662.20	143348.00	4660.65	144418.13	6.43	155529.65	33.11
1989	86528.65	30304.73	155847.00	5064.46	160745.10	6.83	162531.60	34.33
1990	95022.98	34604.24	169046.00	5490.89	178461.07	7.25	169629.17	35.57

Table 7.12 - Harvest Failure in 1983-Annual Percentage Growth Rates of Major Endogenous Variables - 1978/79-1989/90

YEAR	YAR	YLFR	YMMR	YCONR	YEGR	YTSR	YWAR	YODR	YPADR	YSRVR
1978/79	.057	.064	.116	.071	.135	.086	.071	.013	.073	.062
1979/80	.057	.025	.091	.070	.118	.065	.058	.015	.055	.051
1980/81	.076	.051	.083	.042	.114	.067	.060	.040	.053	.060
1981/82	.066	.034	.069	.056	.095	.053	.050	.030	.040	.047
1982/83	-.184	-.229	.037	.043	.075	.014	.012	-.033	.009	.001
1983/84	.267	.263	.059	-.004	.150	.050	.038	.039	.032	.041
1984/85	.110	.102	.078	.119	.095	.064	.071	.079	.046	.069
1985/86	.068	.055	.048	.041	.062	.048	.048	.057	.034	.050
1986/87	.068	.070	.053	.038	.060	.054	.050	.069	.038	.056
1987/88	.057	.055	.049	.044	.051	.046	.044	.054	.030	.044
1988/89	.062	.069	.053	.036	.052	.051	.048	.067	.035	.051
1989/90	.051	.053	.045	.040	.044	.042	.040	.053	.028	.041
1978/1990	.059	.046	.065	.049	.081	.053	.049	.040	.039	.048
1978/1990 (Initial Forecast)	.062	.052	.065	.051	.082	.056	.051	.045	.041	.051

YEAR	GDPR	GDPC	GNPR	NYDR	CR	IR	EXR	RTLFR	RFR
1978/79	.076	.139	.073	.086	.071	.067	.116	.030	-.418
1979/80	.058	.146	.057	.062	.059	.057	.056	.036	-.089
1980/81	.064	.141	.063	.063	.066	.035	.053	.044	-.006
1981/82	.052	.121	.052	.052	.051	.046	.052	.042	-.099
1982/83	-.047	.013	-.040	-.047	.004	.037	.050	.005	-.198
1983/84	.099	.169	.091	.098	.045	-.005	.041	.042	1.715
1984/85	.082	.150	.079	.079	.068	.096	.053	.036	-.375
1985/86	.051	.113	.049	.049	.051	.032	.049	.036	-.275
1986/87	.056	.119	.054	.053	.056	.023	.047	.045	-.150
1987/88	.048	.110	.046	.045	.045	.036	.047	.041	-.247
1988/89	.053	.117	.052	.051	.051	.028	.046	.041	-.186
1989/90	.044	.109	.043	.042	.041	.033	.046	.041	-.422
1978/1990	.053	.012	.051	.051	.051	.040	.055	.040	-
1978/1990 (Initial Forecast)	.055	.122	.054	.055	.053	.042	.055	.041	-

YEAR	GRC	GDEFC	TFDC	RFDC	RSUPC	P	ER	EMP
1978/79	.091	2.526	.146	.142	-.059	.059	.052	.038
1979/80	.134	.104	.135	.133	.661	.083	.053	.040
1980/81	.117	.122	.125	.124	.109	.072	.053	.040
1981/82	.108	.139	.118	.116	.113	.065	.052	.040
1982/83	.079	.220	.111	.110	.125	.063	.051	.040
1983/84	.100	.157	.106	.105	.160	.064	.050	.039
1984/85	.121	.111	.101	.100	.120	.063	.045	.036
1985/86	.101	.143	.097	.096	.099	.060	.049	.039
1986/87	.103	.136	.093	.092	.113	.060	.048	.039
1987/88	.099	.143	.090	.089	.111	.060	.046	.037
1988/89	.102	.137	.087	.087	.113	.061	.045	.037
1989/90	.098	.142	.085	.084	.110	.062	.044	.036
1978/1990	.106	.250	.104	.103	.135	.064	.048	.039
1978/1990 (Initial Forecast)	.105	-	.104	.103	.143	.063	.049	.039

Table 7.13 - Increase (20%) in Bank Credit - Values of Major Endogenous Variables - 1979-1990

YEAR	YAR	YLFR	YMMR	YCUMR	YFGR	YTSR	YWRM	YDDR	YPADR	YSRVR
1979	5035.77	8994.65	5112.03	2616.50	1461.98	3263.19	6549.67	1449.90	5087.47	4755.73
1980	5340.28	9268.73	8878.85	2825.70	1636.37	3484.30	6952.61	1476.41	5377.06	5013.07
1981	5766.52	9792.37	9648.38	2962.77	1823.70	3726.14	7390.10	1541.31	5671.13	5328.73
1982	6165.63	10154.44	10345.28	3141.33	1999.11	3934.29	7780.25	1594.33	5907.44	5594.02
1983	6654.62	10852.20	11126.57	3300.21	2186.82	4183.20	8239.50	1689.07	6175.63	5935.75
1984	7096.87	11407.48	11840.75	3489.41	2357.81	4402.97	8654.08	1770.51	6399.91	6228.98
1985	7610.60	12190.50	12623.82	3647.60	2537.50	4659.84	9127.20	1887.77	6659.05	6589.05
1986	8070.20	12844.93	13338.79	3832.35	2700.57	4886.40	9551.67	1987.76	6877.31	6895.44
1987	8598.34	13713.44	14124.76	3987.69	2874.29	5149.43	10033.82	2120.72	7133.03	7265.85
1988	9064.44	14427.51	14828.84	4165.72	3032.32	5379.14	10461.95	2232.69	7347.62	7577.02
1989	9596.68	15343.27	15603.72	4311.61	3203.54	5643.87	10944.44	2374.92	7599.78	7949.04
1990	10066.82	16099.14	16301.07	4481.50	3361.43	5874.90	11372.41	2494.35	7811.50	8260.69

YEAR	GDPR	GDPC	GNPR	NYOR	CR	IR	EXR	MTLFR	MFR	FERC
1979	47326.90	172269.61	53785.87	49391.94	47948.96	9424.56	3393.22	6053.91	233.32	-357.46
1980	50253.35	198346.28	57058.24	48365.45	50888.80	10031.25	3584.80	6291.95	231.34	-3063.52
1981	53651.15	227323.57	60835.54	51570.43	54367.96	10432.64	3773.97	6586.44	229.29	-5799.43
1982	56646.16	256019.38	64172.57	54386.13	57268.30	10945.02	3969.49	6870.15	205.92	-8866.09
1983	60343.57	290010.64	68185.73	57853.88	60895.54	11386.49	4169.74	7163.76	194.25	-11990.71
1984	63648.78	324716.31	71808.42	60905.24	63997.04	11916.37	4374.85	7462.28	165.25	-15349.54
1985	67532.93	365457.45	76051.66	64437.81	67757.70	12344.43	4585.49	7779.80	148.50	-18739.85
1986	70985.42	407025.32	79832.38	67549.13	70958.57	12853.27	4804.70	8099.36	116.88	-22400.83
1987	75001.38	455702.95	84210.37	71141.97	74802.09	13264.76	5030.18	8437.48	98.50	-26042.91
1988	78517.25	505717.93	88054.90	74251.60	78042.38	13751.66	5265.08	8790.40	64.91	-29827.04
1989	82570.86	564137.79	92470.84	77825.77	81898.48	14134.52	5509.36	9150.26	45.44	-33774.84
1990	86123.82	624580.78	96347.24	80928.99	85141.87	14593.48	5763.58	9515.32	11.20	-37840.66

YEAR	GRC	GDEFC	TFDC	RFDC	MSUPC	P	RR	EMP
1979	31637.28	8063.05	56834.00	1865.55	36117.12	3.64	100500.63	23.51
1980	35989.77	8853.04	64488.00	2112.83	40046.31	3.95	105905.17	24.45
1981	40285.63	9879.62	72571.00	2373.96	46858.48	4.24	111700.20	25.46
1982	44661.42	11202.32	81107.00	2649.73	74591.36	4.52	117664.84	26.50
1983	49530.46	12917.45	90120.00	2940.96	83558.29	4.81	123903.27	27.59
1984	54623.84	14848.19	99638.00	3248.46	93958.77	5.10	130333.62	28.71
1985	60376.55	16893.06	109689.00	3573.19	105159.31	5.41	137036.65	29.88
1986	66407.20	19369.60	120303.00	3916.10	116956.41	5.73	143899.62	31.08
1987	73223.72	22056.47	131512.00	4278.23	130363.62	6.08	150996.90	32.32
1988	80432.69	25260.39	143348.00	4660.65	144760.78	6.44	158223.79	33.58
1989	88590.85	28758.24	155847.00	5064.46	161081.92	6.83	165646.50	34.88
1990	97229.06	32901.76	169046.00	5490.89	178759.27	7.25	173155.16	36.19

Table 7.14 - Increase (20%)in Bank Credit - Annual Percentage Growth Rates of Major Endogenous Variables - 1978/79--1989/90

YEAR	YAR	YLFR	YMR	YCONR	YEGR	YISR	YWRR	YDOR	YPAOR	YSRVR
1978/79	.060	.069	.120	.083	.137	.088	.074	.016	.075	.064
1979/80	.060	.030	.095	.080	.119	.068	.062	.018	.057	.054
1980/81	.080	.056	.087	.049	.114	.069	.063	.044	.055	.063
1981/82	.069	.040	.072	.060	.096	.056	.053	.034	.042	.050
1982/83	.079	.066	.076	.051	.094	.063	.059	.059	.045	.061
1983/84	.066	.051	.064	.057	.078	.053	.050	.048	.036	.049
1984/85	.072	.069	.066	.045	.076	.058	.055	.066	.040	.058
1985/86	.060	.054	.057	.051	.064	.049	.047	.053	.033	.047
1986/87	.065	.068	.059	.041	.064	.054	.050	.067	.037	.054
1987/88	.054	.052	.050	.045	.055	.045	.043	.053	.030	.043
1988/89	.059	.063	.052	.035	.056	.049	.046	.064	.034	.049
1989/90	.049	.049	.045	.039	.049	.041	.039	.050	.028	.039
1978/1990	.069	.056	.070	.053	.083	.058	.053	.048	.043	.053
1978/1990 (Initial Forecast)	.062	.052	.065	.051	.082	.056	.051	.045	.041	.051

YEAR	GDPR	GDPC	GNPR	MYDR	CR	IR	EXR	MTLFR	MFR
1978/79	.079	.144	.076	.089	.073	.077	.116	.032	-.414
1979/80	.062	.151	.061	.066	.061	.064	.056	.039	-.008
1980/81	.068	.146	.066	.066	.068	.040	.053	.047	-.009
1981/82	.056	.126	.055	.055	.053	.049	.052	.043	-.102
1982/83	.065	.133	.063	.064	.063	.040	.050	.043	-.057
1983/84	.055	.120	.053	.053	.051	.047	.049	.042	-.149
1984/85	.061	.125	.059	.058	.059	.036	.048	.043	-.101
1985/86	.051	.114	.050	.048	.047	.041	.048	.041	-.213
1986/87	.057	.120	.055	.053	.054	.032	.047	.042	-.157
1987/88	.047	.110	.046	.044	.043	.037	.047	.042	-.341
1988/89	.052	.116	.050	.048	.049	.028	.046	.041	-.300
1989/90	.043	.107	.042	.040	.040	.032	.046	.040	-.754
1978/1990	.058	.126	.056	.056	.055	.044	.055	.041	-
1978/1990 (Initial Forecast)	.055	.122	.054	.055	.053	.042	.055	.041	-

YEAR	GRC	GDEFC	YFDC	YFDC	YSUPC	P	XR	EMP
1978/79	.094	2.510	.146	.142	-.042	.060	.052	.038
1979/80	.138	.098	.135	.133	.663	.084	.054	.040
1980/81	.119	.116	.125	.124	.113	.074	.055	.041
1981/82	.109	.134	.118	.116	.116	.067	.053	.041
1982/83	.109	.153	.111	.110	.120	.063	.053	.041
1983/84	.103	.149	.106	.105	.124	.062	.052	.041
1984/85	.105	.138	.101	.100	.119	.061	.051	.041
1985/86	.130	.147	.097	.096	.112	.060	.050	.040
1986/87	.103	.139	.093	.092	.115	.060	.049	.040
1987/88	.098	.145	.090	.089	.110	.060	.048	.039
1988/89	.101	.138	.087	.087	.113	.061	.047	.039
1989/90	.098	.144	.085	.084	.110	.061	.045	.038
1978/1990	.106	-	.104	.103	.113	.064	.051	.040
1978/1990 (Initial Forecast)	.105	-	.104	.103	.143	.063	.049	.039

Table 7.15 - Lower Rate of Public Investment Values of Major Endogenous Variables - 1979-1990

YEAR	YAG	YLFR	YMAN	YCON	YEGR	YTSR	YWRR	YOUR	YPADR	YSRVR
1979	4974.07	8833.07	7975.43	2485.55	1450.85	3233.87	6467.35	1434.35	5063.68	4715.41
1980	5185.67	8876.06	8579.66	2565.59	1613.43	3412.60	6763.05	1434.68	5314.08	4909.08
1981	5500.83	9126.74	9175.06	2600.14	1790.60	3604.60	7088.04	1466.63	5560.14	5148.22
1982	5768.87	9194.74	9667.91	2688.68	1955.68	3754.63	7357.43	1480.29	5740.47	5324.89
1983	6107.51	9487.90	10214.74	2763.69	2133.42	3937.57	7685.89	1529.37	5944.37	5566.37
1984	6384.18	9628.12	10673.29	2875.30	2294.38	4084.90	7961.25	1559.58	6099.00	5749.66
1985	6722.27	9966.93	11189.84	2963.15	2465.77	4264.93	8289.93	1621.24	6283.14	5993.10
1986	6999.75	10157.02	11631.70	3064.83	2620.28	4411.58	8567.34	1662.44	6423.28	6178.66
1987	7342.34	10547.35	12141.99	3184.48	2786.86	4593.16	8902.15	1734.39	6599.17	6426.17
1988	7622.79	10778.80	12572.26	3314.76	2936.34	4741.13	9185.09	1784.26	6733.62	6614.52
1989	7971.66	11212.10	13077.78	3421.79	3100.14	4925.22	9526.86	1864.14	6906.51	6865.59
1990	8263.90	11495.55	13514.75	3562.50	3248.48	5077.88	9820.95	1922.14	7041.18	7060.19

YEAR	GDPR	GDPC	GNPR	NYDR	CR	IR	EXR	MTLFR	MFR	FERC
1979	46633.63	169443.99	53032.23	44770.32	47598.46	9047.84	3393.22	6017.61	225.69	-357.46
1980	48653.89	190293.29	55322.08	46954.91	49926.09	9285.88	3583.53	6169.45	222.41	-2833.32
1981	51061.01	212029.33	58037.35	49304.08	52663.65	9397.75	3770.88	6381.85	222.49	-4866.95
1982	52933.58	231191.68	60188.23	51143.20	54697.91	9658.43	3964.27	6612.25	202.23	-6776.77
1983	55371.45	252916.70	62881.29	53511.52	57339.42	9867.50	4162.00	6871.67	194.87	-8437.47
1984	57309.66	272642.52	65080.97	55367.62	59352.31	10184.45	4364.22	7141.71	171.64	-10126.40
1985	59760.33	295217.82	67839.00	57646.05	61949.99	10421.65	4571.66	7428.95	162.00	-11680.37
1986	61736.87	315614.38	70095.25	59465.64	63938.63	10761.18	4787.47	7718.62	138.39	-13324.93
1987	64258.06	339185.37	72938.54	61745.30	66542.67	11027.22	5009.44	8028.76	128.66	-14776.30
1988	66283.55	360531.99	75259.68	63543.20	68537.95	11387.82	5240.76	8355.68	104.17	-16203.49
1989	68871.79	385278.71	78186.81	65817.71	71162.27	11672.14	5481.49	8695.84	93.98	-17631.85
1990	71007.51	407701.79	80635.31	67654.81	73207.59	12060.27	5732.21	9046.87	69.12	-19060.22

YEAR	GRC	GDEFC	TFDC	RFDC	MSUPC	P	KR	EMP
1979	31344.10	7124.25	56834.00	1865.55	34933.60	3.63	100500.63	23.51
1980	35157.63	6853.67	64488.00	2112.83	54402.77	3.91	105528.45	24.38
1981	38749.33	6625.35	72571.00	2373.96	56316.48	4.15	110593.19	25.27
1982	42260.91	6460.02	81107.00	2649.73	58435.96	4.37	115567.21	26.14
1983	46071.85	6433.92	90120.00	2940.96	60900.05	4.57	120602.96	27.02
1984	49898.54	6325.52	99638.00	3248.46	63795.21	4.76	125646.34	27.90
1985	54126.46	6016.15	109689.00	3573.17	66319.28	4.94	130804.94	28.80
1986	58375.75	5753.23	120303.00	3916.10	68155.13	5.11	135994.39	29.70
1987	63080.36	5289.51	131512.00	4278.23	70077.52	5.28	141315.79	30.63
1988	67863.47	4844.73	143348.00	4660.65	71319.31	5.44	146690.38	31.57
1989	73166.74	4169.62	155847.00	5064.46	72497.92	5.59	152210.58	32.53
1990	78556.86	3496.51	169046.00	5490.89	72879.40	5.74	157794.30	33.51

Table 7.16 - Lower Rate of Public Investment-Annual Percentage Growth Rates of Major Endogenous Variables-1978/79-1989/90

YEAR	YAR	YLFR	YMMR	YCONR	YEGR	YTSR	YWRR	YDOR	YPADR	YSRVR
1978/79	.047	.049	.101	.028	.128	.079	.061	.065	.070	.055
1979/80	.043	.005	.076	.032	.112	.055	.046	.000	.049	.041
1980/81	.061	.028	.069	.013	.110	.056	.048	.022	.046	.049
1981/82	.049	.007	.054	.034	.092	.042	.038	.009	.032	.034
1982/83	.059	.032	.057	.028	.091	.049	.045	.033	.036	.045
1983/84	.045	.015	.045	.040	.075	.037	.036	.020	.026	.033
1984/85	.053	.035	.048	.031	.075	.044	.041	.040	.030	.042
1985/86	.041	.019	.039	.041	.063	.034	.033	.029	.022	.031
1986/87	.049	.038	.044	.032	.064	.041	.039	.043	.027	.040
1987/88	.038	.022	.035	.041	.054	.032	.032	.029	.020	.029
1988/89	.046	.040	.040	.032	.056	.039	.037	.045	.026	.038
1989/90	.037	.025	.033	.041	.048	.031	.031	.031	.019	.028
1978/1990	.047	.027	.054	.033	.080	.045	.041	.025	.034	.039
1978/1990 (Initial Forecast)	.062	.052	.065	.051	.082	.056	.051	.045	.041	.051

YEAR	GDPR	GDPC	GNPR	MYDR	CR	IR	EXR	MTLFR	MFR
1978/79	.064	.125	.061	.074	.065	.034	.116	.026	-.433
1979/80	.043	.123	.063	.049	.049	.026	.056	.025	-.015
1980/81	.049	.114	.049	.050	.055	.012	.052	.034	.000
1981/82	.037	.090	.037	.037	.039	.028	.051	.036	-.091
1982/83	.046	.094	.045	.046	.048	.022	.050	.039	-.036
1983/84	.035	.078	.035	.035	.035	.032	.049	.039	-.119
1984/85	.043	.083	.042	.041	.044	.023	.046	.040	-.056
1985/86	.033	.069	.033	.032	.032	.033	.047	.039	-.146
1986/87	.041	.075	.041	.039	.041	.025	.046	.040	-.070
1987/88	.032	.063	.032	.029	.030	.033	.046	.041	-.140
1988/89	.039	.069	.039	.036	.038	.025	.046	.041	-.098
1989/90	.031	.058	.031	.028	.029	.033	.046	.040	-.265
1978/1990	.041	.087	.041	.041	.042	.027	.054	.036	-
1978/1990 (Initial Forecast)	.055	.122	.054	.055	.053	.042	.055	.041	-

YEAR	GRC	GDEFC	TFDC	RFDC	RSUPC	P	RR	EMP
1978/79	.084	2.101	.146	.142	-.073	.058	.052	.038
1979/80	.122	-.038	.135	.133	.557	.076	.050	.037
1980/81	.102	-.033	.125	.124	.035	.062	.048	.036
1981/82	.091	-.025	.118	.116	.038	.052	.045	.034
1982/83	.090	-.004	.111	.110	.042	.046	.044	.034
1983/84	.083	-.017	.106	.105	.048	.042	.042	.033
1984/85	.085	-.049	.101	.100	.040	.038	.041	.032
1985/86	.079	-.044	.097	.096	.028	.035	.040	.031
1986/87	.081	-.041	.093	.092	.028	.033	.039	.031
1987/88	.076	-.084	.090	.089	.018	.030	.038	.031
1988/89	.078	-.139	.087	.087	.017	.028	.038	.031
1989/90	.074	-.161	.085	.084	.005	.026	.037	.030
1978/1990	.087	-	.104	.103	.056	.044	.043	.033
1978/1990 (Initial Forecast)	.105	-	.104	.103	.143	.063	.049	.039

FOOTNOTES TO CHAPTER 7

1. For a thorough exposition of simulations with econometric models see Pindyck and Rubinfeld (1976).

2. See Brown, "A Quadratically Convergent Newton-like Method Based Upon Gaussian Elimination", SIAM Journal of Numerical Analysis, vol. 6(4), pp. 560-569.

3. See Pindyck and Rubinfeld (1976).

4. For a history and state of affairs in regards to data collection in Pakistan, see Alamgir and Berlage (1974). See also Haq (1966).

5. This of course is based on the assumption that the terms on new foreign loans are similar to previous loans, i.e. interest rate is the same.

6. See Government of Pakistan, Pakistan Economic Survey, 1978/79.

7. Changing slope coefficients and/or intercepts is a risky affair. See Pindyck and Rubinfeld (1976).

8. The assumption here is that all foreign aid is given in terms of foreign exchange.

CHAPTER 8

SUMMARY AND CONCLUSIONS

8.1 Introduction

This study has been concerned with analysing the growth prospects of a developing country over the period 1978 to 1990. The country under study was Pakistan and the framework used was a macroeconometric model which was formulated to reflect the economic and institutional characteristics of Pakistan, and which was estimated using appropriate econometric techniques. Data for estimation of the structural parameters of the model covered the period 1956 to 1978. In this concluding chapter, the study and its main findings are reviewed and some suggestions for refinement and extensions through future research are offered.

8.2 A Recapitulation

There are various terms by which low-income countries are alluded to. Since a majority of the world's population lives in them, there is increasing concern among the developed countries to do something about the economic problems faced by the less developed countries. Over the past thirty years, resource transfers through the IBRD and its affiliated institutions, as well as unilateral transfers from the developed countries, have been avenues through which efforts have and are being directed.

This study has been concerned with a comprehensive economic

analysis of Pakistan, a developing country which has been the beneficiary of various aid schemes and which shows considerable promise in reducing the gap between itself and more developed countries.

It has been charged that modern economic theory, as taught and practised in the Western World, is largely irrelevant to the multi-faceted problems faced by the developing countries, where pragmatic and quick solutions are sought. In Chapter 2 some of the arguments concerning the application of economic theory to developing countries were considered. It was argued that economic theory has a major role to play in such countries. Most criticism seems to be focused on the choice of models used instead of on the subject matter itself. The conventional concepts of economics, such as supply and demand, were deemed necessary to analyse complex issues of surplus labour, effects of fixed prices, curbing of incentives, and so on. The confusion of assuming the subject matter to be synonymous with laissez-faire capitalism was noted and it was pointed out that value-free economics is concerned with the efficient allocation of resources and laissez-faire capitalism was neither necessary nor sufficient for such an outcome.

In principle, the allocation of resources, instead of relying on the invisible hand, could be brought about through other forms of organization. However the task involved for such a set-up would tax the limited resources of skilled personnel available in the developing countries. It was argued in Chapter 2 that state-wide planning as a pragmatic alternative has not fared any better. In fact distortions have been created. These include dualism characterised by highly mechanised urban sectors in stark contrast to the dilapidated

rural areas, and increasing unemployment and under-employment due to the capital-intensive nature of the industrial sector which is also subsidised at the expense of agriculture.

Economy-wide models of developing countries were surveyed in Chapter 3. The highly aggregative Harrod-Domar models were considered, with their various offshoots incorporating input-output relations among the various sectors, in both non-optimising and optimising frameworks. It was noted that such models are rigid in their specifications of the economic relations in the economy and are usually not able to pay sufficient attention to the institutional and behavioural characteristics of the economy. Although such models do take into account inter-industrial relations in a consistent manner, problems arise in specifying both the objectives and constraints.

Macroeconometric models were surveyed next, and it was seen that they are better able to reflect the behavioural and institutional characteristics of the economy. The role of fiscal, monetary and income policies can be explicitly incorporated. Simulations can be performed for realistic policy analysis, each showing the consequences of alternative proposals. Since the earliest macroeconometric models were designed for developed countries in a Keynesian framework, for use in short-term stabilisation analysis, earlier models for the developing economies were fashioned in the same mode. Later attempts tried to incorporate specific features of individual developing countries which were being studied. These included supply constraints characterising most non-oil developing countries, income distribution, the dual nature of these economies, and so on.

From a survey of the various kinds of economy-wide models of

developing countries, it was found desirable to append to the behavioural relations in a macroeconometric model the detailed multi-sectoral structure found in input-ouput models. A rather disaggregative macroeconometric model in which inter-industry flows were incorporated could, it was felt, serve as a useful analytical tool to predict Pakistan's future growth pattern.

A good understanding of the economy under study is a sine qua non for a well built model, and thus a review of the Pakistan economy as it has evolved over the period 1956 to 1978 was undertaken in Chapter 4. The objective there was to paint as clear a picture of the economy as possible, as a basis for the construction of the model. Attention was focused on the country's structure of production, its financial and trade arrangements, and the growth in the various aggregate expenditures. The nature and role of the government in the country's development was also examined. It was found that Pakistan exhibits most of the stylised characteristics of a developing economy. Agricultural output is a major part of the total and absorbs the major share of the labour force. The industrial sector is plagued by the small scale of its units. The capital market was found to be virtually non-existent and the structure of investment was unsatisfactory. The value of exports is only about 60-70% on the average of the value of imports, and they are dependent on a few commodity exports like raw cotton and rice. The deficit in the country's trade is covered by remittances from emigrants, aid and foreign loans. The economic problem of Pakistan seems to be to lift its people to a higher level of per-capita income while facing severe foreign exchange shortages, lack of any known industrial raw

materials or minerals, an acute unemployment problem in the face of shortages of skilled labour and an unequal distribution of income.

Based on the review of the economy, the model was formulated in Chapter 5. The production side was disaggregated into ten sectors which were linked to final demand categories through an input-output block. The final demand categories consist of private and public consumption expenditures, private and public investment expenditures, imports by economic categories, and exports, the latter consisting of the traditional raw cotton exports and the rapidly emerging cotton manufactured exports. The export equations are linked to income in the countries which import from Pakistan. The revenue apparatus of the government was explicitly incorporated into the model through tax and non-tax revenue equations. Also incorporated were the influence of bank credit on capital formation, the effect of government deficits on the money supply and the latter's effect on the price level. The size and scope of the model were limited by the data available.

The model links the output side of the economy to final demand through the input-output block. Both are determined simultaneously within the model, and in addition, the supply constraints in production are brought in through the explicit introduction of sectoral capital stocks in each sector's production. In total the model comprises 73 equations representing the major features of the economy.

Chapter 6 was devoted to the estimation and interpretation of the estimated parameters of the model. The simultaneous equations were estimated by the method of principal components, a procedure in

which each endogenous variable is first regressed on a set of principal components formed from all the predetermined variables in the model and the resulting estimated series is then used in a second stage of estimation, in the manner of two-stage least squares. Whenever appropriate, the Cochrane-Orcutt iterative technique for correcting atuo-correlationwas used. Equations not subject to simultaneous determination were estimated by the method of ordinary least squares, auto-correlationagain being corrected by the Cochrane-Orcutt method.

In the process of estimation, various hypotheses were tested on the individual equations, and although some were validated in the context of Pakistan, some were not. The hypothesis that the rural sector in the predominating agricultural economy tends to save less, did not find support in our tests and the opposite result was obtained in numerous attempts. The hypothesis that foreign inflows encourage consumption was also refuted, and the opposite result was obtained, with statistically significant parameters in alternative formulations. Inflation, real balances and income distribution seemed not to influence private consumption, for which disposable income was the dominant variable. A habit persistence form for the consumption equation, similar to the Permanent Income Hypothesis formulation, explained private consumption satisfactorily in both its per-capita and absolute versions. The long-run marginal propensity to consume was found to be close to unity.

Although it is difficult to impose a behavioural equation on government expenditures, it was found that they were explained by tax and non-tax revenues and population size. The inelasticity of

the tax structure in Pakistan was reflected in the results and direct estimates of the various average tax rates were obtained. Income of the importing countries and relative prices were significant in explaining exports. Habit persistence was reflected in the import equations, since imports were found to depend on past levels. Income and the level of foreign exchange reserves were significant also in explaining imports but relative prices had no significant effect, except in the case of imports of consumer goods. Government deficits, foreign exchange reserves and commercial bank borrowings were significant in explaining the money stock, which in turn was found to affect the price level, thus supporting the monetarists' view that money supply has a causal role. Private investment was seen to respond positively to bank credit and to growth in the economy. Most equations fit the data reasonably well, as evidenced by standard statistical tests (R^2, t and F tests). The criteria of equation selection was based on implied long-run properties, and on the statistical significance and plausibility of coefficients.

Having estimated the structural parameters of the model, its predictive ability was tested in Chapter 7. The criterion used was the model's ability to replicate the historical values of all the endogenous variables. Values of the major endogenous variables, such as gross domestic product, consumption, value added in the various sectors, aggregate and sectoral capital stocks, employment, price level, tax and non-tax receipts, aggregate exports, etc., representing seven-tenths of the total number of endogenous variables, were approximated over the twenty-one years of history within 9%, based on the mean absolute percentage error. Moreover the mean error was close

to zero for all variables, indicating a lack of bias in the model.

The main purpose for which the model was formulated and estimated was achieved by analysing growth prospects of the economy over the period 1978 to 1990. First the model was used to forecast values of the major endogenous variables, based on assumptions about the likely course of the exogenous variables over this period. The forecasts depend crucially on the nature of these assumptions. Actual values of the exogenous variables for which data were available for 1979 and 1980, were used. For the remainder of the period, they were allowed to grow at average rates experienced during the five years immediately preceding the forecast. These variables included international prices and income. For domestic variables, some values were generated on the basis of growth rates assumed by the Pakistan Planning Commission in the context of the Fifth Five-Year Plan (1978-1983). This was done in order to compare the model's projections with growth targets worked out by the Planning Commission. In the initial forecast with the model, it was seen that the gross domestic product would increase annually at a rate of 5.4%. However, this would occasion massive government deficits and call for increased balance of payments support.

The Fifth Five-Year Plan's growth targets for the major economic variables were then compared with the model's projected values. It was found that the targets were generally optimistic about growth in the major sectors of the economy. Gross domestic product was targeted to grow at a rate of 7% over 1978 to 1983, compared with the projected growth rate of 6.2%. The major inconsistency that emerged from an examination of the plan was that no allowance was made for inflationary pressures in the economy, and the planned

increase in nominal public investment was expected to provide an impetus for real growth in the various sectors without being eroded by inflation. Also, adequate consideration was not given to the resulting government deficits which the massive development expenditures would entail. Their effects would be reflected in an increasing money stock over and above that which would be needed by a growing economy.

If the planned government development expenditures had materialised in real terms, it was found that all targets could be attained. In that sense, the plan was found to be consistent. However, given the structural characteristics of the economy and the patterns of government receipts, the plan was found to be infeasible, in that non-inflationary resources could not be generated to finance it. It came as no surprise that the plan was abandoned in June 1981, after the forecast with the model had already been made.[1]

Finally, six experiments with the model were performed to examine the effects of major international and domestic factors on the growth path of the economy. The first experiment allowed for a 33% higher rate of growth of international income than assumed for the initial forecast. The objective was to see the sensitivity of the economy to international growth. Although the growth path of the Pakistan economy moved upwards in comparison with the initial forecast, increased growth internationally did not translate into equivalent growth in the domestic economy, partly because of the insignificance of total exports in domestic GNP, and partly because of the resulting leakages of imports which increasing income would entail.

In the second experiment, imports were allowed to increase

10% over and above the projected import requirements in 1983. The objective here was to see the vulnerability of the economy and its growth prospects to a sudden surge in imports. It was found that the recessionary effects in the economy were felt for two to three years after the sudden increase in imports but that the economy then went back to its original growth path. Thus it was seen that the economy can counteract an occasional bump in imports, leaving its long-run growth unaffected, but that a sustained increase in imports would move the path to a lower level. This was evidenced by the continuation of recessionary effects for two to three years after the increase in imports.

In the third experiment, all foreign aid was terminated in 1983. The objective here was to assess the importance of foreign aid in Pakistan's development. As expected, the impact effect of reduced foreign aid was recessionary. In the long run it was seen that termination of foreign aid might not be undesirable after all. From 1983 to 1987, GDP and the other aggregates grew at lower rates than in the initial forecast, but by 1990 all variables had attained their previous levels. This was presumably due to the curbing of imports and decreased debt servicing that termination of foreign aid would cause. Also, the real value of foreign aid in the later years of the forecast may be low anyway, because of inflation. The conclusions from this experiment have to be seriously qualified as the country's foreign exchange position would be worsened, which would necessitate considerable balance of payments support.

In the set of three experiments dealing with domestic factors, including a harvest failure, increased credit availability and

a lower rate of nominal public investment, the results were as expected a priori. When a harvest failure in 1983 was assumed by reducing agricultural output by 25%, the impact and long-run effects on the economy were more pronounced, highlighting its dependence on the agricultural sector. A bad harvest, it was seen, could lower the growth path of the economy, both in the short run and long run. Increase in bank credit to the private sector resulted in increasing private investment. Spurred by growth in private investment, the economy's rate of growth was increased.

The final experiment imposed a path on nominal public investment more consistent with historical experience. The rate of growth was assumed to be half of what the initial forecast had assumed. As mentioned above, the previous assumption was based on the Planning Commission's targets. The results of this experiment can also be considered as the most feasible course to follow, as forecast by this study, in light of the structure of the economy as it has evolved over the past 25 years. The long-run real annual growth in the economy is projected to be 4.1%, as indicated by GDP, GNP and associated aggregates. By feasible it is meant that the government deficits would be cut to a manageable size, occasioning less rapid increases in the money supply, which would then grow at a rate of 5.6%. Balance of payments deficits would be reduced substantially. Employment would increase by 3.3% annually, which is higher than the population growth rate. It is also projected that imports of food-grains would be negligible by 1990.

8.3 Future Extensions and Refinements

After constructing and experimenting with a highly aggrega-

tive econometric model of the monetary sector in Pakistan (including Bangladesh), Bhuiyan (1971) said:

> "The various deficiencies and limitations of this study point to one fundamental need in common: the statistical office of the government and other related agencies must devote more attention towards collecting new data, especially on capital stock, sectoral investments, employment, wage rates, prices, regional income, etc., and improving the existing ones. Until this is done, detailed quantitative studies of the Pakistan economy cannot be done in a meaningful manner." (pp. 230-231.)

Ten years later, these remarks apply with the same force. Macroeconometric studies of the present Pakistan economy are non-existent. The study mentioned above was in the context of Pakistan, which then included Bangladesh and the model contained a real sector of only 10 equations, in highly aggregative form. This was because of the severe limitations of data faced by the author. The present study can be viewed as a step towards the building of a much more detailed and sophisticated model of the Pakistan economy in the future. The present model has been constructed in such a way that extensions will be possible with relatively little effort, as more disaggregated and consistent data become available. Some of the possible extensions will now be discussed.

The input-output table used for this study relates to 1963, and thus can be considered out-dated. We have managed to circumvent this problem by modelling the residual differences between actual value added by sector and the ones generated by the input-ouput block, and by this means have brought in sectoral capital stocks to help in explaining the difference. This gives the model some supply characteristics as well as revealing inter-industry flows. Future extensions could conceivably use more tables, if they became available,

and thus model the actual coefficients in the input-output block.

In the macroeconometric model, the input-output block has been integrated by relying on the various relationships that connect the inter-industry accounts to final expenditures. These relationships have been used to integrate the real part of the model. In a similar fashion, sectoral prices could be linked to final demand prices and the differences between actual sectoral prices and the ones emerging from the input-output block, could be explicitly modelled.[2]

The sectoral capital stocks that have been generated, in this study, although a step forward, are based on capital-output ratios prevailing in 1963. They are adjusted to bring them into conformity with aggregate capital stock, but the assumption is that the capital-output ratio changed in the same proportion in all sectors. Actual data on sectoral capital stocks would relieve the model of this assumption.

The final demand components have been disaggregated to a level permitted by the data. Consumption and investment were split between government and private sectors but a more detailed disaggregation is possible in the same framework. This would involve specifying consumption and investment by economic categories such as the ones used for imports in the model. Investment by sector could also be included, if data became available. In linking the input-ouput table with the stochastic block, imports are treated as competitive. However, if information were available, a distinction between competitive and non-competitive (necessary) imports could be allowed for, and conclusions about the effects of terminating foreign aid might then be modified.

Aggregate employment is explained in the model but disaggregation by sector would be possible, given sufficient information. Sectoral employment could then be linked to sectoral capital stocks and given sectoral wage rates, and the scope of the model broadened to include distribution of income among the various economic classes in the economy. The monetary sector is not incorporated completely in the model; a more complete specification would allow both supply and demand forces to be explicitly examined. This study suffers from the same drawbacks as other studies of developing economies, in this regard.[3] The model that has been presented is flexible enough to incorporate these various extensions.

Once a model is built, it can be used to simulate the effects of many different policies. All our experiments have focussed on the stochastic part of the model. However, the incorporation of an input-output block makes possible the simulation of changes in the structure of interindustrial relations and resource use. How can the structure of the economy be changed? To achieve faster growth, which sectors ought to be encouraged? Questions such as these can be handled by the existing model. This would necessitate assumptions about changes in either rows or columns of the input-output matrix of direct coefficeients, then linking value added by sector to final demand, and finally modelling the new residual differences.[4]

In conclusion, it should be recognized that the economy is subject to structural and institutional change over time. Our findings are based on the structure that has evolved over the preceding 25 yeats. A model that explains the data well for a given period may not necessarily perform as well for a different period.

Developing economies have one thing in common: they are undergoing rapid structural transformation. The increased Islamisation of the economy through the abolition of Riba and the institutionalisation of Zakaat are factors that future studies will have to address.[5] Periodic revisions and extensions can only help keep the model useful over time.

FOOTNOTES TO CHAPTER 8

1. The Economist intelligence Unit Ltd., 1981.

2. Preston (1971) links sectoral prices to final demand prices through the input-output block in the context of the Wharton Model.

3. Some of these models are: Marzouk (1975); Behrman and Klein (1970); Dar (1981); Rio and Klein (1974); Ball (1973); and Behrman (1975).

4. These kinds of simulations were successfully applied in the case of Mexico. See Seguy and Ramirez (1975).

5. Zakaat is equivalent to a yearly wealth tax. A moslem is obligated to give a certain proportion of his total wealth to the needy. Riba, according to Islamic tenets, is expressly forbidden. It is similar to interest payments on loans but there is doubt as to its modern-day equivalent. For further interpretation of Riba and associated issues see Ahmed (1977).

APPENDIX I

SOURCES OF DATA USED IN THE STUDY

I.1 Introduction

In this appendix we cite the major sources of data used in the study and, in some cases, the methods by which series that were not available directly were constructed. Before 1972, data for Pakistan included Bangladesh, and although some series became available subsequently for Pakistan starting from 1956, other series had to be constructed for independent Pakistan, especially for the government sector. This necessitated the use of various published and unpublished sources of information.

For forecasting experiments beyond the sample period, assumptions had to be made regarding the future course of exogenous variables up to 1990. These assumptions are also listed in this appendix. In section I.2, specific sources of all data for the sample peiod are given, and in section I.3, assumptions regarding the future course of exogenous variables beyond the sample period are discussed. Appendix II contains all data used in the study.

I.2 Sources of Data

Input-Output Table

The input-output table used in this study is from Khan and MacEwan, Regional Current Input Output Tables for the East and West Pakistan Economies 1962/63, Research Report No. 63, Pakistan Institute of Development Economics, Islamabad. The 1963 table for

West Pakistan is used. It had thirty-five sectors which were aggregated to ten sectors for the model. Regional imports and exports from and to East Pakistan (Bangladesh), were aggregated with corresponding imports and exports from/to rest of the world.

Value Added by Sector

The main sources for value added for the ten sectors, GDP at factor cost and GNP at market prices are the following: Government of Pakistan, Finance Division, Pakistan Economic Survey, 1976/77, 1977/78 and 1978/79 issues; Khan and Bergan, Measurement of Structural Changes in the Pakistan Economy; a Review of the National Income Estimates: 1949/50-1963/64, The Pakistan Development Review, Vol. 6, No. 2, Summer 1966; Government of Pakistan, Central Statistical Office, 25 Years of Pakistan in Statistics 1947-1972, Karahi, 1972.

Private Consumption Expenditures

For the years 1960 to 1978, the following were the main sources: Pakistan Economic Survey op. cit.; Naseem (1973); World Bank, World Tables, Washington D.C. 1976.

Before 1960, data on private consumption expenditures were unavailable. Independent estimates of private consumption expenditures are not made by the Central Statistical Organisation which is the primary data collecting agency in Pakistan. They are calculated as the difference between GNP at market prices and the other aggregates in the expenditure accounts. The same procedure was used to derive data for the years 1956 to 1959, at 1963 prices.

Gross Investment Expenditures

The following were the main sources in deriving private and public gross investment expenditures: Haq (1966); Pakistan Economic Survey,op. cit.; World Tables, op. cit.; 25 Years of Pakistan in Statistics 1947-1972, op. cit.; Pakistan National Institute of Social and Economic Research, Basic facts about East and West Pakistan, Karachi, 1972; Government of Pakistan, Ministry of Finance, Explanatory Memorandum on the Budget of the Government of Pakistan 1969/70, Islamabad, 1970.

General Government Consumption Expenditures

For the period 1960 to 1970, the data was collected and derived from the following sources: World Tables, op. cit.; 25 Years of Pakistan in Statistics 1947-1972, op. cit.; Pakistan Economic Survey, op. cit.. For the years 1956 to 1959, data on general government consumption expenditures were unavailable. Data was derived directly from the West Pakistan and central government accounts in 25 Years of Pakistan in Statistics 1947-1972, op. cit.. Allocations of central government expenditures to Bangladesh were based on the procedure of Alamgir and Berlage, Bangladesh National Income and Expenditure 1949/50-1969/70, Research Monograph No. 1, Dacca: The Bangladesh Institute of Development Studies, 1974. Their procedure involved the assumption of certain proportions of central government expenditures for defence, public administration, foreign affairs, etc. as having been incurred in Bangladesh. The same proportions were used to net out general consumption expenditures in Bangladesh from 1956 to 1959.

Government Tax and Non-Tax Revenues

The series for customs, sales, excise, other indirect and direct taxes after 1972, were obtained from Government of Pakistan, Finance Division, Pakistan Basic Facts 1977/78, Islamabad, 1978. The series for provincial tax and non-tax revenues for West Pakistan for the years 1956 to 1971, were available in 25 Years of Pakistan in Statistics 1947-1972, op. cit.. The same source was used for the central government tax and non-tax revenues, but revenues accruing from Bangladesh as estimated by Alamgir and Berlage (1974), were subtracted.

Government Capital Receipts

These include internal debt and other non-recurring domestic receipts and foreign loans and grants. Data for the years 1972 up to 1978 was taken from Pakistan Basic Facts, 1977/78, op. cit.. For the years 1956 to 1971, the main source is 25 Years of Pakistan in Statistics 1947-1972, op. cit.. Series for total domestic debt and total foreign debt were constructed starting from 1956 as the base year. Loans and grants to East Pakistan were subtracted out.

Exports and Imports

Exports of raw cotton, cotton manufactures, and other exports including factor and non-factor services, for the period 1972 to 1978, were taken from Pakistan Economic Survey 1978/79, op. cit.. For the period prior to 1972, the main source is 25 Years of Pakistan in Statistics 1947-1972, op. cit.. Exports to Bangladesh prior to 1972 are from the same source.

Imports of Pakistan from 1956 to 1965 are taken from Islam (1967). The commodity classification scheme used by him is similar

to the one used by Central Statistical Organisation (CSO) and also used in this study. From 1966 onwards, the main source for imports by commodity groups is Pakistan Economic Survey 1978/79, op. cit.. The series on imports of goods from Bangladesh (prior to 1972) is taken from 25 Years of Pakistan in Statistics 1947-1972, op. cit..

Population, Employment, Sectoral and Aggregate Capital Stocks

The series on population is taken from Government of Pakistan, Central Statistical Office, Pakistan Statistical Year-Book 1978, Karachi. For employment the following were the main sources: 25 Years of Pakistan in Statistics 1947-1972, op. cit.; International Labour Office, Year Book of Labour Statistics, Various issues, Geneva; Farooq (1968); Pakistan Statistical Year-Book 1978, op. cit..

The series on sectoral and aggregate capital stocks were constructed by us. The bench-mark figure for aggregate capital stock was obtained from Khan and MacEwan (1967). In that study, capital-value added ratios were given for thirty-five sectors. By multiplying these ratios by their corresponding figures for value-added in 1962, sectoral capital stock, for the beginning of the period, were obtained. These were added to obtain aggregate capital stock in 1963. Given gross investment figures and a depreciation rate, the series for aggregate net capital stock was derived. On the basis of the 1963 capital-value added ratios, series on sectoral net capital stocks were calculated and adjusted to aggregate net capital stock as outlined in Chapter 5.

Monetary Data

The series on money supply (comprising of currency in circula-

tion and demand deposits), supply of credit to the private sector, and scheduled bank borrowings from the State Bank of Pakistan, were obtained from the following sources: 25 Years of Pakistan in Statistics 1947-1972, op. cit.; Pakistan Economic Survey 1978/79, op. cit.; Bhuiyan (1971); International Monetary Fund, International Financial Statistics, various issues.

Foreign Exchange Reserves

The series on foreign exchange reserves (including gold) for the period 1956 to 1978, were obtained from the same sources as the monetary data.

Prices

As a major part of the model was in real terms, it necessitated the use of various price indices to deflate nominal magnitudes. Series on sectoral value added, GDP, and GNP were available in both nominal and in terms of 1960 prices. Price indices with 1960 as the base-year, were derived from these magnitudes and the base was shifted to 1963. Unit value index of imports (PM) and exports (PEX), were obtained from the following sources: 25 Years of Pakistan in Statistics 1947-1972, op. cit.; Pakistan Economic Survey 1978/79, op.cit.; World Tables, op. cit.; International Financial Statistics, op. cit.. Whenever a change in the base of index numbers was encountered, the old and new series were spliced, and the base for all price indices was shifted to 1963. Price indices for consumer good, food grain, raw and intermediate good, and capital good imports were obtained from the following sources: Islam (1967); 25 Years of Pakistan

in Statistics, 1947-1972, op. cit.; Pakistan Economic Survey, 1978/79, op. cit.; Hamza and Alvi (1973).

The domestic price of raw cotton exports is the index of the wholesale price of raw cotton prevailing in Pakistan. This series was obtained from 25 Years of Pakistan in Statistics 1947-1972, op. cit.; Pakistan Economic Survey 1978/79, op. cit.. The unit value index of raw cotton exports was obtained from the same sources.

Price of cotton manufactures in the world market is the price of cotton cloth and fabrics in the London market. Price of synthetic fabrics also is the one prevailing in the London market. Both series were obtained from FAO, Production Yearbook, various issues; OECD, Main Economic Indicators, Historical Statistics 1955-1971. To deflate other nominal series in the model, when required, the implicit GDP deflater (P) was used. This was obtained from World Tables, op. cit.; 25 Years of Pakistan in Statistics 1947-1972, op. cit.; Pakistan Economic Survey 1978/79, op. cit.; Statistical Yearbook of Asia and the Far East, various issues, op. cit..

GNP of Countries Importing from Pakistan

This index (GNPW) was constructed by taking the weighted average of GNP in 1975 prices of U.S.A., Canada, Hong Kong, Japan, Middle East countries and European Community Countries. Weights were determined by the volume of Pakistan's imports to these countries. The base of the constructed series was shifted to 1963. The main sources for these data are: United Nations, Year Book of National Accounts, various issues; United Nations Statistical Yearbook, various issues.

I.3 Assumptions about Exogenous Variables for Forecast

Here we take up the exogenous variables whose values for the period 1979-1990 had to be supplied, for the initial forecast. The Pakistan Planning Commission, in projecting target growth rates of various variables, made assumptions regarding growth of certain variables for the period 1978 to 1983. The same assumptions were used for exogenous variables. These included the following: Net factor income from abroad (NFYR) would increase annually at a rate of 1.6%, population (N) would have an annual rate of increase of 2.53%, nominal public investment would increase by 10.8% annually, yearly increases in nominal net credit would be Rs. 5.12 billion, nominal subsidies would stabilize at Rs. 4 billion annually, and foreign aid would increase by 5.5% annually.

Assumptions on exports and import prices were based on their actual growth rates during the years 1976 to 1980. The assumption of growth in income of countries which buy Pakistan's exports, was based on the actual annual growth experienced by these countries during the years 1976 to 1980.

For these exogenous variables the main sources of data for the years 1979 and 1980 are: Government of Pakistan, Planning Commission, The Fifth Five-Year Plan (1978-1983); United Nations, Year Book of National Accounts, 1980; International Monetary Fund, International Financial Statistics, April 1981; FAO, Production Yearbook, 1980.

APPENDIX II

Data Used in Study

	YAR	YLFR	YMMR	YCONR	YEGR
1956	2000.00	5093.00	1872.94	341.176	44.8276
1957	2089.60	5136.00	1982.80	354.255	58.9744
1958	2077.00	5308.00	2043.88	407.143	65.5914
1959	2210.00	5452.00	2150.00	487.500	68.7500
1960	2224.70	5480.00	2197.89	449.474	90.6250
1961	2230.00	5477.00	2485.26	645.745	103.030
1962	2384.00	5757.00	2818.75	627.083	102.941
1963	2493.00	6072.00	3127.00	739.000	127.000
1964	2634.00	6144.00	3493.07	950.495	148.113
1965	2650.00	6617.00	3829.41	1081.37	178.571
1966	2612.00	6657.00	4161.68	1136.45	204.464
1967	2852.00	6910.00	4393.69	1095.50	215.200
1968	3658.00	7225.00	4681.74	1087.93	232.800
1969	3999.00	7345.00	5062.60	1389.43	261.864
1970	4400.00	8016.00	5618.75	1434.65	667.677
1971	4065.00	7996.00	5787.41	1465.93	766.667
1972	4528.00	7934.00	5584.03	1224.31	806.863
1973	4716.00	7965.00	6146.95	1418.52	936.275
1974	4759.00	8426.00	6622.39	1572.73	1193.14
1975	4658.00	8249.00	6668.61	1850.37	987.500
1976	4887.00	8601.00	6759.49	2209.51	1025.75
1977	4940.00	8918.00	6811.05	2188.72	1182.72
1978	5068.00	9104.00	7422.97	2376.00	1296.83

	GDPR	GDPC	GNPR	NYR	NYDR
1956	15290.8	12232.7	16295.1	13384.9	13078.7
1957	15735.0	13846.8	16567.0	13823.2	13542.6
1958	16150.4	15181.4	16959.2	14264.2	13899.3
1959	17024.1	15491.9	18054.8	15132.2	14601.4
1960	17189.5	16845.7	18104.8	15283.2	14890.3
1961	18064.7	18426.0	19104.4	16124.1	15737.8
1962	19129.4	19129.4	20324.4	17128.1	16815.1
1963	20489.0	20489.0	21807.0	18387.6	17877.6
1964	21833.1	22924.8	23324.6	19632.6	19168.8
1965	23898.2	26288.1	25652.3	21558.4	21223.0
1966	25754.9	29103.1	27598.9	23257.8	22465.8
1967	26528.9	32630.5	28860.3	23932.9	23595.5
1968	28285.0	35639.0	30834.6	25576.9	25141.2
1969	30082.3	37903.7	32764.6	27268.4	26790.6
1970	32703.6	42841.8	36069.2	29826.1	29298.7
1971	33171.0	45776.0	36566.4	30107.2	29816.6
1972	33494.8	49237.3	36879.6	30455.0	29920.3
1973	35997.0	60835.0	39745.5	32966.5	32328.0
1974	38841.6	80402.0	42079.1	35720.4	35461.5
1975	40371.4	104966.	43478.5	37192.0	36882.0
1976	41701.0	121767.	45820.7	38701.9	38310.1
1977	42779.5	136039.	47982.4	40014.5	39628.3
1978	45774.5	157007.	52151.2	43756.7	43369.2

	YTSR	YWRR	YODR	YPADR	YSRVR
1956	888.889	1855.67	776.471	1090.48	1327.38
1957	920.690	1914.14	800.000	1065.91	1412.64
1958	936.957	1982.22	822.340	1047.83	1459.48
1959	1117.78	2026.21	848.421	1139.78	1523.61
1960	1002.11	2147.96	871.875	1114.89	1610.01
1961	1109.09	2297.03	892.857	1133.67	1691.00
1962	1093.14	2480.20	924.000	1171.72	1770.59
1963	1200.00	2706.00	953.000	1206.00	1866.00
1964	1235.58	2980.19	980.392	1317.65	1949.62
1965	1666.67	3208.70	1012.15	1549.53	2104.84
1966	1777.88	3504.27	1041.23	2442.73	2217.21
1967	1845.24	3710.08	1080.55	2088.14	2338.41
1968	1941.54	3846.62	1113.49	2035.25	2462.59
1969	2064.39	4102.22	1139.85	2133.06	2584.39
1970	1806.52	4559.66	1161.15	2215.20	2823.84
1971	2078.62	4567.79	1191.84	2261.83	2939.95
1972	2124.18	4517.72	1234.19	2426.06	3115.44
1973	2477.33	4848.59	1278.29	2768.75	3441.33
1974	2536.57	5536.32	1327.78	3176.80	3640.82
1975	2702.19	5732.62	1374.45	4225.52	3923.17
1976	2733.77	5834.71	1423.53	4108.23	4118.01
1977	2778.38	5730.41	1476.35	4394.49	4309.36
1978	3149.36	6245.48	1529.41	4885.39	4696.59

	CPR	IPR	CGR	IGR	SBR
1956	12674.5	1172.57	1912.88	837.500	0.
1957	13892.8	912.293	1680.11	693.182	0.
1958	14088.0	783.923	1754.26	1063.83	0.
1959	13931.6	774.958	2361.54	1142.86	0.
1960	14293.4	1427.18	2008.16	1336.73	10.7143
1961	15521.9	1448.88	2000.98	1386.27	28.4314
1962	15471.4	1776.81	2165.00	2151.00	51.0000
1963	16094.0	2311.00	2195.00	2494.00	62.0000
1964	17065.8	2753.29	2491.43	2465.71	45.7143
1965	19491.1	3653.26	2662.73	2738.18	194.545
1966	20134.5	3213.75	3967.26	1883.19	214.159
1967	22595.8	3611.99	3160.16	2243.90	184.553
1968	24445.3	3031.51	3070.63	2128.57	170.635
1969	26027.0	3093.90	3333.33	2056.35	173.810
1970	28430.4	3112.68	3703.05	2550.38	177.099
1971	28991.1	3120.46	3818.84	2546.38	139.855
1972	28490.9	2970.27	4406.80	2222.45	155.102
1973	30510.5	2826.56	4570.41	2319.53	308.876
1974	33480.9	2297.10	4125.12	3272.46	1485.02
1975	33923.0	2260.27	4596.15	4234.62	1513.08
1976	35344.7	1898.68	4911.99	5577.74	1032.19
1977	37566.4	2372.97	4973.58	5862.26	592.453
1978	41761.4	2507.35	5290.38	5928.28	1003.21

	INTDC	RFDC	GDEBTC	TFDC	GDEFC
1956	66.0000	7.70000	26.0000	3.00000	26.0000
1957	97.0000	8.80000	924.000	15.7000	898.000
1958	95.0000	5.98000	1870.00	22.7000	946.000
1959	132.000	14.2000	2510.00	496.100	640.000
1960	164.000	22.9000	2919.00	657.100	409.000
1961	122.000	48.7000	3302.00	797.100	383.000
1962	125.000	72.0000	3603.00	1100.10	301.000
1963	125.000	100.000	3875.00	2150.00	272.000
1964	169.000	125.000	4469.00	2959.00	594.000
1965	262.000	150.000	5030.00	3895.00	561.000
1966	240.000	170.000	6503.00	4870.00	1473.00
1967	389.000	196.000	7013.00	8260.00	510.000
1968	293.000	231.000	7942.00	11064.9	929.000
1969	338.000	247.000	9049.00	12976.3	1107.00
1970	397.000	284.000	10788.0	14328.0	1739.00
1971	277.000	362.000	12787.0	15926.0	1999.00
1972	615.000	383.000	16856.0	16198.0	4069.00
1973	171.000	0.	18208.0	19293.0	1352.00
1974	765.000	744.000	19937.0	22423.0	1729.00
1975	740.000	900.000	23637.0	29758.0	3700.00
1976	1200.00	978.000	29095.0	37238.0	5458.00
1977	1567.00	1340.00	33673.0	42770.0	4583.00
1978	1505.00	1633.00	35045.0	49586.0	1367.00

	TIC	TXMC	TDC	TOC	GRC
1956	368.000	449.000	311.000	483.000	1611.00
1957	396.000	352.000	344.000	451.000	1543.00
1958	457.000	307.000	438.000	561.000	1763.00
1959	612.000	336.000	615.000	749.000	2312.00
1960	504.000	427.000	549.000	767.000	2247.00
1961	695.000	418.000	516.000	718.000	2347.00
1962	746.000	527.000	438.000	914.000	2625.00
1963	886.000	543.000	635.000	732.000	2796.00
1964	1172.00	482.000	656.000	1351.00	3661.00
1965	1495.00	709.000	631.000	1566.00	4401.00
1966	1675.00	705.000	1135.00	1698.00	5213.00
1967	2334.00	811.000	804.000	1631.00	5580.00
1968	2674.00	780.000	342.000	1673.00	5969.00
1969	2486.00	1148.00	940.000	1948.00	6522.00
1970	3479.00	1158.00	1088.00	2254.00	7979.00
1971	3241.00	1737.00	673.000	2257.00	7912.00
1972	3804.00	1313.00	1401.00	2259.00	8777.00
1973	4015.00	2585.00	1250.00	2480.00	10330.0
1974	5218.00	4268.00	1301.00	3545.00	14332.0
1975	6642.00	4918.00	1546.00	4152.00	17258.0
1976	8475.00	5167.00	2344.00	5229.00	21215.0
1977	9511.00	6139.00	2795.00	6023.00	24468.0
1978	11177.0	7945.00	2834.00	7697.00	29653.0

	ECTR	ECTTR	EOSR	BEXR	EXR
1956	363.858	31.9785	638.646	383.908	1418.39
1957	281.920	87.6635	553.821	565.957	1489.36
1958	203.585	30.0090	318.258	649.074	1200.93
1959	196.289	57.4837	475.575	745.652	1475.00
1960	183.301	266.744	585.745	598.947	1634.74
1961	118.621	102.609	441.643	723.292	1386.16
1962	117.524	34.8936	637.889	845.697	1636.00
1963	370.000	88.0000	861.000	957.000	2276.00
1964	414.634	189.950	860.784	968.615	2433.98
1965	265.741	249.541	969.807	869.781	2354.87
1966	286.598	212.755	901.207	1150.33	2550.90
1967	394.872	241.289	702.549	1124.79	2463.50
1968	446.465	400.962	992.832	1138.50	2978.76
1969	327.358	438.827	1144.60	1287.17	3197.96
1970	201.802	512.000	1143.34	1566.73	3423.87
1971	250.000	615.101	1372.37	1211.96	3449.43
1972	477.500	741.045	1638.70	0.	2857.25
1973	454.086	1029.07	1951.67	0.	3434.83
1974	91.0670	606.285	1863.13	0.	2560.48
1975	463.664	556.363	1960.93	0.	2980.96
1976	241.032	726.687	2207.98	0.	3175.70
1977	70.1923	531.698	2089.72	0.	2691.61
1978	231.290	534.040	2308.42	0.	3073.75

	MCLFR	MFR	MKR	MRR	MSR
1956	395.714	30.2326	483.063	328.591	185.608
1957	366.667	211.692	652.745	432.343	160.056
1958	330.909	250.899	665.772	291.992	104.891
1959	170.814	166.519	462.821	356.790	157.720
1960	306.769	280.220	846.561	561.674	230.764
1961	313.550	347.003	1090.35	724.719	307.238
1962	303.671	266.321	1100.94	629.472	173.379
1963	288.000	249.000	1506.00	757.000	291.000
1964	252.427	318.957	1593.65	789.179	444.722
1965	459.459	588.933	1967.05	779.080	965.103
1966	347.913	260.780	1824.95	562.203	577.774
1967	363.546	514.661	2037.63	774.164	924.262
1968	370.649	502.174	1705.46	751.391	867.490
1969	450.902	69.5364	1819.37	678.737	1234.11
1970	245.283	53.1814	2018.29	1034.18	1094.91
1971	274.423	81.1965	2530.20	1004.52	886.778
1972	461.967	292.611	1760.10	815.261	738.048
1973	530.167	457.434	1202.02	1333.98	392.759
1974	421.066	412.139	956.909	1476.53	390.320
1975	399.004	395.833	1376.29	2028.02	317.336
1976	522.051	396.723	1797.14	1827.63	544.534
1977	648.144	167.506	1995.44	2077.93	595.393
1978	847.778	351.075	1933.58	2565.91	711.606

	KAR	KLFR	KMMR	KCONR	KEGR
1956	0.	0.	0.	0.	0.
1957	9266.05	8226.65	4778.78	260.228	801.797
1958	9276.85	7949.63	4847.80	258.919	1010.78
1959	9006.53	8024.83	4880.95	290.656	1098.05
1960	9067.07	7798.57	4857.82	329.276	1088.93
1961	9176.93	7881.17	4992.99	305.240	1443.21
1962	9062.75	7760.37	5562.31	432.044	1616.49
1963	9573.25	8059.98	6233.59	414.562	1595.86
1964	9891.91	8399.90	6833.05	482.741	1945.43
1965	10435.5	8486.61	7621.39	619.955	2265.41
1966	10314.7	8979.61	8208.66	692.943	2683.35
1967	9984.46	8871.85	8760.90	715.177	3017.33
1968	11013.9	9303.66	9344.35	696.490	3208.39
1969	13530.8	9317.57	9537.09	662.510	3324.43
1970	14409.2	9227.08	10045.9	824.207	3642.66
1971	14569.4	9254.03	10246.1	782.071	8535.11
1972	13569.0	9305.59	10639.0	805.585	9879.79
1973	15051.2	9194.80	10222.1	669.990	10354.3
1974	14852.5	8745.72	10661.4	735.482	11383.7
1975	14176.0	8750.70	10863.8	771.263	13720.9
1976	14406.7	8895.09	11358.7	942.182	11791.1
1977	15332.2	9407.97	11679.0	1141.22	12423.9
1978	15644.2	9846.43	11878.7	1141.11	14459.8

	KTSR	KWRR	KOOR	KPADR	KSRVR
1956	0.	0.	0.	0.	0.
1957	4461.62	3243.99	12017.8	1921.08	2366.18
1958	4428.23	3206.45	11864.8	1799.37	2413.00
1959	4401.70	3243.29	11912.6	1727.72	2435.04
1960	4968.33	3136.70	11628.4	1778.11	2405.12
1961	4478.38	3343.23	12014.8	1748.72	2555.30
1962	4883.17	3522.38	12121.9	1751.88	2644.16
1963	4755.04	3757.97	12395.4	1789.12	2735.64
1964	5158.45	4051.35	12632.4	1819.57	2848.77
1965	5303.34	4455.09	12975.8	1985.00	2971.92
1966	7028.15	4712.54	13161.1	2293.37	3152.24
1967	7362.65	5054.32	13296.4	3550.50	3260.97
1968	7720.12	5406.15	13941.5	3066.29	3474.56
1969	7780.46	5368.75	13759.5	2662.60	3504.78
1970	8060.56	5577.26	13720.5	2922.50	3582.90
1971	6480.54	5697.10	12844.3	2789.10	3597.63
1972	7516.95	5753.16	13290.4	2870.84	3840.07
1973	7649.57	5666.29	13705.1	3066.41	3984.49
1974	8452.58	5761.75	13449.0	3315.67	4170.04
1975	8347.20	6222.60	13212.9	3598.23	4172.77
1976	9054.42	6690.08	14201.3	4969.44	4668.63
1977	9291.90	6907.10	14919.8	4900.95	4970.93
1978	9532.31	6907.16	15618.9	5291.73	5250.83

	KR	DEPR	EMP	N	PEX
1956	47223.0	1888.92	12.9500	38.6290	.870000
1957	47344.2	1893.77	13.2550	39.5390	.940000
1958	47055.9	1882.23	13.9400	40.4700	1.08000
1959	47021.4	1880.86	14.2710	41.4230	.920000
1960	47058.4	1882.33	14.0410	42.3480	.950000
1961	47939.9	1917.60	14.9500	46.9210	1.14200
1962	49357.5	1974.30	15.3460	48.2760	1.01100
1963	51311.0	2052.44	16.0270	49.6700	1.00000
1964	54063.6	2162.54	16.4960	51.1040	.924000
1965	57120.0	2284.80	17.4980	52.5790	1.00600
1966	61226.7	2449.07	18.0030	54.0950	1.05100
1967	63874.5	2554.98	18.2320	55.6540	1.17800
1968	67175.4	2687.02	19.0780	57.2580	1.08300
1969	69648.5	2785.94	19.2100	58.9090	1.07600
1970	72012.8	2880.51	20.3700	60.6070	1.06400
1971	74795.4	2991.81	21.0700	62.4250	1.13700
1972	77470.4	3098.82	21.3720	64.2980	1.37300
1973	79564.3	3182.57	21.1920	66.2270	2.90000
1974	81527.8	3261.11	21.1460	68.2140	4.67100
1975	83836.3	3353.45	21.0290	71.2880	4.35900
1976	86977.7	3479.11	21.3480	72.3680	4.37100
1977	90975.0	3639.00	21.9880	73.4300	5.19800
1978	95571.2	3822.85	22.6470	75.6300	5.41000

	P	PM	PMCI	PMKI	PMRI
1956	.800000	.734000	.700000	.679000	.885600
1957	.880000	.903000	.900000	.838000	.909000
1958	.940000	.937000	1.10000	.745000	1.02400
1959	.910000	.854000	.884000	.780000	.810000
1960	.980000	.865000	.916000	.756000	.908000
1961	1.02000	.866000	.893000	.808000	.890000
1962	1.00000	.958000	.899000	.961000	.964300
1963	1.00000	1.00000	1.00000	1.00000	1.00000
1964	1.05000	1.01400	1.03000	.977000	1.07200
1965	1.10000	.980600	1.03600	.880000	1.10900
1966	1.13000	.965400	1.00600	.914000	1.05300
1967	1.23000	.995000	1.00400	.930000	1.10700
1968	1.26000	1.00100	1.06300	.971000	1.07800
1969	1.26000	.980800	.998000	.919000	1.07700
1970	1.31000	1.01200	1.11300	.820000	1.25800
1971	1.38000	1.02300	1.12600	.745000	1.32600
1972	1.47000	1.16200	1.07800	.842000	1.49400
1973	1.69000	2.45100	2.56900	2.07900	2.56000
1974	2.07000	4.15700	3.94000	4.15400	4.26000
1975	2.60000	5.09600	5.62400	4.47000	4.96000
1976	2.92000	4.68900	4.87500	3.98300	4.90800
1977	3.18000	4.87600	4.60700	4.38500	5.10700
1978	3.43000	5.08600	4.97300	4.81800	5.04500

	RELPCTI	RELFABP	GNPW	CREDC	MSUPC
1956	.755906	1.66517	67.9000	593.000	3334.00
1957	.810400	1.52857	72.1000	719.000	3659.00
1958	.896226	1.34746	76.5000	732.000	3942.00
1959	.891753	1.12456	81.1000	774.000	4091.00
1960	1.03398	1.09773	86.1300	1020.00	4309.00
1961	.925962	1.24257	90.3400	1372.00	4326.00
1962	.993333	1.22844	95.1000	1951.00	4492.00
1963	1.00000	1.00000	100.000	2627.00	5153.00
1964	1.21951	.936911	106.450	3446.00	5885.00
1965	1.04630	1.03220	111.660	4842.00	6440.00
1966	1.07526	1.15309	117.400	4837.00	7311.00
1967	1.16487	1.22401	122.740	6354.00	7573.00
1968	1.02323	1.02061	130.580	6720.00	7931.00
1969	1.06226	.824854	138.900	6591.00	9028.00
1970	1.05766	.805153	146.700	7301.00	9850.00
1971	1.27807	.878641	154.000	7934.00	10525.0
1972	.761000	1.13559	163.400	11603.0	16830.0
1973	.964202	1.40801	363.700	13231.0	20958.0
1974	.642680	1.63939	392.500	16194.0	22828.0
1975	.744144	1.13088	395.540	17552.0	24436.0
1976	.635627	1.05203	424.280	19805.0	29226.0
1977	.909375	1.39842	452.700	25117.0	36914.0
1978	.889852	1.35758	483.000	28439.0	44097.0

	FERC	BORC	BIMC	NFYR	FINC
1956	694.000	21.0000	238.000	-17.0000	32.0000
1957	1395.00	70.0000	244.000	-18.0000	81.0000
1958	1201.00	29.0000	270.000	-4.00000	182.000
1959	881.000	7.00000	288.000	-11.0000	922.000
1960	1043.00	5.00000	362.000	-24.0000	710.000
1961	1170.00	253.000	364.000	-23.0000	1047.00
1962	1225.00	302.000	402.000	-27.0000	1282.00
1963	1128.00	289.000	472.000	-49.0000	1753.00
1964	1436.00	587.000	511.000	-38.0000	1483.00
1965	1235.00	1266.00	537.000	-55.0000	1464.00
1966	952.000	759.000	652.000	-48.0000	1679.00
1967	1263.00	1338.00	739.000	-41.0000	3655.00
1968	793.000	1292.00	785.000	-21.0000	3042.00
1969	864.000	1220.00	871.000	-28.0000	2148.00
1970	1423.00	1049.00	924.000	3.00000	1560.00
1971	1368.00	2551.00	804.000	-72.0000	1818.00
1972	949.000	1299.00	0.	59.0000	300.000
1973	3138.00	1497.00	0.	152.000	3155.00
1974	4584.00	4311.00	0.	140.000	3271.00
1975	3985.00	5818.00	0.	174.000	7709.00
1976	4812.00	5180.00	0.	480.000	8436.00
1977	6085.00	6766.00	0.	874.000	6482.00
1978	4266.00	5784.00	0.	1805.00	7800.00

	UAR	ULFR	UMMR	UCONR	UEGR
1956	-237.933	110.704	-306.101	-408.718	-163.950
1957	-101.712	-25.4485	-149.287	-260.542	-151.977
1958	-77.6328	57.7330	-242.310	-292.025	-155.267
1959	-186.480	-128.670	-387.118	-237.573	-167.947
1960	-70.3797	7.50890	-164.924	-566.480	-143.703
1961	-74.1923	-239.244	74.6474	-571.507	-143.716
1962	-137.029	-239.836	91.1747	-794.353	-164.020
1963	-280.270	-258.391	298.417	-986.606	-155.927
1964	-291.684	-618.246	459.314	-922.549	-155.647
1965	-311.860	-744.815	659.485	-1205.19	-155.170
1966	-947.406	-1520.74	606.770	-712.993	-150.673
1967	-639.380	-1585.33	815.359	-1021.52	-156.306
1968	-234.687	-2022.61	727.128	-797.012	-164.888
1969	-474.534	-2501.72	1059.95	-499.584	-147.187
1970	-525.504	-2819.20	1125.86	-641.847	214.661
1971	-911.536	-3006.33	1277.02	-614.597	308.614
1972	-287.054	-3253.25	545.923	-693.594	325.840
1973	-466.830	-4168.50	519.976	-492.174	411.085
1974	-594.791	-4397.21	557.901	-493.736	632.228
1975	-897.361	-4877.93	579.466	-537.864	413.289
1976	-943.909	-5126.30	394.981	-523.146	421.381
1977	-1201.30	-5377.56	301.808	-814.003	556.221
1978	-1552.24	-6542.77	476.309	-713.837	619.197

	UTSR	UWRP	UDDR	UPADR	USRVP
1955	-38.8581	-104.889	147.173	151.395	-152.911
1957	-56.5915	-120.841	125.183	64.7151	-158.349
1958	-53.7173	-71.9282	138.907	26.8751	-141.249
1959	83.5616	-111.548	145.535	90.7740	-131.125
1960	-43.7774	-124.338	158.627	65.4305	-43.0884
1961	-1.50171	-147.144	136.922	6.18030	-80.0261
1962	-51.9756	-70.6359	153.166	34.9507	-26.2566
1963	-17.8139	-103.559	154.013	26.2023	-3.86523
1964	-68.8696	-35.9338	136.692	55.9548	-50.3460
1965	205.317	-230.019	56.4337	121.525	-149.587
1966	213.423	10.2668	1.49179	689.951	-233.854
1967	183.425	-54.5293	-30.4517	429.734	-272.103
1968	162.085	-80.2402	-73.5474	263.469	-329.656
1969	186.411	-34.4185	-126.755	243.605	-387.764
1970	-251.182	42.8577	-225.089	146.806	-432.592
1971	-16.4382	-27.0103	-223.579	150.369	-331.550
1972	27.6699	54.0163	-185.015	307.486	-226.524
1973	219.792	87.3462	-235.101	508.480	-132.167
1974	207.030	575.305	-294.545	754.437	-183.811
1975	246.980	505.239	-287.266	1744.05	4.73124
1976	157.004	279.593	-313.144	1514.26	19.9762
1977	88.2620	-40.6449	-358.825	1654.53	-10.9441
1978	187.403	-135.344	-500.405	1856.44	-70.9751

	NFYR	N	CREDC	IGC	FINC
1979	1833.90	77.5400	33559.0	22530.0	8237.00
1980	1863.20	79.5000	38679.0	24963.0	8698.00
1981	1893.00	81.5200	43799.0	27659.0	9185.00
1982	1923.00	83.5800	48919.0	30647.0	9700.00
1983	1954.00	85.6900	54039.0	33956.0	10242.0
1984	1985.00	87.8600	59159.0	37624.0	10816.0
1985	2017.00	90.0800	64279.0	41687.0	11422.0
1986	2049.00	92.3600	69399.0	46189.0	12061.0
1987	2082.00	94.7000	74519.0	51178.0	12737.0
1988	2115.00	97.0900	79639.0	56705.0	13450.0
1989	2149.00	99.5500	84759.0	62829.0	14203.0
1990	2183.00	102.070	89879.0	69615.0	14999.0

	FINLC	SBC	TIME	FINGC
1979	7248.00	4013.00	24.0000	988.000
1980	7654.00	4000.00	25.0000	1044.00
1981	8083.00	3900.00	26.0000	1102.00
1982	8536.00	3800.00	27.0000	1164.00
1983	9013.00	3969.00	28.0000	1229.00
1984	9518.00	4000.00	29.0000	1298.00
1985	10051.0	4000.00	30.0000	1371.00
1986	10614.0	4000.00	31.0000	1447.00
1987	11209.0	4000.00	32.0000	1528.00
1988	11836.0	4000.00	33.0000	1614.00
1989	12499.0	4000.00	34.0000	1704.00
1990	13199.0	4000.00	35.0000	1800.00

	RELFABP	PEX	PM	PMKI	PMCI
1979	1.22152	5.60000	5.24000	5.01000	5.22000
1980	1.17592	5.80000	5.40000	5.21000	5.48000
1981	1.13411	6.00000	5.56000	5.42000	5.76000
1982	1.09518	6.21000	5.72000	5.63000	6.04000
1983	1.05882	6.43000	5.90000	5.86000	6.35000
1984	1.03455	6.65000	6.07000	6.09000	6.66000
1985	1.01261	6.88000	6.26000	6.33000	6.99000
1986	.991593	7.12000	6.44000	6.59000	7.34000
1987	.971810	7.37000	6.63000	6.85000	7.71000
1988	.954955	7.63000	6.84000	7.12000	8.10000
1989	.937281	7.89000	7.04000	7.41000	8.51000
1990	.920559	8.17000	7.25000	7.70000	8.93000

	GNPW	SDIS	RELPCTI	PMRI
1979	512.400	-4000.00	.972901	5.25000
1980	543.600	-4000.00	1.01852	5.46000
1981	576.700	-4000.00	.992806	5.67000
1982	611.800	-4000.00	.961538	5.90000
1983	649.000	-4000.00	.932203	6.14000
1984	688.600	-4000.00	.914333	6.38000
1985	730.600	-4000.00	.896166	6.64000
1986	775.000	-4000.00	.880435	6.90000
1987	822.000	-4000.00	.862745	7.18000
1988	872.000	-4000.00	.845029	7.47000
1989	925.500	-4000.00	.829545	7.77000
1990	981.800	-4000.00	.813793	8.07000

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