INTEGRATED SOCIAL POLICY AND MACRO-ECONOMIC PLANNING MODEL FOR PAKISTAN

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INTEGRATED SOCIAL POLICY AND MACRO ECONOMIC PLANNING MODEL FOR PAKISTAN

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LIST OF ACRONYMS

2SLS	Two Stage Least Squares
3SLS	Three Stage Least Squares
ADP	Annual Development Plan
AERC	Applied Economics Research Centre
BHU	Basic Health Unit
BLUE	Best Linear Unbiased Estimate
BOS	Bureau of Statistics
CIDA	Canadian International Development Agency
ENR	Enrollment Ratio
ESAF	Extended Structural Adjustment Facility
FBS	Federal Bureau of Statistics
FIML	Full Information Maximum Likelihood
GDP	Gross Domestic Product
IMF	International Monetary Fund
MCH	Mother and Child Health Centre
MLGRD	Ministry of Local Government and Rural Development
NFC	National Finance Commission
NS	Number of new schools
OGDC	Oil and Gas Development Corporation
OLS	Ordinary Least Squares
PIDE	Pakistan Institute of Development Economics
PTC	Pakistan Telecommunications Corporation

RE	Recurring Expenditure
RMPSE	Root Mean Square Percentage Error
SAP	Social Action Programme
SHC	Sub-Health Centres
SS	Stock of Schools
SURE	Zeller's Seemingly Unrelated Estimator
TB	Tax Base
TE	Number of Teachers
TIC	Theil Inequality Coefficient
WAPDA	Water and Power Development Authority
X	Export

CHAPTER 1

INTRODUCTION

1.1 Background

The primary motivation of constructing a comprehensive social sector macroeconomic planning model has come from the launching of the Social Action Programme (SAP) by the Government of Pakistan in 1991-92 with support from donor agencies. Traditionally, Pakistan had given a relatively low priority to the social sectors as reflected in the poor human development indicators of the country. However, Pakistan has recorded a respectable economic growth rate of 6 percent per annum during the decade of the eighties. Apparently, low levels of literacy and poor health standards had not acted as a constraint to growth in the past. In fact, the view had sometimes been put forward that because Pakistan had placed higher priority on public investment in economic and physical infrastructure as opposed to larger development outlays in the social sectors it had been able to accelerate its growth rate. Lately, it has been argued that while this was a successful development strategy in the short run it was bound to fail eventually because of lack of human capital development to sustain the process of future economic growth.

Undoubtedly, it is essential to develop a deeper understanding of the operation of the economy of a developing country like Pakistan and to analyse in a long-term macroeconomic setting the consequence of public investments in different sectors. Since, SAP potentially represented a big push forward in the social sectors with some diversion of resources from traditional priorities of government, it is crucial to project the implications of this programme not only on the process of social development but also on the overall rate of economic growth in a long-run perspective.

In the aftermath of the launching of the SAP, concerns have been voiced by the provincial governments about the financial sustainability of this program. Provincial governments in Pakistan are primarily responsible for the delivery of basic social services like education, health, water supply and sanitation, etc. These governments rapidly realised that while accelerated development funding could potentially become available through SAP there was no obvious source of revenue for financing the downstream operations and maintenance expenditures of the facilities created, especially since some of the social sectors like education and health are highly recurring expenditure intensive. The lack of recurrent funding could, therefore, adversely affect the fiscal position of provincial governments and require either larger intergovernmental revenue transfers or higher resource mobilisation.

1.2 Review of the Existing Models

All these fiscal, expenditure, macroeconomic and social sectors issues are intrinsically interlinked and they need to be addressed within a consistent planning model framework. It is ironical that the existing government practice of planning either for social or economic sectors does not employ an integrated long-term approach. Consequently, public investment allocations are made on an *adhoc* short-term basis independently of resource mobilisation strategies and furthermore without proper assessment of government financing constraints.

During an earlier phase of the CIDA commissioned work (1993), an expenditure planning model for the social sectors was prepared. However, no attempt was made to capture its links with the resources available to the provinces, the links that such social sector investments have with the rest

of the economy and the inter-relationship of the provinces with the federal government and the local governments.

There are however two other macroeconometric models on Pakistan's economy one developed by the *Pakistan Institute of Development Economics* (PIDE) and the other by the *Applied Economics Research Centre* (AERC). In the following we briefly describe these two models.

PIDE Macroeconometric Model: PIDE macroeconometric modelling initiative was first taken in 1979 and a completed document was produced in 1982. It started with a modest medium sized model with 53 equations and subsequently it was updated and extended to a 97 equations model in 1992.[1] In their '92 model detailed modules were developed for sectors related to production, expenditure, labour market, international trade and monetary. The *PIDE Macroeconometric Model* is comprehensive and was developed with a view to address the policy issues facing the macroeconomy at large. For instance, simulations were conducted to investigate how "to achieve a high level of economic and social well being of the people in a reasonably short period of time". In this context the study [1993, p.4] highlighted that:

> *... such a high-growth path cannot be sustained on a long-term basis without ensuring a modicum of macroeconomic stability - i.e., it is essential that the economy should not be plagued by large budgetary deficits, insupportable trade imbalances, an excessive depreciation of the exchange rate, and high rate of inflation.*

AERC Econometric Model: A relatively small sized 33 equations econometric model was also developed by *AERC*. Although *AERC Macroeconometric Model* is rich on public finance side

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1 *Between 1982 and 1993, PIDE also produced three other updated versions of their macroeconometric models in 1983, 1986 and 1991.*

wherein they developed fiscal linkages between federal and provincial governments, the focus and scope of the model was primarily limited to resources mobilisation.

1.3 Objective and the Potential Uses of the Study

Thus although the existing econometric models in Pakistan have focused on either broad macroeconomic aspects or fiscal dimensions of the economy, none of these framework have explicitly linked the macroeconomy with the grossly neglected social sector.

In view of the above considerations the objective of this study is to develop a comprehensive 196 equations integrated planning macroeconometric model for Pakistan's economy. The model constructed which will establish linkages between macroeconomy, public finance and expenditure as well as the social sector. Based on the estimated future simulations (upto year 2002-03) the planning model will address a number of important public policy issues. These include the sustainability of the *Social Action Programm* (SAP), the implications for future resource generation by the provinces and local governments, the extent of devolution (from provincial to local level) that can take place, the overall size of the resource gap and the modalities for financing annual development programmes (ADPs) and the recurring expenditure implications of *SAP* on the macroeconomy at large.

Some of the potential uses of the study are:

- Projections of the quantum of revenue transfers to the provincial governments by the federal government, both short-term and medium-term, under different scenarios;
- Impact of different rates and patterns of economic growth on provincial tax bases and

revenues;

- Impact of changes in provincial expenditure priorities on fiscal status, levels of service provision and the overall macroeconomy;
- Impact of education expenditures by provincial governments on sectors inputs (schools, teachers), enrollment, output, entry into labour force and literacy rate;
- Impact of health expenditures by provincial governments on sectors inputs (beds, RHCs, doctors, nurses, paramedics) and on health status of population;
- Impact on higher level of resource mobilisation by provincial governments on federal transfers, sectoral levels of expenditure and fiscal status; and
- Impact of *SAP* type programs on level and quality of service provision and on financial position of provincial governments.

1.4 Linkages in the Model

Before discussing the detailed specifications of the model, in this section, we illustrate the broad linkages and interrelationship between different modules.

1.4.1 Inter-Module Linkages

Given the above concern the principal features of the model is that it fully characterises the process of interaction between the macroeconomy, public finances of all levels of government (federal, provincial and local) and social sector development. The model can, broadly speaking, be divided into three large modules – macro, fiscal and social sectors. Each module in turn consists of sub-modules or blocks. On the whole there are 17 blocks in the model, five in the macro module, nine

in the fiscal module and three in the social sector module. The principal links between the three modules can be traced as follows (see Chart 1.1).

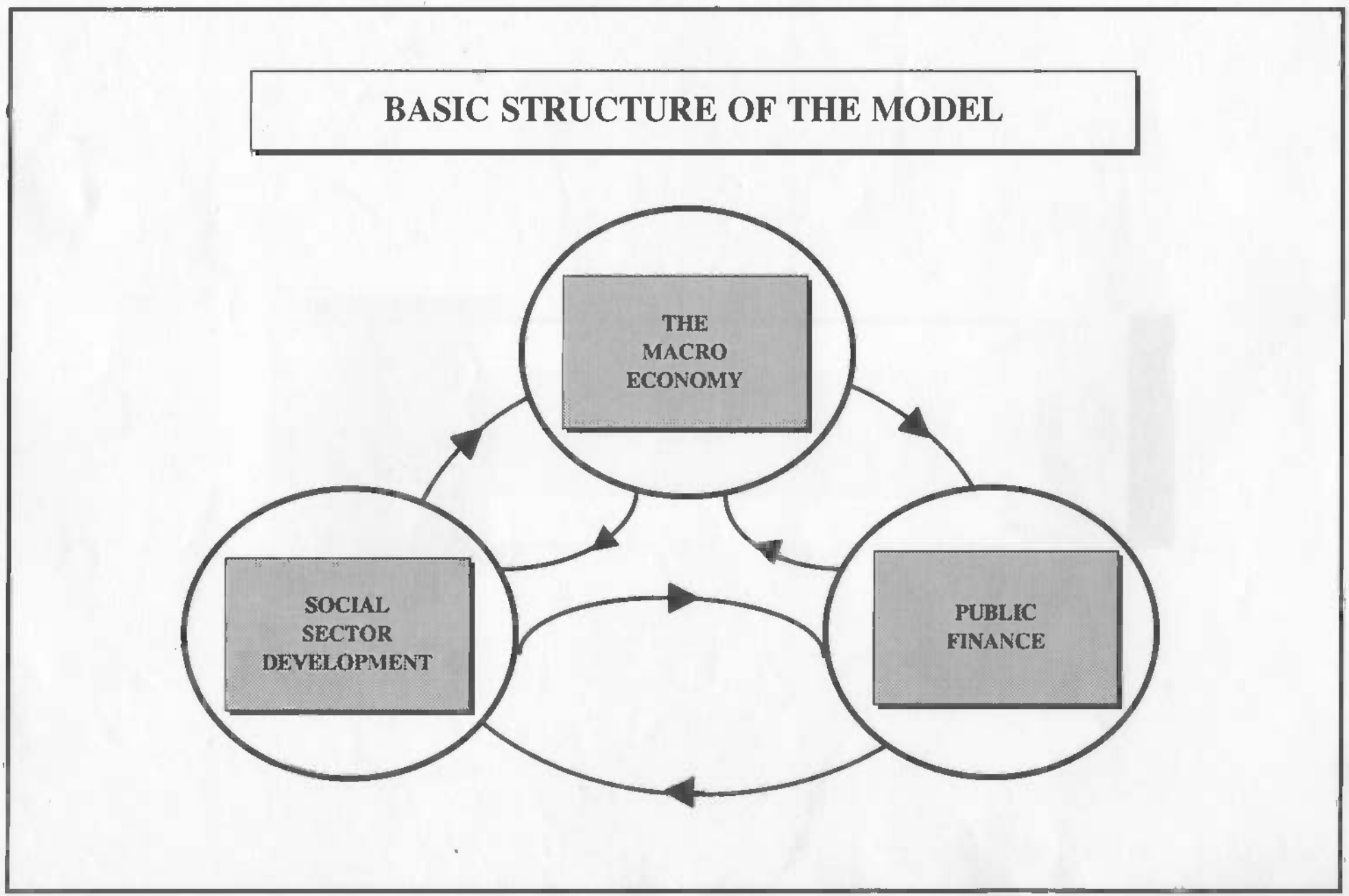
Macro Economy —► Public Finances: The key link here is that developments in the macro economy influence the growth of tax bases of taxes (including divisible pool taxes) and thereby affect the fiscal status of different governments. Also, the overall rate of inflation in the economy affects the growth of public expenditure.

Public Finance —► Social Sector Development: The availability of resources, both external and internal, determines the level of development and recurring outlays to social sectors by different levels of government, especially the provincial and local governments.

Social Sector Development —► Macro Economy: Higher output of educated workers and their entry into the labour force raises the human capital stock and could contribute to improvements in productivity and higher growth rate of output in the economy. Similarly, an improvement in public health standards may also have a favourable impact on production.

Public Finances —► Macro Economy: The level of government expenditure could exert a demand side effect on national income while the size of the overall budget deficit of the federal and provincial governments combined influences the rate of monetary expansion and consequently the rate of inflation in the economy.

CHART 1.1



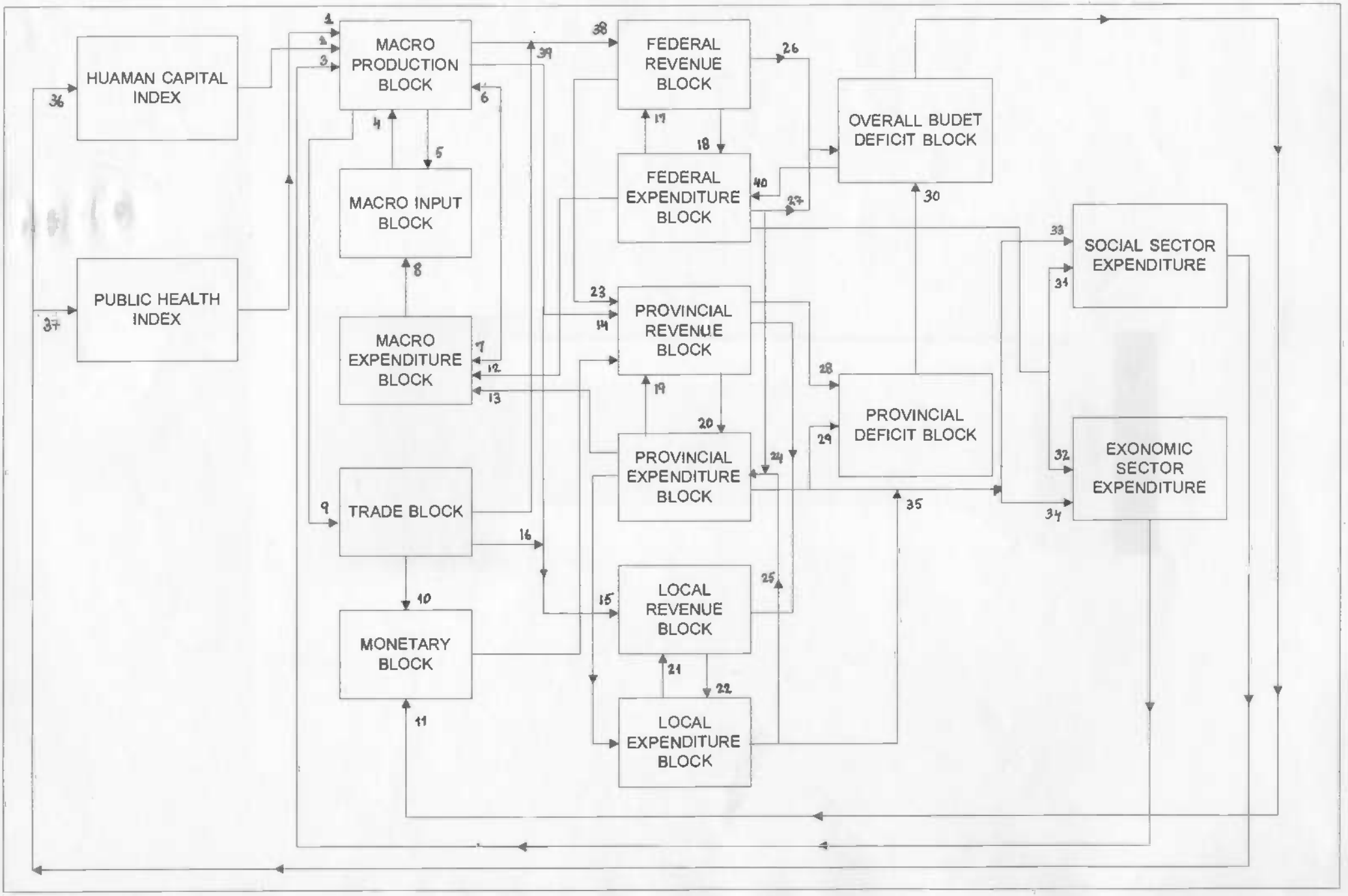
Social Sector Development → Public Finances: A vital link in the model is between the rate of social sector development and the state of public finances, especially of provincial governments, in terms of the implications on the level of debt servicing and recurring expenditures.

Macro Economy → Social Sector Development: Demographic and other social-economic changes impact on the demand for social sector facilities like schools, hospitals, etc., and thereby influence the level of social sector outputs.

1.4.2 Intra-Module Linkages

Besides linkages between different modules, link exist between different blocks within each module also. Chart 1.2 gives the schematic diagram of the model alongwith intra-block linkages. In all there are 39 major linkages in the model. Seven of these are within the macro module, fifteen within the fiscal module and two within the social sector module. Major linkages within macro module consists of, for example, the two way linkage to and from the macro production block and macro input blocks (links 4 and 5). this link is due to the dependence of sectoral value added on the factors of production and input demand functions on the value of production. Similarly, two-way linkages between the macro production and macro expenditure block (link 6 and 7) arise due to the partial dependence of value added in services sectors on public expenditure and the causality between income and private consumption. Link between macro production block and trade block (link 9) is due to the fact that value of imports and exports depend on the level of economic production activity. The trade gap effects the level of money supply captured by link 10.

CHART 1.2
SCHEMATIC DIAGRAM OF LINKAGES IN THE MODEL



Important linkages in the fiscal module consist of the simultaneous dependence of revenues of various levels of government and their expenditures. Non-tax receipts of governments have been made of function of the recurring expenditure on particular services via cost recovery ratios. Similarly, the level of government expenditure is effected by that government's level of resource generation. Important vertical links between levels of government includes the fiscal transfers in the form of divisible pool transfers, non-development grants and ADP loans from federal to provincial governments (link 23) and development grant requirements (in line with the feasible level of decentralisation) from provincial to local governments (link 25). Link between federal and provincial governments budget deficit (link 30) and their revenues and expenditures is obvious.

Within the social sector module there exists a link between the level of social sector expenditures and the human capital and public health indices (links 36 and 37) which have been defined in depth in a subsequent paragraph.

1.4.3 Types of Linkages

The linkages in the model, described above, are of varying nature. In some cases, the linkage is simultaneous, in which equations in a block are not only determining equations in another block but are also determined by them. Examples include the linkage between the macro production and input block, the production and macro expenditure blocks and the fiscal revenues and expenditure blocks. These simultaneous equations may be behaviourally determined or may just be identities.

Given the richness in its structure and the complex web of interrelationships and interaction embodied in the model, described above, it can be used, first, as a **forecasting tool,** both for the medium and

long-run purposes and, second, for undertaking **policy simulations** to analyse the consequence of particular policy actions by the provincial or other levels of government.

CHAPTER 2

SPECIFICATION OF THE MODEL

2.1 Introduction

This chapter provides the detailed specifications of different blocks in the model. A discussion at such a disaggregated level will yield a deeper insight into the working of the model. It will also enable us to know and appreciate the strengths and weaknesses of the model. More importantly, such an exercise will be necessary for the following chapters on practical implementation and policy simulations. In particular, it will help us to understand, examine and trace the intricate and, at times, complex multi-dimensional linkages and paths through which the impact of a given public policy permeates the overall macroeconomy.

2.2 Basis for the Specification of the Model

Ideally, the econometric model should be based on five items presented in Table 2.1. What this implies is that the structure of the macroeconomy should have a strong economic rationale. Behavioural equations such as value added production, private consumption, investment, imports and other public sector variables (e.g., revenues and expenditures) should have strong micro underpinnings or economic stories consistent with some type of optimization principle such as profit maximization for private investors, etc. Time series data on variables should be long enough and consistent to fullfil certain statistical criteria.[1]

Incorporation of all these attributes in the model may be desirable on theoretical grounds. However, for a less developed country like Pakistan, the quality of some of the time series data may be questionable. Government revenues and expenditure variables derived from national

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1 *For technical reader, these may include best linear unbiased estimate (BLUE) for OLS estimates.*

income accounts do not match the data reported by the finance department. One of the largest components of the national income identity, namely private consumption, is residually determined as reported in the *National Accounts of Pakistan* (FBS, 1992-93, p.178).

Under these conditions, obviously, all traditional precepts of macroeconomic theory, originated in developed countries, may not always be applicable for less developed countries. Standard economic theories need to be adapted and reformulated to suit to the given state of the economy. Specification of the model must be rich but should be revised to capture the reality and stylized facts of Pakistan's economy. In the modifications and adaptation of the model to the local conditions, one point needs to be emphasized, namely, that all these changes should be based on a **pragmatic** approach so as to capture the reality as suggested in the lower half of Table 2.1. In fact, on this issue, Lawrence Summers (1991) noted:

> *... that pragmatic empirical work has contributed a great deal to the development of economics... I have argued that formal econometric work where elaborate technique is used to either apply theory to data ... where they are not obvious a priori virtually always fails... that in evaluating empirical work we should begin by asking different questions than the ones usually posed... we should ask whether the fact reported is an interesting one that affects our view of how the economy operates.*

2.3 Size of the Model

The integrated policy model contains 196 equations and is divided into 18 separate blocks or modules ranging from broad macroeconomy to social sectors and from expenditures and revenues of all three levels of governments to public infrastructure as reported in Table 2.2. Of the 196 equations, 84 of them are behavioural and the remaining 112 are identities and definitions. There are 58 exogenous variables and 82 lagged or predetermined variables making the model reasonably dynamic. Only 7 out of the 196 equation are recursive supporting the premise that the model is highly interlinked or simultaneous in character. Among the different modules, human

TABLE 2.1
KEY ASSUMPTIONS AND SOME LIMITATIONS OF THE MODEL

- Is Macroeconometric Modelling a Medication for all Socio-Economic Planning ?

- Ideally, the Econometric Model should be based on:

a Sound Economic Theory
b Rich Specification
c Long Consistent Time Series Data Base
d Realism
e Dynamics

Incorporation of all these attributes may or may not be possible in the Model particluarly for a less developed country like Pakistan.

- ASSUMPTION

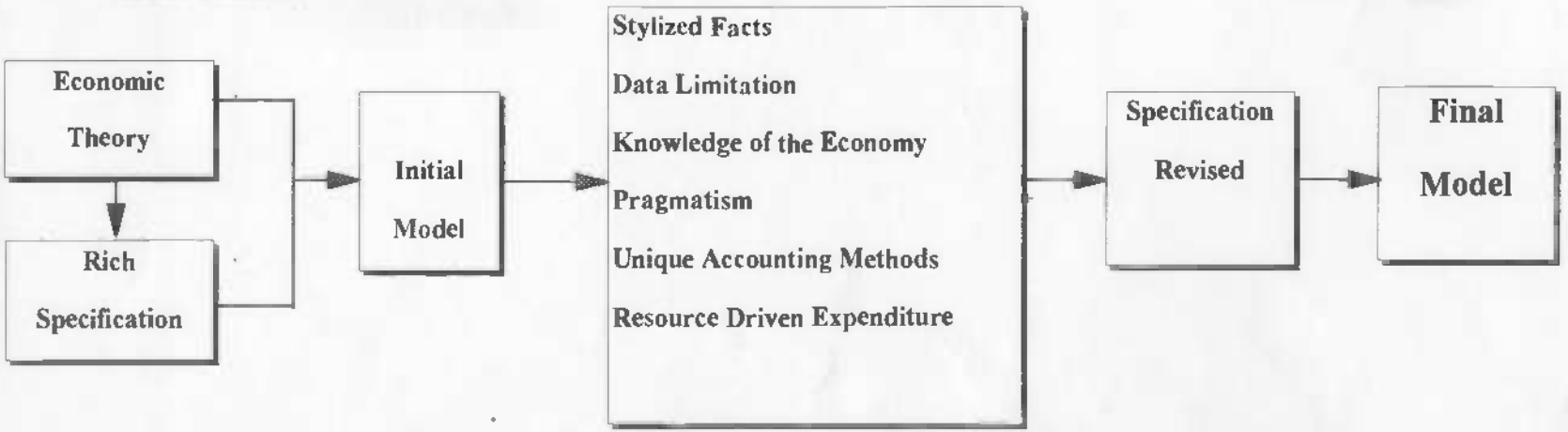

TABLE 2.2
LIST OF VARIABLES IN BLOCKS AND MODEL

BLOCK		Endogenous Variables			Exogenous Variables		Lagged/Predetermined Variables		Total Variables in the
		Behavioral	Identity	Total	Block	Model*	Block	Model*	Block
A	Macro Economic Production Block	3	5	8	4	4	0	0	12
B	Macro Input Demand Block	4	5	9	2	2	4	4	15
C	Macro Economic Expenditure Block	4	7	11	4	3	5	5	20
D	Federal Revenue Block	5	4	9	9	8	4	4	22
E	Federal Expenditure Block	5	2	7	2	2	4	4	13
F	Federal Deficit Block	0	3	3	2	3	2	0	7
G	Provincial Revenue Block	4	7	11	6	3	0	0	17
H	Provincial Expenditure Block	10	3	13	1	1	10	10	24
I	Provincial and Total Budget Deficit	0	3	3	0	0	0	0	3
J	Local Revenue Block	3	4	7	1	1	1	1	9
K	Local Expenditure Block	8	4	12	2	1	8	8	22
L	Trade Block	3	3	6	4	3	1	1	11
M	Monetary Block	1	1	2	1	0	2	2	5
N	Price Block	6	1	7	4	0	6	4	17
O	Human Capital Index Block	18 5	36	54	22	20	22	22	98
P	Public Health Index Block	10	13	23	7	7	11	11	41
Q	Index of Economic Infrastructure Block	0	7	7	1	0	2	2	10
R	Index of Fiscal Effort Block	0	4	4	5	0	4	4	13
	Total Variables in the Model	84	112	196		58		82	

** = Whenever a variable is used in one block it is not replicated in the subsequent blocks*

Total number of simultaneous equations = 189
Total number of recursive equations = 7
Total number of equations = 196

capital block has the largest number of equations (54) followed by public sector health block (23).

In the following a discussion on the specification of the modules are presented. It should be noted that for the sake of convenience some the smaller blocks are merged into the larger ones. In addition, in order to minimise unnecessary repetition, a general discussion will be provided for equations which are generic in nature while detailed algebraic specifications are given in *Appendix-A*.

2.4 Macroeconomic Module

Macroeconomic module contains three sub block namely, production, input demand and expenditure blocks. Specific details of each block is given below.

2.4.1 Production Block

Although, the model is broadly Keynesian in spirit, the specifications of individual blocks and equations are based on a pragmatic approach. We tried to capture the reality and non-market clearing aspects of Pakistan's economy. Due to the large agriculture sector primarily based in the rural areas and information not readily available to the farmers and, more importantly, due to prevalent government administered agriculture commodity price support programmes, prices do not always clear the market. Thus, the macroeconomic block is essentially supply driven.

The traditional Keynesian aggregate demand consisting of total consumption, investment, government expenditures and net exports in the context of Pakistan's economy does not always match with the aggregate supply of the economy resulting in resource gap/surplus followed by a persistent current account gap. In order to capture this aspect of Pakistan's economy, we

developed the real gross domestic product (Y^r) identity based on the value added production of three important sectors of the economy, namely, agriculture (Y_A^r), manufacturing (Y_M^r)and other sectors (Y_{OT}^r) consisting of wholesale/retail trade, transport and communication, construction, etc. Incorporating the indirect taxes in real terms (IT^r) and deducting subsidies (SUB^r) from the valueadded produces the GDP identity. When net factor income is added to the GDP, it creates the national income identity as shown below:

$$Y^r = Y_A^r + Y_M^r + Y_{OT}^r + IT^r - SUB^r \quad (1)$$

When net factor income is added to the GDP, it creates the national income identity as shown below:

$$Y_N^r = Y^r + NFI^r \quad (2)$$

It needs to be underscored that along with the traditional physical inputs [land ($\bar{A}$) , labour (L) and capital (K)], we have also introduced three key variables into value added production which we consider to be an important innovation to the model. These key variables are human capital (HCI), public sector health (PHI) and public infrastructure ($SPIE$).[2] Although these public sector variables do not directly contribute to the production process like other physical variables, in the technical sense, what is crucial to understand here is that the presence of these social and economic public infrastructures may create positive externalities. Consequently, they may accentuate the production process indirectly by making both physical capital and labour more productive. Thus, the public sector variables could be termed as labour augmenting or capital augmenting or a combination of both. The general form of the value added production for the

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2 *In a recent paper Evans and Karras (1994) found significant impact of public sector activities particularly that of education on private production for the U.S. economy. In another paper, Sturm and de Haan also analysed the impact of public expenditure on productivity.*

ith sector is given below:

$$Y_i^r = f(K_i^r, L_i^r, \bar{A}_i, SPIE_i, HCI_i, PHI_i) \quad (3)$$

In addition, to the above there are four other identities in the production block defining real gross national product (Y_N^r), indirect taxes, subsidies and net factor income from abroad (NFI^r). It should be noted that since our model caters governments at all levels, the total real indirect taxes identity includes federal, provincial and local governments. As for net factor income identity, interest on external federal debt is deducted from total remittences.

2.4.2 Input Demand Block

Input Demand Block contains five identities and four behavioural equations. Input demand for capital stock in the manufacturing (K_M^r), agriculture (K_M^r) and other services sectors are defined as the previous year's capital stock adjusted for depreciation rate (δ) plus the current new investment (I^r) in the respective, sectors. Ideally, the demand for capital stock should be a function of output and relative prices derived from first order condition of profit maximization of the producers. However, since the methodology of developing the capital stock series for Pakistan is not theoretically sound, we have opted for a definitional approach and have used the following equation to generate capital stock data for the *ith* sector:

$$K_i^r = (1-\delta) K_{i-1}^r + I_i^r \quad (4)$$

It should be noted that the initial value of the capitial stock series for the *ith* (K_{io}^r) sector is obtained by simply taking a cumulative aggregate of sufficiently long back forcast data on the investment series.

The labour input demand variables for manufacturing (L_M), agriculture (L_A) and other services sectors (L_{OT}) are determined behaviourally by their respective output, capital, overall economic infrastructure and previous years labour demand variables. Thus the specification for the *ith* sector labour input can be represented by the following equation:

$$L_i = f(Y_i^r,\ K_i^r,\ SPIE_i,\ L_{i-1}) \tag{5}$$

Again the three labour input demand functions are based on a pragmatic approach consistent with the stylised facts of Pakistan's economy and on the availability of the data. Due to lack of free competitive markets determined input prices (e.g., interest and wage rates) we have alternatively used private capital stock and this varibale will have negative impact on labour demand. Since input demand for labour is a derived demand, variable output (Y_i^r) captures the demand for the product itself and will effect labour demand positively. Lagged values of labour demand variable (L_{i-1}), reflects the presences of persistence and rigidities of the labour market.

The fourth behavioural equation simply determines the size of the labour force based on the total population of male and female over 10 years of age. Give the three behaviourally determined labour input demand, the total labour demand will be the sum of these varibales.

2.4.3 Expenditure Block

There are four behavioural equations and seven identities in Expenditure Block. Of the four behavioural equations three of them represent the private investment demand for agriculture (I_{PA}), manufacturing (I_{PM}), and other sector (I_{OT}) while the fourth one is simply the demand for total private consumptiom (C_P).

The behaviour of total real private consumption is based on the Keysian approach wherein C_p is positively determined by real disposable income and exogenous remittences ($\overline{RM}$). These two variables are expected to capture the income effect on consumption. It should be noted that real disposable income is the difference between gross income (Y) minus the total income tax (ITR_F) adusted by price index.

$$C_p^r = f\left[Y^r, \frac{ITR_F}{PI_{WG}}, \overline{RM}^r \right] \quad (6)$$

Factors determining the private investment demand functions are based on the *standard neoclassical* theory [e g., changes in income (ΔY), exogenous interest rate ($\overline{INT}$) and lagged investment (I_{t-1})] and the stylised facts of Pakistan's economy [remittences ($\overline{RM}$), public economic infrastructure ($SPIE$) and exports (X)]. Changes in income representing the "accelerator" effect will influence investment positively while interest rate reflects the opportunity cost of capital and this will have a negative impact. The lagged predetermined investment variable may capture the adjustment cost of capital. Remittence income plays an important role in Pakistan's economy particularly in the agricultural sector and thus this variable has been introduced in the investment demand for agriculture. Inclusion of infrastructure variable is justified on the grounds that it complements private investment in terms of provision of public services i.e., of roads, electricity, water, gas etc. Export of goods is expected to capture the additional demand for investment particularly for the manufacturing sector. Incorporating all these assumptions the private investment demand for the *ith* sector can be written as:

$$I_i = f(\Delta Y_i^r, \overline{INT}_i, I_{t-1}, \overline{RM}_i, SPIE_i, X_i) \quad (7)$$

The total real public consumption (C_g^r) identity should simply be the sum of recurring

expenditures for federal (RE_F), provincial (RE_P), and local (RE_L) levels . However, since the federal recurring expenditure also includes the interest payments on debt [both external ($INTED_F$) and domestic ($INTDD_F$), repayment of the loan (REP_F) and tranfers to the provinces] these items are therefore deducted from the total public consumption. In addition, since provincial recurring expenditure also includes debt servicing to the federation (DS_P), this variable is subtracted from the total public consumption to avoid double counting. To arrive at real value, the total public consumption is then deflated by government consumption price index (PI_{GC}). The public investment identity is derived by adding the development expenditures of all three levels of governments [federal (DE_F), provincial (DE_P) and local (DE_L)] and the autonomous bodies deflated by government investment price index (PI_{GI}). Algebraically these two identities can be written as:

$$C_g^r = \left[\frac{RE_F + RE_P + RE_L - INTDD_F - INTED_F - REP_F - DS_P - \overline{GP}_F}{PI_{GC}} \right] \tag{8}$$

$$I_g^r = \left[\frac{DE_F + DE_P + DE_L + \overline{DEAUB}}{PI_{GI}} \right] \tag{9}$$

With total gross domestic product (Y^r) determined from the Production Block and consumption (C^r) and investment (I^r) obtained from the Expenditure Block the domestic resources gap (RG) position of the country is simply the difference between total expenditure ($C^r + I^r$) and income. When the domestic resource gap is added to the net exports ($X^r - IMP^r$) it then represents the changes in stcok ($STOK^r$) of the economy. Again these two identies are given below:

$$RG^r = C^r + I^r - Y^r \tag{10}$$

$$STOK^{r} = X^{r} - IMP^{r} + RG^{r} \quad (11)$$

It should be noted that for third world economies the resource gap and net exports are seldom in favourable position leading to a countinuous depletion of the net stock of the economy. Consequently, in this situation the fullfilment of the standard *Keynesian Macroeconomic Identity* (C+I+G+X=Y) will hardly be possible. In view of these difficulties, the model developed in this study donot include any *Keynesian Equilibrium Identity* but it closes the model with the above two identities.

2.5 Federal Government Module

The federal government module has three blocks relating to revenue, expenditure and the overall budgetary position. The specification of equations within each module is as follows:

2.5.1 Federal Revenue Block

Within this block, the equations relate to tax revenues, net revenue receipts and transfers to the provincial governments. Within tax revenues, there are separate equations for excise duty, sales tax, import duties and income tax revenue. Each tax revenue equation is generically of the following form:

$$TXT_{it} = f\left[TB_{it}, IFTX_{it-1} \; x \; TB_{it}, DESTX_{t}\right] \quad (12)$$

Therefore, we assume that tax revenues depend upon the size of the relevant tax base, TB, a measure of fiscal effort, **IFTX**, interacted with the tax base and the quantum of revenues proposed to be generated from taxation proposals during a particular year as designated by DESTX. IFTX

quantifies the cumulative fiscal effort in previous years, as follows:

$$IFTX_{it} = \sum_{j=1}^{\infty} \frac{DESTX_{it-j}}{TB_{it-j}} \qquad (13)$$

In the case of excise duties, the tax base is taken as the value added in the manufacturing and services sectors of the economy; for sales tax the tax base is value added in manufacturing plus duty paid value of imports; for import duties it is imports while for income tax it is the value added in the non-agricultural sectors of the economy.

The basic advantage of the specification in e.q. 13 is that it enables determination of the revenue impact in the short run and in the long run of an exogenous magnitude of revenue to be generated from taxation announced in any budget. Therefore, in this way it is possible in the model to study the consequences of different levels of fiscal effort by the federal government.

There are a number of accounting identities in the block, first, for total indirect tax revenues (excise duty + sales tax + customs duty + surcharges). Revenues from surcharges which are primarily dependent on administered prices of POL and gas are assumed to be exogenous. Second, total tax revenues are taken as equal to income tax revenues plus indirect tax revenues. Third, net revenue receipts is the sum of federal tax revenues plus non-tax revenues minus divisible pool transfers to the provinces. Non-tax revenues consist of the flow of funds to the federal government of payments by the provincial governments for debt servicing, DSP, plus other non-tax revenues which are assumed as exogenous. The former is determined in the provincial expenditure module.

Divisible pool transfers, DPTXF, are a function of the federal taxes in the divisible pool. That is

$$DPTX_F = f(ITR_F, STR_F, ETR_F) \quad (14)$$

where ITR = income tax revenue, STR = sales tax revenue and ETR = excise duty revenue.

Total revenue transfers to the provincial governments include the divisible pool transfers plus a component (of gas) development surcharge and special grants.

2.5.2 Federal Expenditure Block

Separate equations have been specified for major components of federal expenditure like interest on domestic debt, interest and repayment of external debt, annual development program and other recurring expenditure. The magnitude of defence expenditure is fed exogenously into the model.

Interest on domestic and external debt respectively are determined by the following equation:

$$INT_t = f\left[DEBT_{t-1}, Z_t\right] \quad (15)$$

where DEBT is the quantum of outstanding debt and Z_t is a vector of exogenous variables acting as a proxy for the effective interest rate on debt. For the interest payment equation on domestic debt, Z includes the average rate on bank advances.

$$ORE_F = f[NRR_F] \quad (16)$$

The external debt repayment is also taken as a function of the volume of outstanding external debt. Other recurring expenditure, ORE_F, consists of costs of general administration, federal outlays on services, subsidies, etc., is assumed to be resource driven. Therefore,where NRR_F is net federal revenue receipts.

The size of annual development program, DE, is given by the following equation

$$DE = f(DE_{-1}, \overline{GFB}_F, NRR_F, GRR_P) \quad (17)$$

Therefore, total development expenditure is assumed to depend, first, on the availability of external resources, GFB_F; second, on the throw forward of on-going projects as measured by the previous years development expenditure and, third, on the availability of domestic resources given by the sum of federal net revenues, NRR_F, and total provincial revenues, GRR_P.

Total recurring expenditure of the federal government is derived as an accounting identity consisting of interest on domestic debt, interest and repayment of external debt, grants to provinces (specified exogenously) and other recurring expenditure. Federal development expenditure is taken as the difference between the total development expenditure, DE, and provincial development expenditure, DE_P. The latter is determined in the provincial expenditure block.

2.5.3 Federal Deficit Block

There are three equations in this block. The first determines the volume of outstanding debt as follows:

$$EDEBT_t = EDEBT_{t-1} + \overline{GFBF}_t - REPF_t \quad (18)$$

Therefore, the outstanding debt in a particular year is the addition of net inflow (after repayment) of external resources to the level of the previous year.

$$DDEBT_t = DDEBT_{t-1} + BDOV_t - \left[\overline{GFBF}_t - \overline{REP}_t\right] \quad (19)$$

Similarly, the increase in domestic debt is given by the extent to which the overall budget deficit, BDOV, is financed by domestic borrowings. The federal component, $BDEF_F$, of the overall budget deficit is given by

$$BDEF_F = DE + RE_F - NRR_F - \overline{SAB_F} - REP_F \quad (20)$$

Therefore, this deficit corresponds to the difference between total expenditure and revenues. The former is the sum of federal recurring expenditure (excluding external debt repayment) and total development expenditure (the ADP), while the latter is given by the sum of net federal revenue receipts and self-financing by autonomous corporations or proceeds from privatization, SAB_F.

2.6 Provincial Government Module

Like the federal government module, the provincial government module also has three blocks – provincial revenue, expenditure and deficit blocks.

2.6.1 Provincial Revenue Block

Revenue receipts of provincial governments consists of revenues generated from various tax and non-tax sources (legislatively under the fiscal powers of the provincial governments), revenue sharing transfers from the federal government under the divisible pool and non-development grants. On the development side, receipts by and large consist of development transfers from the federal government under the ADP. Therefore, for estimation purpose we have divided the provincial revenue block into the following categories.

Revenues from Own Taxes: Major tax sources of the provincial government include stamp duties, motor vehicle tax, property tax (shared with the local governments) and other smaller

sources like professional, trade and callings tax, entertainment tax, hotel tax, electricity duty, provincial excise etc. Revenues from major taxes has been estimated behaviourally as a function of the GDP estimated in the macro production block. Besides, tax revenue equations capture the impact of taxation effort made in particular years[3] through the use of dummy variables. Therefore, tax revenue from the `ith' tax source, TTP_i, has been estimated as follows:

$$TTP_{it} = f[GDP_t, DES_{it}] \quad (21)$$

where:

DES_{it} = discretionary change in the `ith' tax in the year t.

Revenue from property tax has additionally been made a function of home remittances since a significant proportion of these has been used in housing construtions.

Non-Tax Revenues: User charges from various economic and social services are estimated as a function of the recurring expenditures on particular services and its cost recovery ratio. This formation allows for the flexibility of changing cost recovery ratios in line with changes in policy. Specifically, non-tax revenue from the `ith' source, is given by:

$$TNTP_{it} = CRP_{it}, REP_{it} \quad (22)$$

where:

CR_{it} = Cost Recovery ratio of the `ith' service in the year t.

REP_{it} = Recurring expenditure on the `ith' service in the year t.

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[3] Much of the tax effort has been made in the 1990s.

Total Revenue Receipts: Total revenue receipts of the provincial governments, $GRRP_t$, are therefore, given by:

$$GRRP_t = \sum_{i=1}^{n} TTP_{it} + \sum_{i=1}^{n} TNT_{it} + DPTF_t + \overline{GR}_F \qquad (23)$$

Note that $DPTF_t$ is determined in the federal revenue block while $\overline{GR}_p$ are exogenous given the fixity in these following the announcement of the 1991 NFC award.

Development Transfers: Provincial governments in Pakistan are almost totally dependent on federal transfers to finance their development expenditures. Transfers to provinces from the national ADP (mostly given as loans) depend on the development requirements of the provincial governments and the extent to which provinces are able to meet these from endogenous resources. Also, development transfers to provinces have been influenced by structural policy actions of the federal government in the last few years. For example, in the last 80s, in view of the overall macro resource constraint and the pressures on the federal government to meet IMF conditionalities under the ESAF, there had been a decline in federal transfers to the provinces. As opposed to this, an upsurge of development transfers has been witnessed following the cessation of non-obligatory grants to provinces as recommended by the 1990 NFC and the launching of the SAP. The impact of such structural changes has been capture in the model through dummy variables. Specifically, development transfers to the provinces, $DETFP_t$, is given by

$$DETFP_t = f\left[DEP_t, RSD_{t-1}, D_{it}\right] \qquad (24)$$

where:

DEP_t = Total Development expenditures of the provincial governments
RSD_{t-1} = Provincial Revenue deficit/surplus in the year t-1
D_{it} = Dummy variable for 'ith' policy change

2.6.2 Provincial Expenditure Block

Provincial expenditure block has been divided into two sub-blocks. The first estimates the development expenditures of the provinces and the second the recurring expenditures incurred on governance, operation and maintenance.

Development Expenditures: Provincial development expenditure on major social and other sectors are determined as a function of development transfers from the federal government, provincial revenue receipts, the throw-forward needs. Provincial revenue receipts have been used to capture the stimulatory impact, if any, of higher federal transfers on the revenue account. Also, development expenditures experienced a boost following the launching of the Five Point Programme by the Junego regime and the motor way project by the Nawaz Sharif regime. The former lasted for three years and substantially stimulated development expenditures on social sectors while the latter increased development expenditures on economic services. The model has been developed to captures the impact of such programs. Specifically,

$$DEP_{it} = f\left[DETFP_{t}, GRRP_{t}, DEP_{it-1}, D_{it} \right] \tag{25}$$

where:

DEP_{it} = Development Expenditure on `ith' sector

D_{it} = Dummy for the `ith' policy change.

Total Provincial Development expenditures have been estimated as a sum of the above.

Recurring Expenditures: Similarly, recurring expenditures on various social and economic services is a function of lagged recurring expenditures, provincial revenue receipts, federal

development transfers and policy changes introduced like the five point percentage by the government. That is, provincial recurring expenditure on the `ith' sector is given by:

$$REP_{it} = f\left[REP_{it-1},\ GRRP_{t}\ DEPRP_{t}\ D_{it}\right] \tag{26}$$

Besides, an important proportion of provincial recurring expenditure is incurred on servicing debt undertaken to finance development liabilities over the years. Most of these loans are taken from the federal government at near market rate of interest. Specifically, debt servicing by the provincial governments, DSP_t, is estimated as follows:

$$DSP_{t} = f\left[DSP_{t-1},\ DETFP_{t}\right] \tag{27}$$

Total provincial recurring expenditure is given by:

$$REP_{t} = \sum_{i=1}^{n} REP_{it} + DSP_{t} \tag{28}$$

2.6.3 Provincial Budget Deficit Block

Provincial budget deficit is primarily a function of the revenue deficit or surplus. Deficit/surplus on the capital account is directly a part of the federal budget deficit/surplus since the federal government finances almost all of the provincial development outlays and borrows on behalf of the provincial government, if required. Revenue deficit/surplus is endogenous to the simultaneous equations model and is the residual of the gross revenue receipts and the recurring expenditures. This may be expressed as:

$$RSDP_{t} = GRRP_{t} - REP_{t} \tag{29}$$

The overall national budget deficit is the sum of federal budget deficit and the provincial revenue deficit. That is:

$$BDOV_t = BDEFF_t - RSDP_t \quad (30)$$

2.7 Local Government Module

Turning to local finances, the model includes a block for local revenue and expenditures and is specified in a such a way that, in the long-run, a financially sustainable level of decentralisation is estimated.

2.7.1 Local Revenue Block

Revenue from Taxes: The single largest source of urban local council income is octroi levied on goods entering municipal limits for consumption directly or for processing by industries. In the rural areas, export tax, levied at the point of exit of goods from the district, is an important source of revenue. Both these source are estimated behaviourally. Revenues from octroi are made a function of private consumption and the extent of urbanisation and industrial activity in the economy proxied by the share of manufacturing and service related labour in total labour demand and industrial value added respectively. Besides, the impact of fiscal effort by local councils has been captured through the use of dummy variables. Specifically, tax revenue from octroi, $OCTL_t$, is given by:

$$OCTL_t = f\left[C_{pc}, \left(\frac{LMOT}{LABIND}\right)_t, Y_{mt}, DES_t\right] \quad (31)$$

where:

LMOT = Labour demand in manufacturing and other services sector.
LABIND = Total labour input demand in year t.
DES_t = Discretionary tax change in year.

The tax base for export tax, ETL_t, is taken to be value added in agriculture and manufacturing. The latter captures the impact of rural industrialization. Other local taxes $OCTL_t$ are made a function are made a function of the GDP and discretionary changes. Furthermore, property tax is the only provincial tax which is shared between the provincial and local governments in the country. 85 percent of the proceeds of property taxation (net of collection costs) are transferred to the local councils. Therefore, total local taxes, TTL_t, are as follows:

$$TTL_t = OCTL_t + ETL_t + OTL_t + 0.85\ PT_t \tag{32}$$

where, PT_t (property tax) is determined in the provincial revenue block.

Non-Tax Revenues: Like in the case of provincial non-tax revenues, user charges at local level are also a function of recurring expenditures on particular services and the cost recovery rate. That is,

$$TNTL_{it} = CRL_{it}\ [REL_{it}] \tag{33}$$

Total revenue receipts of local governments, $GRRL_t$, is an aggregation of various tax and non-tax revenues plus provincial government grants to local bodies. That is,

$$GRRL_t = TTL_t + \sum_{i=1}^{n} TNTL_{it} + \overline{GR_P} \tag{34}$$

2.7.2 Local Expenditure Block

Like in the case of the provincial expenditure block, local expenditure can be divided into the development and recurring expenditure sub-blocks.

Local expenditures, both recurring and development on major local services like education, health and other social sectors is determined behaviourally as a function of the local resource availability and the throw-forward. Local governments in Pakistan have limited access to revenues from higher levels of governments either as grants or loans. Therefore, by and large, own resource determine the level of expenditures. As such, local development and recurring expenditures are given as:

$$EXPL_{it}^{k} = f\left[(GRRL_{t} + \overline{CARL}_{t}),\ EXPL_{it-1}^{k}\right] \tag{35}$$

k = recurring and development

EXP_{it}^{k} = local `kth' type of expenditure on the `ith' sector

$CARL_t$ = exogenously given capital receipts in year t.

Total resource of local governments include both the general revenue receipts estimated in Equation (34) and exogenously given capital receipts (e.g. income from investments etc if any).

Local budget deficit, which constitute random divergences from the constitutional balanced budget requirement are small and cancel off overtime. These are computed as follows:

$$BDEFL_{t} = DEL_{t} - \overline{CARL} - RSDL_{t} \tag{36}$$

where:

$BDEFL_T$ = Local budget deficit in year t

DEL_t = Local development expenditure in year t

$RSDL_t$ = Revenue surplus/deficit in year t.

These as already mentioned are not very significant.

2.8 External Trade Module

The External Trade Module containes three behavioural equations and three identities. Both exports and imports are further classified into separate categories of goods and services. The behavioural equations for import demand (IMP^r) and export supply (X^r) are based on the standard macroeconomic theory. Pakistan being a small open economy compared to rest of world, the import demand for both goods (IMP_g^r) and services (IMP_s^r) are expected to respond negatively due to higher relative import prices. Relative price is defined as the ratio of exogenous import price ($\overline{PI}_{IMP}$) to the domestic prices (PI). It should be noted that the import price is implicitly adjusted for exchange rates. There are other factors namely, national income (Y_N^r), and previous years imports (IMP_{g-1}^r) may positively effect import demand for goods. On the other hand, items like total value of export (X_g^r) and import for goods and public investment (I_g^r) will also influence import for services positively. This is due to the fact that these variables will create demand for services of foreign personnel and consultants to perform the job of clearing and forwarding and to design and execute projects in the public sector. As for the specification of supply of export for goods (X_g^r), it should be positively effected by relative prices [$PI/(\overline{PI}_{W^*}\ e)$] converted into local currency and domestic income (Y^r). In the standard macroeconomic theory it is the world income that determines the export of a country. In this study, we argue that supply of export for goods at times may be constrained due to domestic consideration [e.g., flood, cotton virus etc.]. The three behavioural trade related equations can be written as:

$$IMP_g^r = f\left[\frac{\overline{PI}_{IMP}}{PI},\ Y_N^r,\ IMP_{g-1}^r\right] \tag{37}$$

$$IMP_s^r = f\left[(X_g^r + IMP_g^r),\ \frac{\overline{PI}_{IMP}}{PI},\ I_g^r\right] \tag{38}$$

$$X_g^r = f\left[\frac{PI}{(\overline{PI}_W * e^r / 100)},\ Y^r\right] \tag{39}$$

Given the above behavioural equations and exogenously determined value of exports for services (X_s^r) and import demand for goods and net factor income obtained from the production block, the current account trade gap can be written as:

$$CAG = \left[(IMP^r * \overline{PI}_{IMP}) - (X^r * \overline{PI}_X) - (NFI^r * \overline{PI}_{IMP})\right] \tag{40}$$

2.9 Monetary and Price Modules

In this section we present the specification of price and the monetary modules. Following Aghevli and Sassanpour (1991), the changes in the behaviour of money supply are influenced by three components: excess demand for liquidity due to domestic component of higher deficits; excess demand due to net inflow of foreign capital and; transaction demand for money. Specification of the monetary equation assumes that, due to rigid government controlled interest rates in the past, the money market is always in disequilibrium. Incorporating the above, the behaviour of the changes in money supply can be written as:

$$\blacktriangle M = f\left[(BDOV + UCB_P - \overline{GFB}_F + REP_F),\ (CAG - \overline{GFB}_F + REP_F),\ (Y_N^r - Y_{N-1}^r * PI)\right] \tag{41}$$

The specification of the price variable [represented by implicit GDP deflator (PI)] simply reflects the traditional *quantity theory of money* wherein the excess demand for money to GDP ratio will

drive up the domestic prices. A part of the domestic prices or inflation is imported from abroad through imported prices. Due to the presence of lags in the system, some components of previous years inflation persist in the present year. Thus the behaviour of implicit price deflator equation can be written as:

$$PI = f\left[\overline{PI}_{IMP}, \frac{M_{-1}}{Y^{r}_{N-1}}, PI_{-1}\right] \tag{42}$$

Other price indices used in the model such as manufacturing (PI_M), wholesale general price (PI_{WG}), government consumption (PI_{GC}) and government investment (PI_{GI}) are generally driven by (PI) and in some cases taxes has may also influence them.

2.10 HUMAN CAPITAL MODULE

The approach adopted in this model (as shown in the flow chart) is first to determine the total development and recurring expenditure allocations for primary and secondary education respectively by gender. Based on the former, the number of new schools commissioned can be determined which yields the stock of functioning schools. From the latter, the number of teachers is derived, given the wage rate. Given the number of schools and teachers, the resulting enrollment is behaviourally determined. This leads to a measure of output from the education system. Given the output and the labor force participation rate, the total number of new educated labor force entrants can be quantified. This helps in identifying the change in the magnitude of the human capital index, based on the stock of educated workers in the labor force.

At each step, the specifications developed are as follows:

2.10.1 Development Expenditure

The total development expenditure, DEED, on education is the sum of expenditure, $DEED_P$, by the provincial governments and, $DEED_L$, by the local governments. These are obtained from the respective expenditure blocks.

Expenditure on a particular education level, l, for a particular gender, g, is then specified in generic form as follows:

$$DEED_{lg} = f\left[DEED, DEED_{lg-1}\right] \tag{43}$$

subject to the condition that

$$\sum_{l}\sum_{g} DEED_{lg} = DEED \tag{44}$$

2.10.2 Recurring Expenditure

Similarly, the total recurring expenditure, REED, on education is the sum of expenditure by the provincial and local governments. Recurring expenditure on a particular level for a particular gender then is given by

$$REED_{lg} = f\left[REED, REED_{lg-1}\right] \tag{45}$$

with

$$\sum_{l}\sum_{g} DEED_{lg} = REED \tag{46}$$

2.10.3 Teaching Inputs

The number of new schools, NS, is derived as

$$NS_{lg} = \frac{DEED_{lg}}{kc_{lg}} \tag{47}$$

where kc is the unit cost of constructing a school.

The stock of schools, SS, in a particular year is given by

$$SS_{lg} = SS_{lg-1} + NS_{lg} \tag{48}$$

The number of teachers, TE, is given by

$$TE_{lg} = \frac{REED_{lg}}{W_{lg}} \tag{49}$$

where W is the wage rate, inclusive of recurring costs, per teacher.

2.10.4 Enrollments

Given the teaching inputs and the school-going age population (specified exogenously), SGAP, the enrollment ratio, ENR, is determined behaviourally by the following equation

$$ENR_{lg} = f\left[\frac{TE_{lg}}{SS_{lg}}, \frac{SS_{lg}}{SGAP_{lg}}, ENR_{lg,1}\right] \tag{50}$$

Based on this, the number of students enrolled, NEN, is given by

$$NEN_{lg} = ENR_{lg} \; x \; SGAP_{lg} \tag{51}$$

2.10.5 Output

The output, OUT, of newly educated persons is derived as

$$OUT_{lg} = \bar{S}_{lg} \; x \; NEN_{lg} \tag{52}$$

where $\bar{S}_{lg}$ is the exogenously specified rate of completion (after allowing for dropouts) of a particular level of education and gender.

2.10.6 Educated Labor Force Participants

The number of new educated labor force participants, LFE, depends upon the output of educated persons, adjusted for the labor force participation rate, LFR, as follows:

$$LEE_{lg} = \overline{LFR}_{lg} \; x \; OUT_{lg} \tag{53}$$

2.10.7 Stock of Educated Workers

Given the number of new educated labor force entrants, the total stock of educated workers, NW, is derived as

$$NW_{lg} = NW_{lg-1}(1 - \bar{\delta}_{lg}) + LFE_{lg} \tag{54}$$

where $\bar{\delta}$ is the exogenously specified average mortality rate.

2.10.8 Human Capital Endowments of Labor Force

We determine next the total number of NW_l with a particular level of education as

$$NW_l = NW_{lm} + NW_{lf} \tag{55}$$

where m designates males and f is for females.

The human capital endowment of labor force, HCIL, in a particular sector, ϵ, is then specified as follows:

$$HCIL_{\epsilon} = f\left[NW_p, NW_s\right] \tag{56}$$

where p stands for primary level and s for secondary level of education.

2.10.9 Human Capital Index

We are finally in the position to quantify, HCI, the human capital index for a particular sector in the following manner:

$$HCI_{\epsilon} = \frac{HCIL_{\epsilon}}{L_{\epsilon}} \tag{57}$$

where L is the employment in sector ϵ, which is determined in the macro input demand block.

2.11 Public Sector Health Module

Public Sector Health Module consists of 23 equations of which 9 of them are behavioural and remaining 13 are identities. Like the Human Capital Module, Health Sector Block is also based on variables related to expenditures, unit costs and physical provision of health inputs (doctors, nurses, hospitals, RHCs, etc.) and outputs (patients treated). One of the key features in the development of this module is the Public Health Index (*PHI*) equation which is essentially predicted by the variables indicated above. All these variables are interlinked and in the following we describe these linkgaes and specifications of the important behavioural equations in broad terms.

The provison of health inputs are assumed to be primarily driven by available resources. In this study, we have also assumed that health services are financed and delivered by the provincial and local governments. Consequently, the total health expenditures both development (*DEH)* and recurring (*RE*) comes from provincial and local governments and these two identities are given below:

$$DEH = DEH_P + DEH_L \tag{58}$$

$$REH = REH_P + REH_L \quad (59)$$

Given the available funds the development expenditures on health sector inputs such as hospital beds (*DEBED*) and rural health centres (*DERHC*) are primarily determined by the lagged values of total development expenditure on health. On the other hand, the recurring expenditures on inputs namely, doctors, nurses and paramedics for both hospital and *RHCs* are explained by the total recurring budget for health. In order to capture, the past commitment lagged recurring expenditures are also include in these equations. A generic behavioural equation determining all these health inputs are given below:

$$DEH_t = f\left[DEBED_t, DERHC_t, DEHOT_t \right] \quad (60)$$

$$REH_t = f\left[DOCH_t, NURH_t, PARH_t, DOCR_t, PARR_t \right] \quad (61)$$

Where DEH_i and REH_i present the 'ith' health inputs.

Having determined the expenditure from above and given exogenous unit cost, the physical quantities for health input is simply the ratio of the two (expenditure and unit cost). As an example the definitional identity for the *ith* health input is given below:

$$PQHI_t = \left[\frac{DEBED_t}{UCBED} + \frac{DERHCs_t}{UCRHCs} \right] \quad (62)$$

In the case of hospital beds and *RHCs*, the above identites will only determine the additional inputs. In order to derive the total stock for these variables we simply add the previous years

existing stock to the addional inputs. Again the equation for stock of ith input is given below:

$$TQPI_i = \left[(TBED_{t-1} + NBED_i) + (TRHCs_{t-1} + NRHCs_i) \right] \quad (63)$$

Having determined all health inputs from above the patients treated in hospitals and *RHCs* will simply be a function of respective health inputs. If patients treated in a given facility is considered as output then we may write the production function this *ith* facility as below:

$$PTPF_i = f\left[DOC_p, NUR_p, PAR_p, TBED_p, TRHCs_i \right] \quad (64)$$

Finally, the public health index (*PHI*) is simply explained by health sector outputs (patients treated in hospitals and *RHCs*) and the expenditures for other health facilities (e.g., *TB Clinics, MCHC,* sanitation, clean water etc.). The equation for *PHI* is given below:

$$PHI = f\left[PTHOS, PTRHC, \frac{DEOTS_p + DEOTS_L + DEHOT}{PI_{GI} \cdot 100} + \frac{REOTS_L + REHOT + REOTS_F}{PI_{GI} \cdot 100} \right] \quad (65)$$

2.12 ECONOMIC INFRASTRUCTURE MODULE

Public investment in economic infrastructure consists of DEAUB, development expenditure by autonomous bodies like WAPDA, PTC and OGDC outside the ADP. DE_F, $DEOT_P$ and $DEOT_L$ representing investment in economic sectors like transport and communications, water and power, industries and minerals, etc., by the federal, provincial and local governments respectively.

The model assumes that DEAUB is determined exogenously while the others are obtained from

the expenditure block of different levels of government. The stock of such infrastructure, SPIE, is obtained for each level of government, g, by the following equation

$$SPIE_g = (1 - \delta)\ SPIE_{g-1} + DE_g \tag{66}$$

2.13 FISCAL EFFORT MODULE

Indices of fiscal effort have been constructed for the four major federal taxes, the index, IFI, is estimated as follows:

$$IFI_x = IFI_{x-1} + \frac{DES}{TB} \tag{67}$$

where DES is the quantum of revenues proposed to be generated from taxation proposals during a particular year while TB is the tax base.

CHAPTER 3

DATA BASE DEVELOPMENT

3.1 Introduction

The development of a model to capture the behaviour of the economy in response to changes in a vector of variable is dependant on the availability of data. Its usefulness as a predictive tool and as a policy tool is dependant on the reliability of the data. The availability of official statistics in Pakistan is largely the result of the efforts by the Federal and Provincial Bureaux of Statistics in consolidating information from line and staff departments and publishing these, to the extent possible in the Pakistan Statistical Year Book at the Federal level and the provincial Development Statistics by each of the federating units.

A closer examination of the statistics published by the primary agencies and the consolidated figures suggests that there are inconsistencies in the data which results in a number of statistics being suspect. In addition data on macro-economic, financial, money and fiscal variables are also published by the Ministry of Finance (the annual Budget, the Pakistan Economic Survey), the provincial Finance Departments (the annual Budgets) and the State Bank of Pakistan (the Annual Report). Where inconsistencies between primary agency data and consolidated data has been observed for some of the years, we have adopted a general rule that a value which is closer to the trend revealed by the consolidated data has been assumed to be more reflective of actual conditions.

3.2 Data Collected from Secondary Sources

The following discussion highlight the data collection process from the secondary sources on Macro, Fiscal and Social Sector variables.

3.2.1 Macroeconomic Variables

The macroeconomic variables are divided into five separate blocks namely; Macro Economic Production Block, Macro Input Demand Block, Macro Economic Expenditure Block, Trade Block and Monetary Block (denoted as A, B, C, L and M) respectively. Altogether, there are thirty six (36) equations, most of them are behavioral in nature and some are identities. These blocks consist of information on 30, 27, 19, 17 and 10 variables, respectively. We have been able to collate data for twenty one years from 1972-73 to 1992-93 for almost all variables other than those derived by the model itself.

The macroeconomic data consists of information on overall import, export, interest rate and information on remittances and monetary assets and by sectors on value added, taxes, subsidies, capital stock and changes therein, labour force, consumption and investment. The principal sources of information are :

a) Pakistan Economic Survey an annual publication by the Economic Adviser's Wing, Ministry of Finance, Government of Pakistan describing the state of the economy and an analysis of its performance issued prior to the announcement of the Federal Budget for the succeeding fiscal year;

b) Annual Report of the State Bank of Pakistan which presents an analysis of the economy in the previous year and contains a statistical appendix which presents the revised National Income Accounts and end-of year statistics;

c) National Accounts of Pakistan an annual publication of the Federal Bureau of Statistics, Ministry of Finance and Economic Affairs, Government of Pakistan which presents the estimation of the value added by component and sector, and of capital accumulation by sector in both current and constant prices;

d) Pakistan Statistical Yearbook an annual publication of the Federal Bureau of Statistics, Ministry of Finance and Economic Affairs, Government of Pakistan which presents detailed disaggregated data on production, consumption, availability and prices on each of the sectors;

e) Labour Force Survey an annual publication of the Federal Bureau of Statistics, Ministry of Finance and Economic Affairs, Government of Pakistan which presents data on labour force composition and characteristics; and

f) Agricultural Statistics of Pakistan an annual publication of the Ministry of Food and Agriculture, Government of Pakistan which provides data on crops, livestock, forestry and fishing production and yields and every three years disaggregated data on crop production by district.

The list of variables and the sources for each are shown in the Appendix E. To ensure consistency attempts have been made to keep the use of different sources to a minimum. One of the major problem in generating a consistent macroeconomic time series is the change in estimation methodology of the national income accounts in 1987-88. Data on subsequent years is based on the new, changed methodology. As such, there is a need to develop a consistence time series. We have applied regression analysis to generate a series for the relevant macro variables. The following regression equation has been estimated.

$$NX_i = \beta_0 + \beta_1 * OX_i + \mu_i$$

where

NX_i = Value of the `ith' variable on new methodology.

OX_i = Value of the `ith' variable on old methodology.

μ_i = Error Term

Data is presented at constant prices using 1980-81 as the base year.

3.2.2 Fiscal Variables

The fiscal module consists of eight blocks comprising of 66 equations and over 100 variables (see Appendices for list and sources), out of which some are derived variables. Once again, the time series was constructed from various published documents for the period between 1972-73 and 1992-93. The data on these eight blocks consists of the revised estimates of revenue and expenditure for different levels of government.

Federal Government:

Data on federal finances includes detail of both tax and non-tax revenues, discretionary changes, debt, debt servicing and sectoral composition of recurring and development expenditures. However, there are no major gaps in the data. Apart from the various volumes of the Federal Government's budget documents, the other sources of data used to complete the series in the absence of the basic documents themselves are :

a) various issues of the Pakistan Economic Survey.

b) the Yearbooks issued by the Central Board of Revenue, Ministry of Finance and Economic Affairs, Government of Pakistan which provides in-depth data on tax revenues. The publication is available annually from the period starting 1986-87.

c) Pakistan Statistical Yearbook.

Provincial Finances:

For each of the provinces detailed information regarding tax and non-tax revenue and the sectoral and sub-sectoral recurring and development expenditures has been collected from the respective volumes of the budget documents. Gaps in the data resulting from non-availability of the basic documents themselves have been overcome with the help of the Annual Report of the State Bank of Pakistan. However, the gap in information on discretionary changes (not available in the

Budget Speech of the Finance Ministers) has been obtained through interviews with relevant officers of the provincial Finance Departments. Estimates of yield are thus subject to further verification.

Local Finances:

Information on local finances also includes tax and non-tax receipts and sectoral distribution of the development and recurring expenditure. The data has been obtained from the computerised data base of the Ministry of Local Government and Rural Development (MLGRD), Government of Pakistan. The Computer Wing of the MLGRD has compiled the data from the budget documents made available to it through the provincial Local Government Departments for the 630 local councils in the country. The data is available for two discrete time periods only, namely from 1979-80 to 1986-87 and again from 1989-90 to 1991-92. Data for the intermediate years have been interpolated and for the period prior to 1979-80 has been extrapolated backwards to 1972-73. Information regarding the discretionary changes for local taxes could not be collected, as such data was not available to the MLGRD itself. However, it would be appropriate to conjecture that the discretionary changes in the local taxes, particularly in the case of smaller local councils, have been marginal.

3.3 Data Generated From Secondary Sources

The data on social sector variables and some price indices has been generated from the secondary sources. The data on price index for government consumption and investment and the data on social sector variables like Public Health Index and Human Capital Index has been constructed.

3.3.1 Social Sector Variables

To capture the social sector influence, Public Sector Health Index and Human Capital Index have

been constructed. The model not only analysed the past behaviour of the social sector but it also provides the future policy tools for the improvement in the social sector. The data generation methodology for these two indices has discussed as follows:

3.3.1.1 Public Sector Health Index

Information on the health status of the population is best measured through morbidity rates and the incidence (or lack of it) of communicable diseases. In addition some studies have also used infant mortality, child-birth deaths, rates of immunisation and such other indicators as a means to studying the health status of a population. In the absence of such sophisticated data, an alternative needed to be developed. We have attempted to do this through the Public Health Index (PHI) which suggests that the inputs into looking after the health of people or providing health care services are reflective of the health status of the population. We have constructed the PHI through a factor analysis technique. The technique draws upon the inter-relationship of a group of highly correlated variables to band them into one variable and the cross-relationship this group has with other homogenous vectors of variables. Each vector of variables (factors) are then considered to be one homogenous whole and the cross-relationships used to develop a factor scores (based on coefficients and eigen values) which explain the impact of each factor on the dependant variable.

The data used to construct the Public Health Index aggregates the provincial data on Basic Health Units (BHUs), Rural Health Centres (RHCs), Sub-Health Centres (SHCs), Mother and Child Health Centres (MCHs), TB centres, Doctors, and Nurses over the period 1971-72 to 1992-93. The factor scores for the country as a whole for each year have then been used to develop the index with the initial year 1971-72 as the base.

3.3.1.2 Human Capital Index

The Human Capital Index (HCI) is used to capture the quality aspect of labour based on their level of education and professional skills. Data for the development of this index by economic sectors, namely, agriculture, manufacturing and others, requires information on the labour force composition with respect to their skill and education. The data source is the annual Labour Force Survey undertaken by the provincial Labour Departments and compiled by the Federal Bureau of Statistics.

In addition to this, data on relative wages is needed for assigning weights to individual segments to capture the qualitative human attributes. This is based on the premise that in a free competitive market wage rates at the margin must be equal to the value of marginal productivity of a worker. Presumably, the productivity of labour is a direct reflection of worker education and skill levels.

Information on wages is obtained from the annual Household Income and Expenditure Surveys conducted by the Federal Bureau of Statistics. To offset the inflationary effect, the implicit GDP deflator has been used to estimate wages at the constant price of 1991-92. The data on GDP deflator has been compiled from the annual Pakistan Economic Survey published by the Ministry of Finance and Economic Affairs.

The HCI has been constructed using the wage rate and number of employed persons. The labour force and wage rate are divided into eight separate categories with respect to professional skill, namely:

a) Professional and Technical

b) Administrative and Managerial

c) Clerical

d) Sales Worker

e) Service Worker

f) Agricultural Worker

g) Production Worker

h) Other Occupation.

The formula for constructing the Human Capital Index for the `kth' sector at period `t' can be written as:

$$HCI_{kt} = \frac{\left(\sum_{i}^{8} L_{k,i,t}\,(W_{ki}/W_{k,ag})\right)}{L_k}$$

where

i = professional occupation

t = time (1 to n)

k = sectors

ag = agricultural worker

The agricultural worker (ag) is taken as a numeraire the weight for the former is simply the ratio of the two wage rates. For the purpose of comparative analysis we have taken 1972-73 as the base year.

3.3.2 Price Indices

The Price Index reflect the cost of a commodity or service relative to a base year. In other instances it also reflects the cost of living or the worth of a unit of currency. Economists usually

apply two approaches to measure the general price level. One is Price Indexes and the other is the Implicit Price Index or Deflator. *Price Indexes* are constructed directly from data on the prices of thousands of goods and services within varying basket of goods and services. *Implicit Price Indexes or Deflators* are constructed by dividing a component of nominal GDP by the same component of real GDP with a fixed basket of goods and services.

The Model has used nine price indices, namely :

a) implicit GDP deflator

b) manufacturing

c) wholesale general

d) government consumption

e) government investment

f) imports for machinery and equipment

g) general imports

h) exports

i) world export.

Data for six price indices (implicit GDP deflator, manufacturing, wholesale, imports of machinery and equipment, general imports and exports) for the period 1980-81 have been taken directly from the Pakistan Economic Survey 1992-93. The indices for the earlier years have been spliced so that the time series from 1972-73 has been converted to the 1980-81 base year.

The index for world export prices have been collated from the International Finance Statistics published by the International Monetary Fund.

The data on the remaining two price indices have been constructed using the implicit price index approach. The data on the value of consumption and investment by government in both nominal and real terms have been used to develop the respective price indices. The source for the former is the National Income Accounts publication of the Federal Bureau of Statistics and of he latter is the Pakistan Economic Survey.

CHAPTER 4

ESTIMATED RESULTS

4.1 Introduction

Policy simulation exercise requires the knowledge of parameters (e.g., marginal propensity to consume, marginal product of inputs, tax rates etc.) and exogenous variables in the system. Exogenous variables can be simply generated based on its historical trend values. However the calculation of numerical values of the parameters, which also reflects the reality, is more complex and it needs statistical regression techniques. In this chapter we therefore present a discussion on the estimation methods used and regression results of the estimated parameters of behavioural equations.

4.2 Estimation Methods

Econometric model contains equations which are primarily simultaneous in character, implying endogenous variable in one equation feeds back into variables in other equations. Consequently, the error term for a given equation becomes correlated with the right hand side endogenous variables. This "errors in variables" problem arising due to simultaneity of equations may make the simple single equation ordinary least squares (OLS) estimates both biased and inconsistent. There are other estimation techniques available namely, two stage least squares (2SLS), Zeller's seemingly unrelated (SURE), three stage least squares (3SLS) and full information maximum likelihood (FIML) which when applied to simultaneous equations, it may resolve the problems of "errors in variables".

On theoretical grounds, obviously systems of equation methods will be preferred to OLS but in terms of practical implementation the usefulness of system based techniques is not clear. This is due to the fact, that the system methods although are asymptotically efficient, there are two critical problems

associated with them. First, any misspecification in the structure of the model will be propagated throughout the system viz., specification error in one equation can effect the parameter estimates in all other equations in the model. Second, the finite sample variation (or error) of the estimated covariance matrix can be transmitted throughout the system. Consequently, theoretical advantage of the system based methods in finite sample may be more modest than the asymptotic efficiency results.

Furthermore, in the case of developing country, like Pakistan, not enough consideration is given to collect and consolidate macro economic variables. As a result, some times the definition/coverage is changed on an *adhoc* basis. For instance, in 1987 the methodology to compute major macro economic series were changed and a new data set for these variables were reconstructed by the *Bureau of Statistics* (BOS) only from 1980-81. Consequently, the series prior to 1981 had to be generated by the researchers based on regression methods which may be different from the one used by *BOS*. Another predicament faced by the researchers that may also add to the problem of specification error pertains to the shortness of the time series data, like in this study only 21 observations were available. In addition to this, the period of estimation considered entails several shocks (or disturbances) some of them are external (e.g., oil prices changes, commodity prices, wars in neighbouring countries) and others are internal [e.g., political instability, rapid shift from one policy regime to another like exchange rate policy change, interest rate policy change and weather conditions (floods and droughts etc)]. So, in all these situations it is quite difficult to adopt a systems based estimation technique which is insensitive to the specification error in data. Therefore, in the light of above econometric and practical problems we have opted to use the simple OLS (ordinary least square) technique to estimate the parameters of behavioural equations. This method is easy to implement and will restrict errors (both specification and data) to the equations affected.

4.2.1 Implementation of Estimation Techniques on the Model

Implementation of the above proposed estimation techniques (OLS) on the theoretical specification of the model further modification of some of the individual behavioural equations may be required. This is due to the fact, that some of the behavioural relationships as postulated by economic theory may not be supported by actual data (because of multicollinearity, auto correlation etc.). Therefore in applied econometric it is a common practice, based on pragmatic approach, to include some other variables (as proxies) or at times drop statistically insignificant variables from a given equation. In addition, dummy variables are also included for some equations to capture a one time structural changes (due to change in political regime, floods etc.) in the behaviour of a given time series. A list of dummy variables used in different equations and their possible explanations are given in the *Appendix F.*

Estimation period of the model covers from 1972-73 to 1992-93 with annual data. The model consist of three main modules i.e., macro, fiscal and social sector and these modules are again divided into 18 sub modules. There are 81 behavioral equations and 115 identities. There are 81 endogenous variables, 56 exogenous variables and 82 lagged endogenous variables. The estimated OLS regression results and other summary statistics of all the behavioural equations are given in *Appendix B.*

4.3 Estimated Regression Results

In this section, we discuss the regression results of Macroeconomic Block, Fiscal Block and Social Sector Block of the model. All behavioral (81) equations of the model are estimated using ordinary least square method (OLS) as stated in earlier section. Table 4.1 reports the significance of parameter estimates based on t-values at different levels of significance (1%, 5% and 10%), presence of no-

serial-correlation, adjusted R-square and total number of behavioral equations. The summary results reported in Table 4.1 are organized in terms sub-modules.

Based on t-values, Table 4.1 indicates that over eighty two percent (316 out of 385) of the estimated parameters in the model are statistically significant at least at 10% or less level. Furthermore, over seventy two percent of the total 81 behavioural equations have no-serial-correlation problem. Of the remaining less than 23 percent most of them are either border line cases (implying very close to no-serial-correlation) or some of them may be in the indecisive region. It is also interesting to note about sixty one percent (50 out of 81) of the behavioural equations have explanatory power (represented by adjusted R^2) greater than 99%.

Many of the economic time series would respond with a lapse of time called "lag". In general lagged variables are incorporated to capture the short and long run multiplier effect of a given variable. The estimated model consist of 78 lagged variables in 81 behavioral equations. The magnitude of the individual coefficient in a given equation is nothing but the short-run or impact multiplier while the summation of the coefficients of all lagged variables in the same equation represent the long run multiplier.

Along with linear specifications, at times we have also used double logarithmic (log) functions to estimate some of the equations in the model. The rationale for using double log functional form is simply to measure elasticity of the dependent variable with respect to a given explanatory variable. In addition, a double-log functional from also enable us to impose constant returns to scale restriction on the co-efficient of the production function (e.g., the production functions in the

TABLE 4.1

SUMMARY OF OLS REGRESSION RESULTS

	BLOCK	T - STATISTICS SIGNIFICANT AT				SERIAL CORELATION		ADJUSTED R-SQUARE		Totel Number of Behavioural Equations in the Block
		= <1 Percen	= <5 Percen	= <10 Percen	Above 10 Percent	No Autocorrelation	Indecisive Region	99 Percent	< 99 Percent	
1	MACRO BLOCK									
A	Macro Economic Production Block	14	-	1	-	1	2	3	0	3
B	Macro Input Demand Block	15	3	1	3	1	3	3	1	4
C	Macro Economic Expenditure Block	15	-	1	6	4	0	2	2	4
L	Trade Block	9	2	2	3	1	2	0	3	3
M	Monetary Block	2	-	2	3	1	0	0	1	1
N	Price Block	19	4	-	4	5	1	5	1	6
Q	Index of Economic Infrastructure Block	-	-	-	-	-	-	-	-	-
R	Index of Fiscal Effort Block	-	-	-	-	-	-	-	-	-
	TOTAL	74	9	7	19	13	8	13	8	21
2	FISCAL BLOCK									
D	Federal Revenue Block	17	-	1	7	3	2	3	2	5
E	Federal Expenditure Block	17	1	2	2	3	2	3	2	5
F	Federal Deficit Block	-	-	-	-	-	-	-	-	-
G	Provincial Revenue Block	11	1	-	1	2	2	1	3	4
H	Provincial Expenditure Block	37	4	2	7	9	1	8	2	10
I	Provincial and Total Budget Deficit	-	-	-	-	-	-	-	-	-
J	Local Revenue Block	6	-	-	-	3	0	1	2	3
K	Local Expenditure Block	17	7	1	12	8	0	4	4	8
	TOTAL	105	13	6	29	28	7	20	15	35
3	SOCIAL SECTOR BLOCK									
O	Human Capital Index Block	45	10	4	15	10	5	9	6	15
P	Public Health Index Block	29	9	5	6	8	2	8	2	10
	TOTAL	74	19	9	21	18	7	17	8	25
	GROSS TOTAL	253	41	22	69	59	22	50	31	81

Macroeconomic Production Block). The model used in the study contains double-log linear functional form in 14 equations of Macro Block and in 4 equations in Social Sector Block.

In following section we briefly discuss the estimated regression results of the individual blocks namely, Macroeconomic Block, Fiscal Block and Social Sector Block. The detailed results are reported in *Appendix B*.

4.3.1 Macroeconomic Block

The Macroeconomic Block consist of 6 sub-blocks in which 21 behavioral equations estimated. The t-values in the Macroeconomic Block shows 74 variables significant upto 1 percent, 9 variables upto 5 percent and 7 upto 10 percent level. Out of 109 variables in the Macroeconomic Block only 19 variables are insignificant. For this reason none of the variables has been dropped from the regression as stipulated in the theoretical specification.

The 21 behavioral equations in the Macroeconomic Block have no auto-correlation while the remaining 8 equations lies in the indecisive region as reported in *Appendix B*. The values of adjusted R^2 in 13 equations are over 99 percent while in 8 equations it is below 99 percent.

In Macro Economic Production Block, 3 behavioral equations were estimated using double-log functional form in order to restrict the input coefficients to constant returns to scale. The regression results of Production Block indicate that along with physical inputs (labor and capital) the stock of public/ provincial infra-structure (Economic) and human capital factors are significant and have high co-efficient values in all 3 equations.

The Macro Input Demand Block which implicitly determines the demand for labor in the economy has estimated 4 behavioral equations by double-log method. In Trade Block and Price Block, 2 and 5 behavioral equations estimated by using the double-log method respectively. All the estimated coefficients in this have the right signs and are also statistically significant.

4.3.2 Fiscal Block

Fiscal Block consist of 8 sub-blocks with 35 behavioral equations and total number of 153 variables. The t-values of the 105 variables out of 153 is significant at less than 1 percent level. Only 29 variables appeared to be insignificant in the Fiscal Block. Problem of auto-correlation do not exist in 28 equations and only 7 equations are in indecisive region. All the 35 behavioral equations has adjusted R-square values of above 95 percent.

In Federal Revenue Block, 5 behavioral equations statistically estimated in which 17 variables significant upto 1 percent level. The co-efficient of the variables used in the equations shows the federal tax revenue buoyancy. Coefficient of the tax base in import duties equation is 0.244, which can be interpreted as 1 rupee increase in tax base leads to on the average 0.24 paisa increase in the total revenues from import duties.

Federal expenditure block has 5 behavioral equations, comprising 2 interest rates equations, 1 Federal annual development plan (ADP) equation, 1 repayment of external debt equation and 1 is the other federal recurring expenditure equation. The coefficients of internal and external debt are 0.16 and 0.025 respectively. Out of 22 variables, 17 variables significant upto 1 percent level while only 2 variables appeared to be insignificant.

Like other regression results in the model, Provincial Expenditure Block confirms the sound theory behind the specification of the model. The Provincial Expenditure Block has 10 behavioral equations in which all the equations have adjusted R-square values above 95 percent. Out of 50 variables 37 variables are significant upto 1 percent level. No auto-correlation exist in 9 behavioral equations and only 1 equation is in indecisive region.

In Local Expenditure block 8 equations are estimated behaviourally. The level of significance in this block is not as high as compared to the other blocks in the model. Out of 37 variables 46 percent variables significant upto 1 percent, 19 percent upto 5 percent and 32 percent variables seem insignificant. In the Local Expenditure Block, 4 behavioral equations has 99 percent "coefficient of determination" while others 4 equations have adjusted R-square values greater than 95 percent.

4.3.3 Social Sector Block

Human Capital Index Block and Public Health Index Block are the core blocks of the model which determine the social sector requirements of the economy. These two blocks have altogether 77 equations in which 15 are behavioral equations of Human Capital Index Block and 10 behavioral equations of Public Health Index Block. A total of 21 variables appeared insignificant from 123 variables whereas 74 variables has been significant upto 1 percent. In 17 behavioral equations of this block has adjusted R-square values as high as 99 percent.

Human Capital Index Block has a total number of 54 equations in which 15 equations statistically estimated. The development and recurring expenditure equations for primary and secondary education by gender have been behaviourally estimated. The lagged variables coefficients in the development

and recurring expenditure behavioral equations indicates the distinct impact of the previous year earmarked outlays in the current year development and recurring expenditure budget. The t-values of the Human Capital Index Block follows the model trend as out of 74 variables, 45 of them are significant upto 1 percent level, 10 variables significant upto 5 percent and 15 variables has been insignificant in the Block. The block shows no auto-correlation and serial correlation. The adjusted R-square value in 9 equations has been estimated upto 99 percent and in 6 equations it is above 95 percent.

Public Health Index Block has the largest number of equations in the model after Human Capital Index Block. It has a total number of 23 equations featuring the nature of health output, inputs and cost requirements for the public sector health facilities in Pakistan. The total of 10 behavioral equations has 29 variables significant upto 1 percent level. It has no auto-correlation and 8 equations has 99 percent adjusted R^2.

4.4 Summary

The objective of this chapter was to outline the econometric techniques used to estimate the behavioural equations as well as to report the performance of the estimated regression results of the model. Due to data limitations and the large size of the model a simple OLS technique has been adopted to estimate the behavioural equations of the model. Based on standard statistical tests (t-values, R^2, DW), the performance of the estimated regression results of the model, in general, seems to be quite reasonable.

CHAPTER 5

VALIDATION OF THE MODEL

5.1 Introduction

In the previous chapter, only the behavioural equations were estimated using a simple OLS regression technique. However, in order to conduct meaningful policy simulations, we also need to incorporate all the identities as well as behavioural equations of the model. In a simultaneous equation framework and due to the presence of dynamic (lagged) variables it is possible that the simulation results produced by the model may not replicate the reality as well. In this context Pindyck and Rubinfeld (p.323, 1991) noted:

> *In a multiple-equation model each individual equation may have a very good statistical fit, but the model as a whole may do a poor job in reproducing the historical the historical data. The converse may also be true; the individual equations of a simulation model may have a poor statistical fit, but the model as a whole may reproduce the historical time series very closely.*

It is therefore, important that before carrying out actual policy simulations the model needs to be tested and validated in such a way so that it may be able replicate the historical reasonably well. In view of the above consideration, the purpose of this chapter is check and validate the estimated model based on standard statistical tests.

5.2 Reasons for Model Validation

Since we have used the single equation OLS least square technique to estimate various behavioral equations, a close investigation of the results (e.g., see *Appendix B*), reveals that almost all of the equations have good fits indicated by adjusted R^2, small standard error of the estimates, reasonable Durbin Watson statistic, and the majority of the estimated coefficient are statistically significant at

below 10% of the significance level. However, as indicated earlier, in the simultaneous equation framework when individual estimated equations (behavioral equations) are linked with other accounting identities, and the endogenous variable in one equation feeds back into variables in another equation, we have no guarantee that the model as a whole, when simulated, will produce the historical data reasonably well, despite the fact that individual equation may produce a good estimates.

Model performance therefore should be tested before performing any policy simulation. To evaluate a simultaneous equation model one needs to simulate the model backward (known as historical simulation) in time, beginning at the start of the estimation period. This will test the model's dynamic stability implying how closely each endogenous variable tracks the historical data. It is quite possible that in historical simulations some of the endogenous variables will track the historical data closely but the others may perform badly. In such a case the model evaluation will involve, a consideration of which variables are most critical and as well as the reasons that produces large errors, also the simulation performance can be improved by new equation forms.

Another important issue concerns the value to be used for lagged endogenous variable namely, whether should we use actual values while simulating the whole model, or we take the estimated lagged endogenous value. In the former case the error will not propagate in next year, while in the latter case errors are accumulated in every year. If the simulation is conducted only for one year than, of course, one should use actual values of the lagged endogenous variable. In this study, since we are testing the model performance throughout the historical period, we have used previous period estimated value of the endogenous variable in the estimation of current year. This obviously will give a more powerful test for validation of the simultaneous model.

5.3 Summary Statistics for Model Validation

In order to measure how closely individual variables track their corresponding data series, we have used standard summary statistics namely, root mean square percentage error (RMPSE) and Theil inequality coefficient (TIC).[1] *RMPSE* simply measures the combined bias and variance of the estimated *vis-à-vis* actual values of a time series in percentage form. Obviously, a smaller percentage value of *RMPSE* will more desirable than the larger ones.

Unlike *RMPSE*, *TIC* on the other hand consists of three components. These components are *bias*, *variance* and *covariance*. The *'bias'* component of the inequality coefficient is an indication of systematic error, since it estimates the average value of the simulated and actual series deviates from each other. A value is close to zero is assume to be good in this case. The *variance* component indicates the ability of the model to replicate the degree of variability in the variable of interest. A large value shows that the variability in one series is not reflecting the variability in the simulated series. This would some time leads to revise specification. The third component, *covariance*, measures the proportion of unsystematic error; i.e. it represent the remaining part. This *TIC* values of a series will always lie between 0 and 1. As the value is close to 0 it becomes more and more better fit, while if the value is close to 1, the model is considered to badly fitted as compared to the given series. Table 5.1 reports cumulative frequency distribution tables and graphs on *RMPSE* and *TIC* for all the variables in the model while Table 5.2 contains the actual values of these two summary measure for key variables.

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[1] *Exact formula for these summary measures are available in Pindyck and Rubinfeld (p.338-41, 1991).*

Inspection of Table 5.1 reveals that about seventy percent (135 out of 196) of the endogenous variables in the model have *RMPSE* values below 10 percent. When *RMPSE* values are examined for key selected variables in Table 5.2, it appears that only 2 out of 24 variables exceeds the 10 percent mark. In fact, the two variables which have large *RMPSE* (greater than 10%) are simply accounting identities (domestic debt and overall budget deficit).

Measuring the performance of historical simulations based on *TIC*, it evident from Table 5.1 that over ninety four percent of the total number of variables in the model have values less than 0.1 and only 10 out of 196 variables have crossed the value of *TIC* greater than 0.1. As for key selected variables, *TIC* value has never exceeded 0.04.

Another important criterion to validate the performance of simulation series is how well the model replicates the turning points in its historical path. Figure 5.1 shows the graphs of actual and simulated series for selected key variables of the model. With the exception of two human capital index variables all other variables (22 of them) simulated by the model are not only very close to each other but more importantly the forecasted series (of these variables) have also captured most of the turning points in actual variables.

5.4 Summary

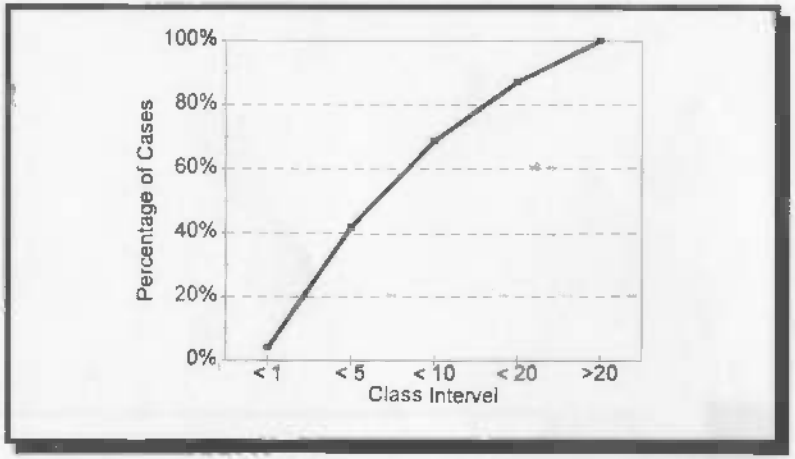
Based on summary statistics (*RMPSE* and *TIC*) and comparing the graphs of actual and simulated series in historical period, it is quite convincing that the estimated model has the power to replicate the historical data for endogenous variables.

TABLE 5.1

Cumulative Frequency Distribution for RMSPE for all Variables

Interval	# of Cases	Cummulative Percentage
Less than 1	8	4.08%
1 - 5	74	41.84%
5 - 10	53	68.88%
10 - 20	36	87.24%
Above 20	25	100.00%
Total	196	

Average **10.52**



Cumulative Frequency Distribution for Theil Inequality for all Variables

Interval	# of Cases	Cummulative Percentage
Less than 1	23	11.73%
1 - 5	139	82.65%
5 - 10	24	94.90%
10 - 20	4	96.94%
Above 20	6	100.00%
Total	196	

Average **4.00%**

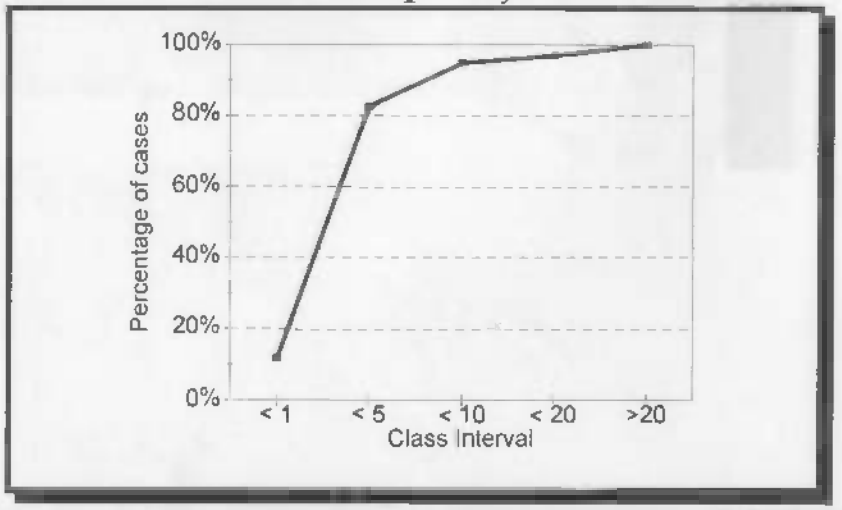
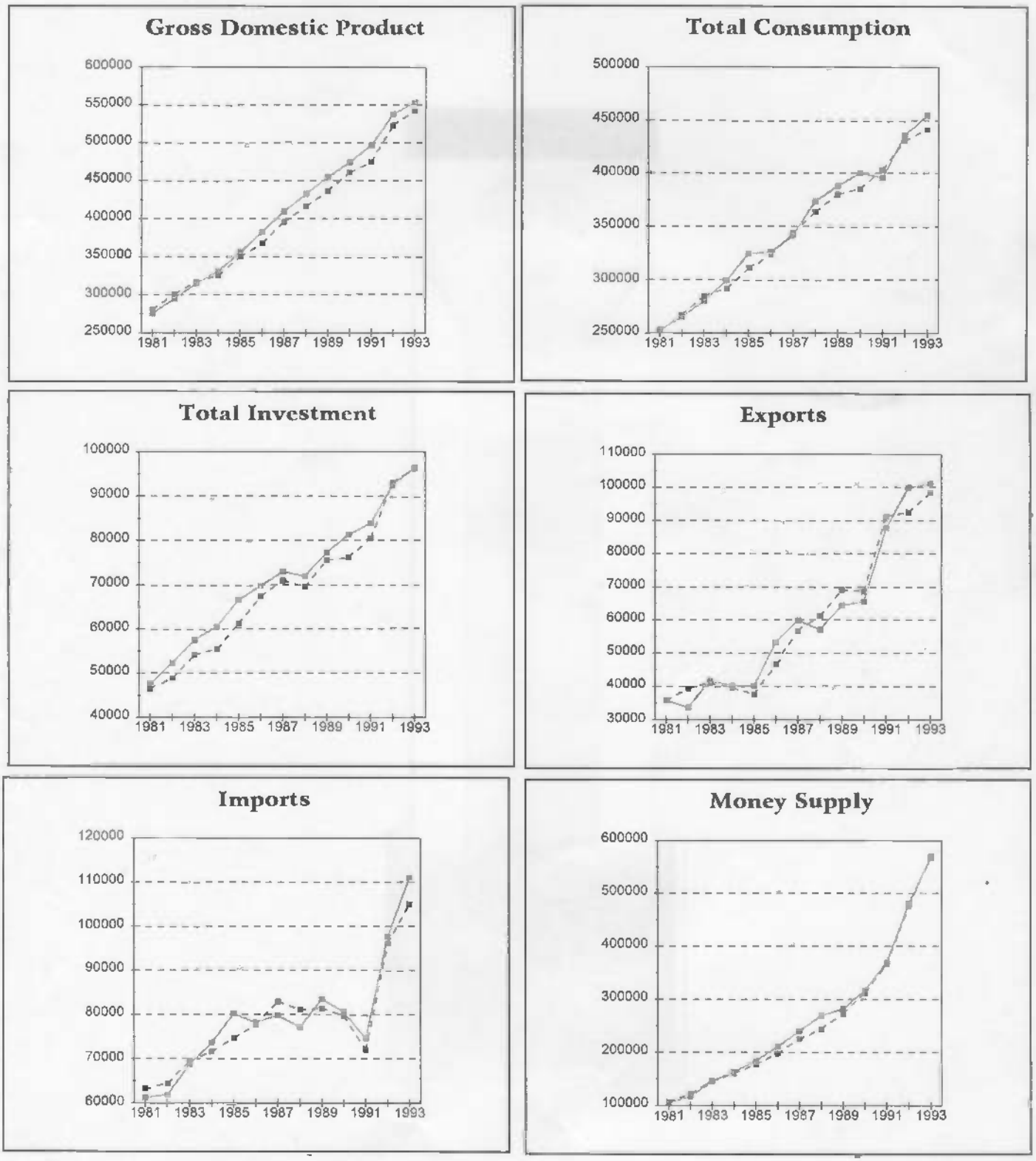


TABLE 5.2

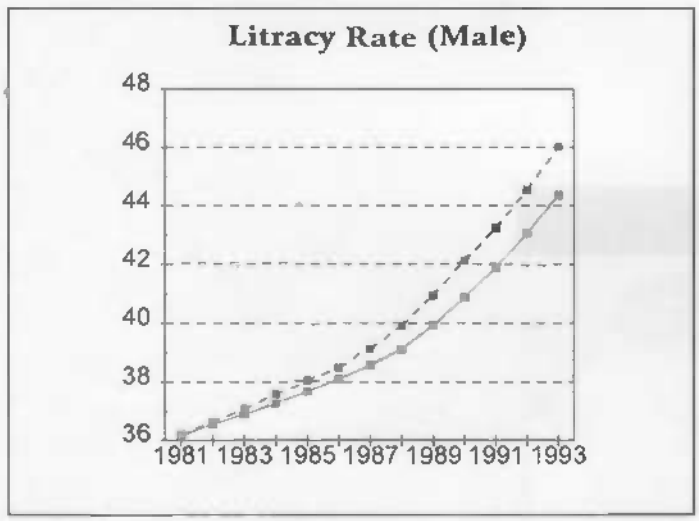
Summary Statistics of Key Variables

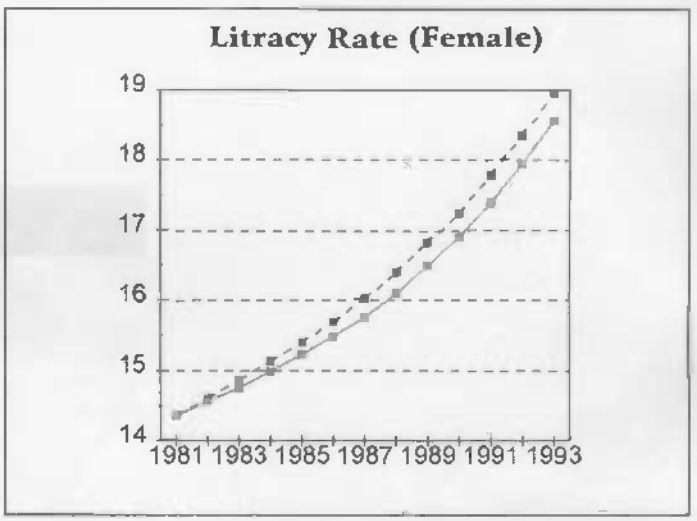
Variables	RMS(%)	TIC
Gross domestic Product	2.910	0.016
Total Consumption	2.327	0.012
Total Investment	4.974	0.023
Exports	7.507	0.032
Imports	3.713	0.019
Money Supply	4.141	0.017
Stock of Public Infrastructure (Federal)	2.901	0.015
Domestic Debt	13.103	0.043
External Debt	0.628	0.002
Budget Deficit Overall	12.305	0.031
Gross Tax Revenue	4.242	0.020
Development Expenditure	4.925	0.019
Development Expenditure (Education)	5.875	0.033
Development Expenditure (Health)	4.985	0.017
Recurring Expenditure (Education)	14.597	0.025
Recurring Expenditure (Health)	3.858	0.017
GDP Deflator	1.759	0.008
Nominal Exchange Rate	7.432	0.038
Literacy Rate (Male)	1.609	0.008
Literacy Rate (Female)	2.164	0.011
Human Capital Index (Agriculture)	1.314	0.007
Human Capital Index (manufacturing)	2.828	0.015
Human Capital Index (Others)	4.785	0.026
Public Sector Health Index	2.615	0.014

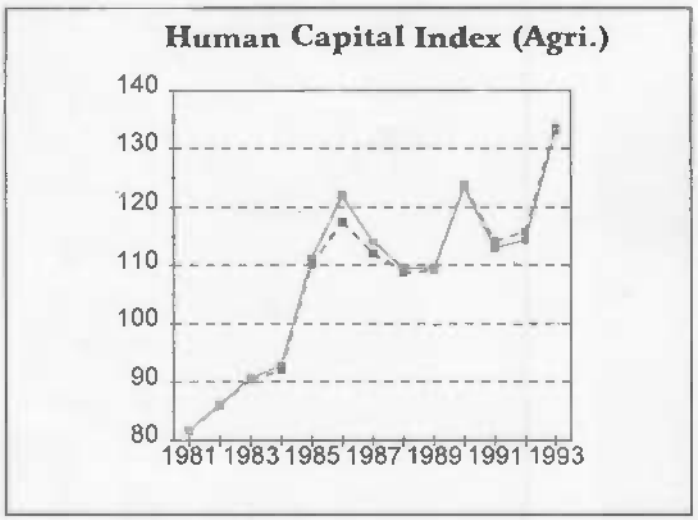
Figure 5.1[1]

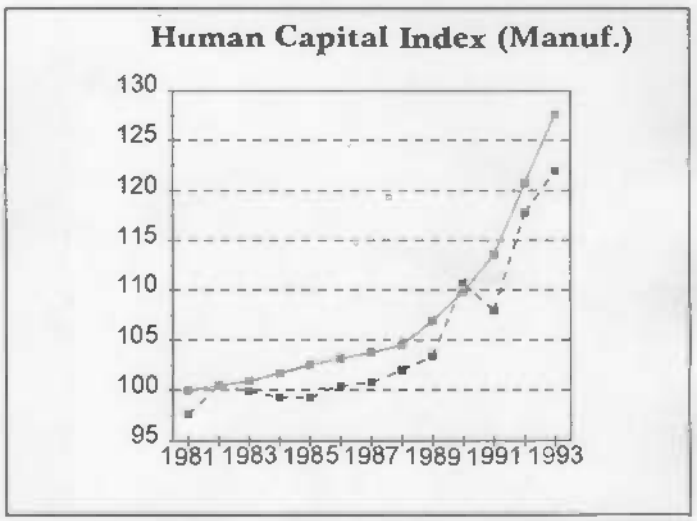


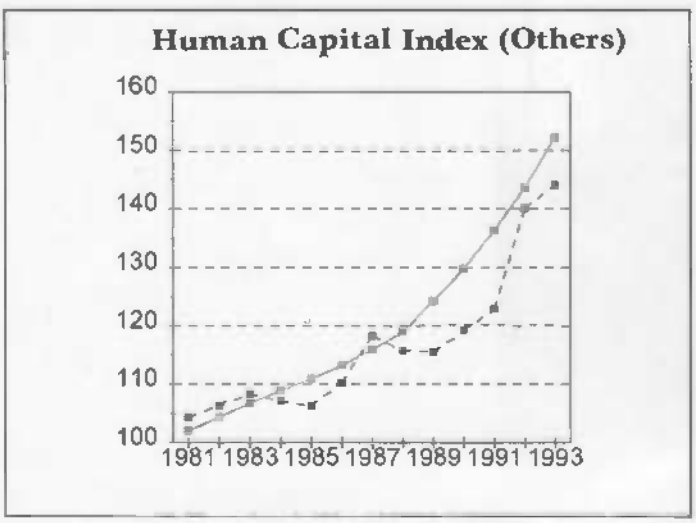
[1] Simulated ---------- Actual _____



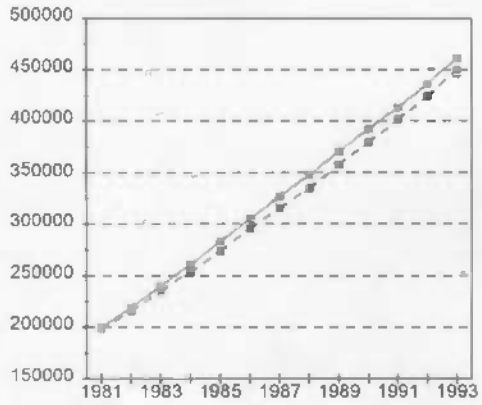




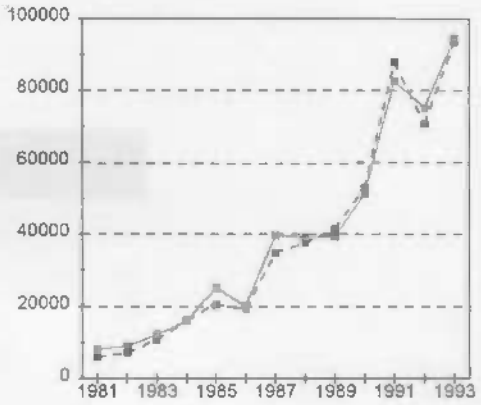




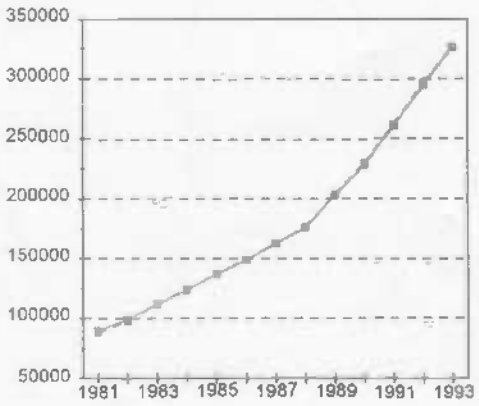
Stock of Public Infrasturcture



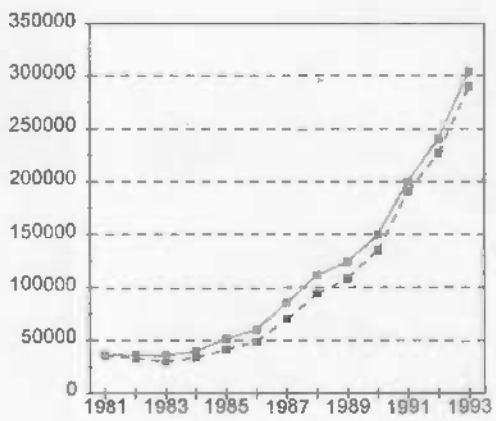
Budget Deficit Overall



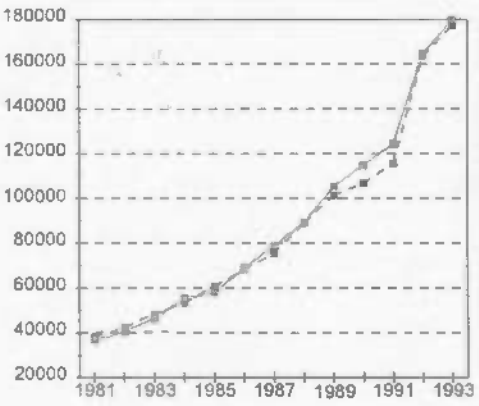
External Debt



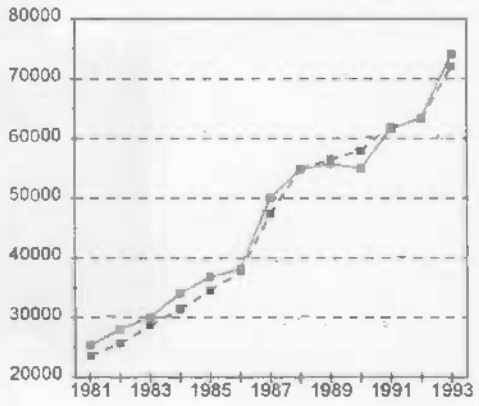
Domestic Debt

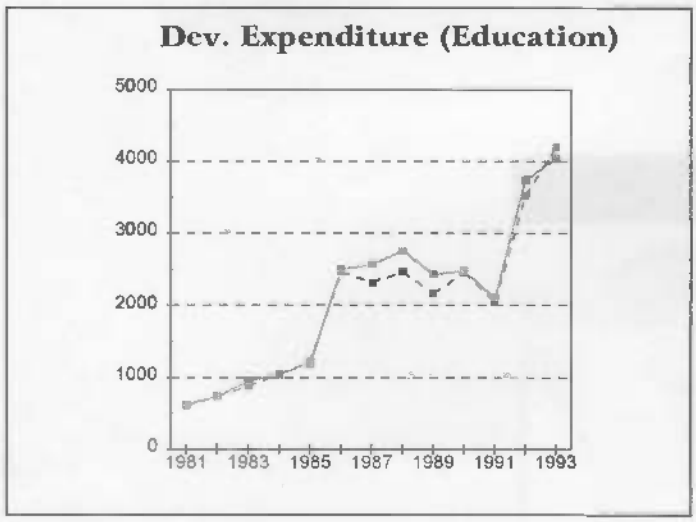


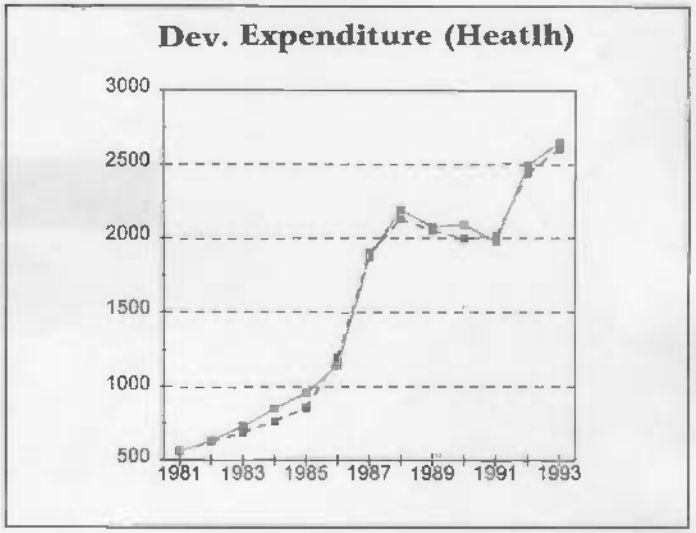
Gross Tax Revenues (Federal)

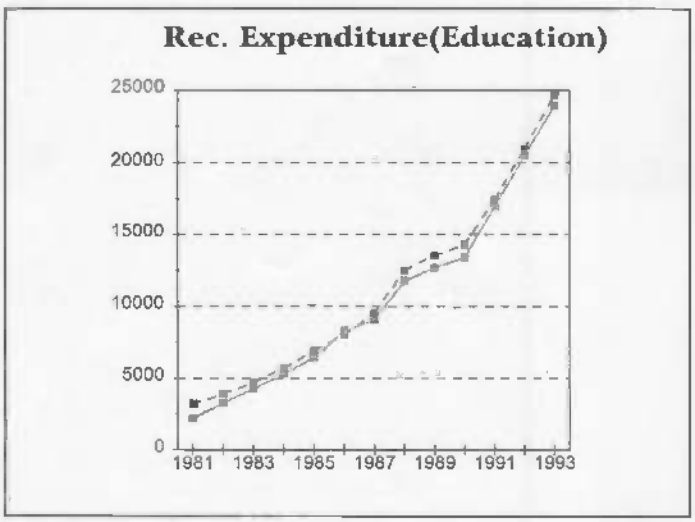


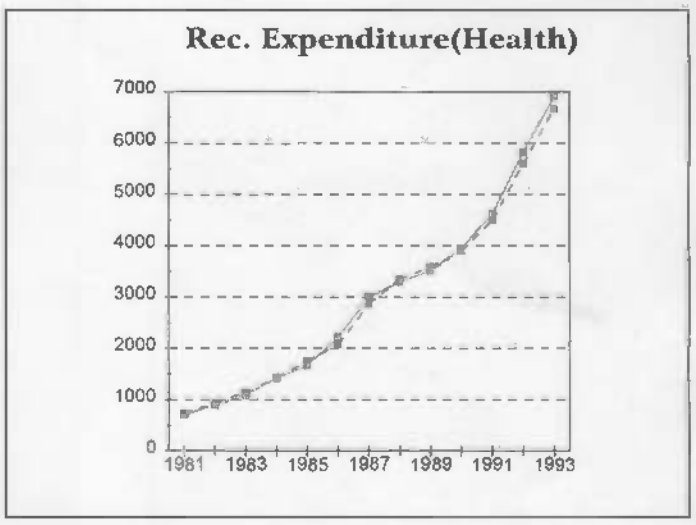
Development Expenditure

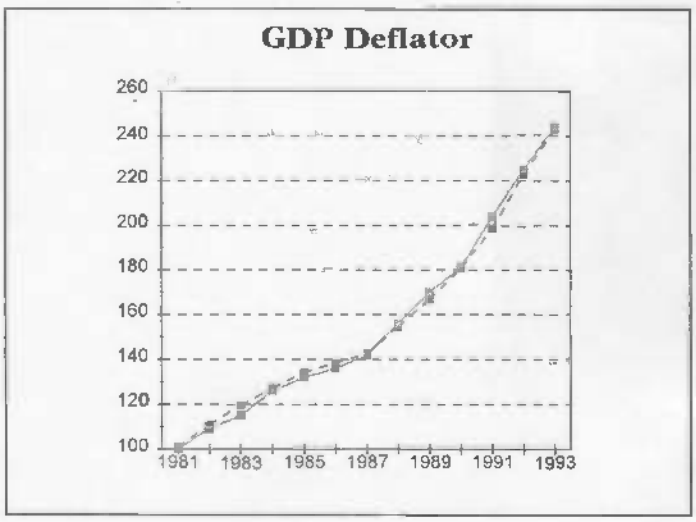


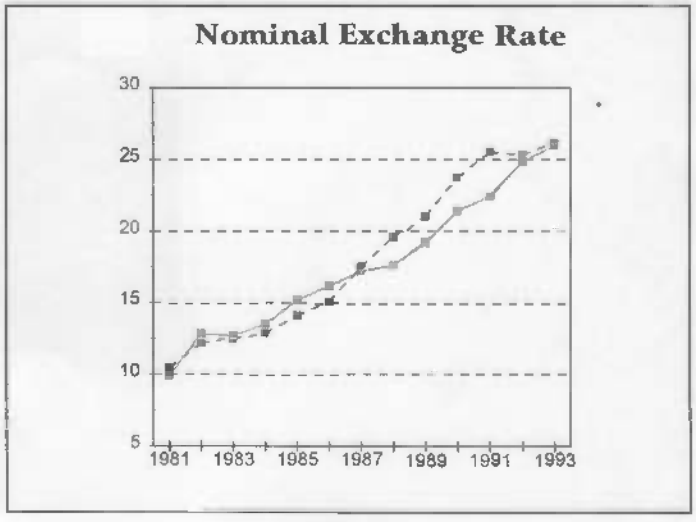












CHAPTER 6

RESULTS OF POLICY SIMULATIONS

6.1 Introduction

The model described above has been used to forecast key economic and social magnitudes till the year 2002-03, which is the last year of the perspective plan. As has already been highlighted, it is a powerful tool and can not only be used to project what will be the shape of the economy in the next decade but also what will be the impacts of different economic policy changes if they are implemented by the government. For example, if the federal government decides to persue a policy of higher tax mobilisation and goes for rigorous fiscal effort, the model can forecast its dynamic impacts on not only federal finances but also on the fiscal status of provincial governments in the country and on the key macro economy magnitudes like growth in the gross domestic product, the inflation rate etc.

6.2 Key Economic and Social Indicators in the Base Simulation

We present first the results of key magnitudes in the Base Simulation, i.e, if there is no major change in any government policy and the economic parameters move on their historical trend, what is likely to be magnitude of some of the key economic and social indicators in the years to come? Table 6.1 presents these indicators for the years 1995-96, 1997-98 and 2002-03. The historical value of the indicator for 1992-93 is given for comparison. The table shows that the long-run natural growth rate of GDP (at constant prices) is around 5½ to 6 percent per annum. The low growth in 1992-93, of 3.6 percent, was due to extraordinary factors like the cotton crop failure due to pest attacks, etc. At this stage it appears that the economy will recover from this temporary aberration and come back to its natural path of moderate growth. The manufacturing sector will continue to show the highest buoyancy followed by the services sector. Growth in the agricultural sector will also be, more or less, at its long run historical level.

TABLE 6.1

PROJECTED MAGNITUDES OF KEY ECONOMIC AND SOCIAL INDICATORS IN BASE SIMULATION OF THE MODEL UPTO YEAR 2002-03

(Percent)

Indicator	1992-93	1995-96	1997-98	2002-03
1. Growth Rate *(at constant prices)*				
Gross Domestic Product (GDP)	3.60	5.6	5.7	5.9
Agriculture	-3.80	3.34	4.15	4.8
Manufacturing	5.60	7.35	7.55	7.71
Services	5.40	5.80	5.80	5.60
2. Rate of Inflation	9.2	6.9	6.1	5.4
3. Current Account Gap to GNP Ratio	5.3	5.05	4.50	2.90
4. Budget Deficit to GDP Ratio	7.1	6.5	6.2	5.7
5. Federal Tax to GDP Ratio	13.4	14.8	15.1	15.4
6. Federal Expenditure to GDP Ratio	19.4	20.0	19.80	19.40
7. Provincial Tax to GDP Ratio	0.6	0.5	0.5	0.4
8. Provincial Revenue to GDP Ratio	6.9	7.5	7.8	8.0
9. Total Public Expenditure to GDP Ratio	29.7	30.1	30.3	30.4
10. Total Provincial Expenditure to GDP Ratio	8.9	9.1	9.4	9.9
11. Total Social Sector Expenditure to GDP Ratio	4.8	4.0	4.12	4.4
12. Provincial Use of Cash Balances to GDP Ratio	0.3	0.2	0.2	0.3
13. Literacy Rate				
Male	46.0	49.3	52.9	62.8
Female	19.0	20.7	22.3	26.7
14. Primary Enrollment Ratio				
Male	99.4	109.5	119.1	134.5
Female	45.2	52.1	57.3	67.7
15. Growth Rate				
Doctors	0.80	7.06	6.9	5.12
Nurses	4.41	7.90	6.60	4.80
Hospital Beds	3.51	2.90	2.80	2.60
13. Human Capital Index - Growth Rate	2.3	2.9	3.6	4.3
14. Public Health Index - Growth Rate	1.0	1.2	1.5	1.8

Another interesting macro indicator is the inflation rate which stood at over 9 percent in 1992-93 and has increased substantially this year. It appears that there will be some moderation in the inflation rate in the economy and it will go down over the years to between 5½ to 7 percent. Over the years there is likely to be an improvement in the current account deficit position also.

On the fiscal side, the overall budget deficit-to-GDP ratio of the federal and provincial governments combined will also decline somewhat but is likely to remain between 6 to 6½ percent of the GDP. Therefore, it appears that the budget deficit targets agreed upon by the government and the IMF, as part of the Extended Sturctural Adjustment Facility (ESAF) conditionalities, are unlikely to be met until dramatic policy changes are introduced in the public finance structure both on the taxation and expenditure side. It also appears that the budgeted deficit for 1994-95 announced by the government at the beginning of the current fiscal year of about 4 percent of the GDP is unrealistic and indications are that the targeted borrowing will overshoot again this year.

The federal tax-to-GDP ratio will show a slight increase, from 14½ percent to almost 15½ percent by the year 2002-03 while federal expenditure as a percentage of GDP will remain at, more or less, its present level. The provincial tax to GDP ratio will show no improvement and will continue to remain very low at less than a half percent of the GDP. The provincial revenue to GDP ratio will, however, increase to 8 percent largely due to the increase in divisible pool transfers resulting from exploitation of divisible pool taxes by the federal government. We assume that these will continue to be transferred according to the 1991 NFC award. The overall size of the public sector will remain more or less at its present level at about 30 percent of the GDP.

Higher Divisible pool transfers will lead to an increase in the role of provincial governments. Total provincial expenditures (which include both recurring and development) will increase from

the present level of under 9 percent to about 10 percent of the GDP. This automatically implies an increase in expenditures on social sectors since the prime responsibility of social service provision rests with the provincial governments while the federal government is largely involved in economic infrastructure provision. The overall fiscal position of the provincial governments, as revealed by the use of cash balances (which gives the extent of overdraft taken from the State Bank of Pakistan), will remain, more or less, at its current level.

Higher expenditures on social sectors will translate into higher social sector output as can be seen from the Table 6.1. The literacy rate (both male and female) is likely to increase from the current level of about 46 percent in the case of males and 19 percent in the case of females to about 63 percent and 27 percent respectively. Primary enrollment ratios will increase and we may achieve a female enrollment rate of about 68 percent while male enrollment ratio could cross 100 percent. In the case of females the enrollments rate is much lower than the targeted enrollment rate of the perspective plan which is 100 percent enrollment for both males and females.

Similarly, there will be higher initial increase in the growth rate of doctors, nurses and number of hospital beds which will, however, tinker down in the next decade. Overall the increase in school output and inputs into the health sector over the years will increase the growth rate of the social sector indices, i.e. the human capital index and the public health index. It may be noticed from the table that the growth rate in both these indices increases with the passage of time.

Altogether in the absence of any major shocks, either external or internal, we do not see any major changes in coming years in the macro economic environment. Development of social sectors will continue at the traditional, relatively slow pace. Pakistan could enter the next century with an

overall literacy rate of about 45 percent only, a level already attained by some countries which are even less developed than Pakistan.

6.3 Impact of Policy Simulation

We turn now to policy simulations, which analyse the impact of a policy change by different levels of government. The model is capable of tracing through the impacts of a wide variety of macro and other policy shocks. A list of some of the policy simulations undertaken is presented in Table 6.2, the results are presented in Annexe D. Here we concentrate only on some key macro, fiscal and social policy changes, especially by provincial governments. We discuss the impact of eight different policy changes - two of which are macro economic and four each on resource mobilisation and expenditure planning side. Finally, we highlight the impact of a program like SAP which envisages additional, earmarked funds for social sector development supported by donor assistance.

As highlighted in chapter one there are well defined linkages both between the macro, fiscal and social sector modules and within these modules. Therefore, a policy change in one component of a module not only effects the other components of that module but also spills over to other modules. These spillover affects are multiple, complex and in some cases not immediately visible or comprehensible. The results will focus largely on the primary affects and ignore the indirect effects, which are not very substantial.

6.3.1 Macro-Economic Simulations

The simulation results of the macro economic variables like foreign aid and private investment is discussed with the assumption that what will be impact on the economy if the foreign aid and private investment increased?

TABLE 6.2

LIST OF POLICY SIMULATIONS

MACRO ECONOMIC POLICY SIMULATIONS

- Increase in Foreign Aid
- Change in Import Price Index
- Increase in Export Price Index
- Increase in Interest Rate on Advances
- Increase in Home Remittances
- Increase in Private Investment
- Increase in ADP
- Increase Investment in Power, Telecom Sector
- Decline in Population Growth Rate

FISCAL POLICY SIMULATION

- Increase in Fiscal Efforts in Federal Taxes
- Higher Fiscal Efforts by Provincial Governments
- Higher Revenue from Federal Surcharges
- Changes in Inter-governmental Revenue Sharing Arrangements
- Decentralisation of Fiscal Services to Local Government
- Retirement of Domestic Debt.
- Lower Interest Rate on Intergovernmental Borrowing
- Cut in Defence Expenditure and Diversion to Federal Development Expenditure

SOCIAL SECTOR POLICY SIMULATION

- Increased Cost Effectiveness in the Provision of Social Services
- Lower School Drop-out Rates
- Change in Investment Priorities within Education
- Change in Investment Priorities within Primary Education
- Change in Investment Priorities
- SAP with only Development
- SAP with Recurring Expenditure Component
- SAP Development with Provincial Resource Mobilization

6.3.1.1 Increase in Foreign Aid

Principal linkages of increase in foreign aid are traced in Flow Chart 6.1. Increase in the flow of foreign aid has an impact on both federal revenues (through an enhancement in resources) and federal expenditures. The net impact on the latter is, however, ambiguous. Enhanced availability of resources may, on one hand, increase expenditure, particularly development expenditures while on the other hand greater access to cheap foreign funds may substitute for expensive domestic debt and thereby reduce governments debt servicing liabilities overtime. Also, higher federal development expenditures stimulates growth in the economy, which in turn, further increases federal revenues and effects the budget deficit. Benefits from the overall growth in the economy and increase in federal revenues triggers down to the lower tiers of government, particular provincial government via enhanced divisible pool transfers. This, in turn, implies higher overall provincial expenditure, higher expenditure on social sectors, higher social sector output, improvement in social sector indices, i.e. human capital index and public health index which further stimulates the economy. Therefore, the overall impact of increased foreign aid may be positive both on the national budget deficit and the economy.

Table 6.3 gives the magnitudes of the key variables. Notice that initially there is an increase in overall federal expenditures but eventually savings in debt servicing through substitution of domestic debt far outweight any stimulatory impact on development expenditures. The result is a substantial decline in the budget deficit in the long run, of over Rs 16 billion in 2002-03. Also, enhanced divisible pool transfers and improvement in the provincial own tax bases leads to an almost immediate improvement in the provincial budgetary position as indicated by the decline in the provincial revenue deficit. Besides, there is some improvement in the social sector indices

FLOW CHART 6.1
MACRO POLICY SIMULATIONS
[Dynamic Impact of Higher Foreign Aid]

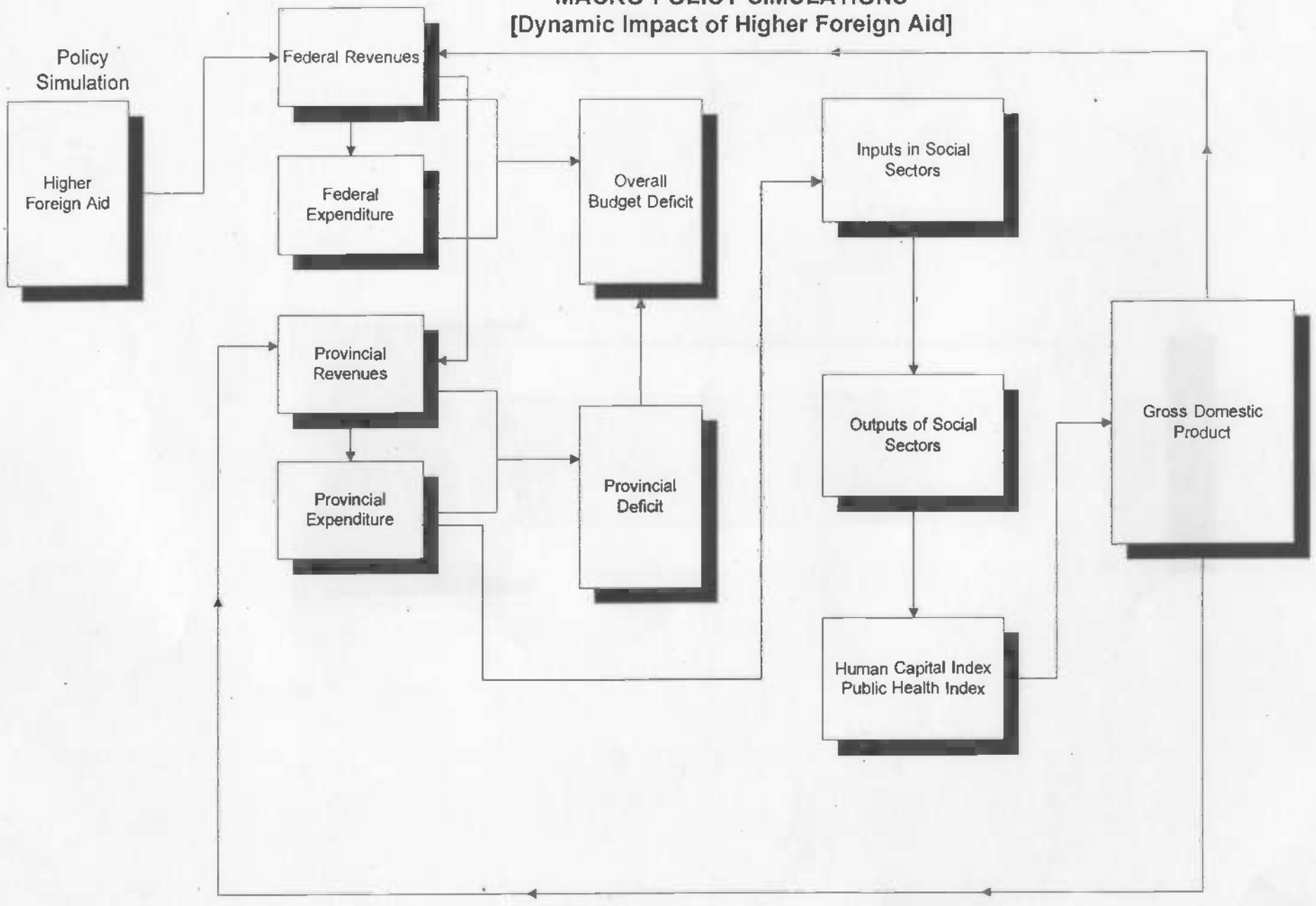


TABLE 6.3

KEY IMPACTS OF INCREASE IN FOREIGN AID
[50 percent Increase in 1993-94]

(Rs in Million)

	Short-run 1994-95	Medium-run 1997-98	Long-run 2002-03
FEDERAL FINANCES:			
Change in:			
Revenue Receipts(Net)	333.21	584.74	468.04
Federal Expenditures	631.63	-3283.97	-14520.51
Budget Deficit	-2498.25	-5967.34	-16241.79
PROVINCIAL FINANCES:			
Change in:			
Provincial Own Revenues	41.75	67.46	68.73
Federal Tax Assignments	322.32	509.28	399.03
Provincial Recurring Expenditures	116.93	281.20	359.05
Provincial Development Expenditures	24.50	51.73	114.41
Expenditures on Social Sectors	86.25	212.89	287.08
Expenditures on Economic Sectors	55.17	120.05	186.37
Provincial Revenue Deficit	-247.14	-295.53	-108.73
LOCAL FINANCES:			
Change in:			
Total Revenue Receipts	44.78	67.94	72.54
Total Expenditures	35.22	69.03	82.02
Local Budget Deficit	-9.56	1.09	9.48
MACRO ECONOMIC MAGNITUDES:			
Change in:			
Gross domestic Product	1753.49	2980.90	3500.40
Overall Budget Deficit	-2745.38	-6262.88	-16350.51
SOCIAL SECTOR MAGNITUDES:			
Change in:			
Human Capital Index			
(i) Agriculture	-0.103%	-0.135%	-0.055%
(ii) Manufacturing	-0.022%	0.068%	0.115%
(iii) Other Sectors	-0.247%	-0.265%	-0.170%
Public Health Index	0.038%	0.111%	0.163%

also. The impact is limited largely because bulk of the additional funds are likely to be invested in the economic sectors as has traditionally been the case.

Besides substantial reduction in the national fiscal deficit, there is also likely to be higher growth in the economy. By the year 2002-03, the GDP is likely to be higher by over Rs 3½ billion.

6.3.1.2 Increase in Private Investment

Increase in private investment registers its impact via the macro-expenditure block and the macro input block (through an increase in capital stock), there is an increase in production and thereby in gross domestic product. Enhancement in economic activity expands federal/provincial/local tax bases and, therefore, revenues which leads to an increase in expenditures and an improvement in fiscal status of the governmental units. There is an increase in expenditures on social services which via the social sector module leads to an improvement in social sector indices and further accentuates growth in economic activity. Flow Chart 6.2 traces through these linkages.

Table 6.4 shows that a 50 percent increase in private investment improves the fiscal status of all levels of government through a reduction in the budget deficit. The overall national budget deficit is lower by about Rs 8½ billion by the turn of the decade. This improvement is in part achieved through both an increase in revenues and a reduction in expenditures at the federal level. There is an increase in revenues of over Rs 3 bilion in 2002-03. Also, in the long run federal recurring expenditures declines due to a reduction in debt servicing liability. This are lower by Rs 3.8 billion by the year 2002-03. In the case of provincial and local governments, the improvement in fiscal status is primarily because of an increase in the resources.

FLOW CHART 6.2
MACRO POLICY SIMULATIONS
[Dynamic Impact of Higher Private Investment]

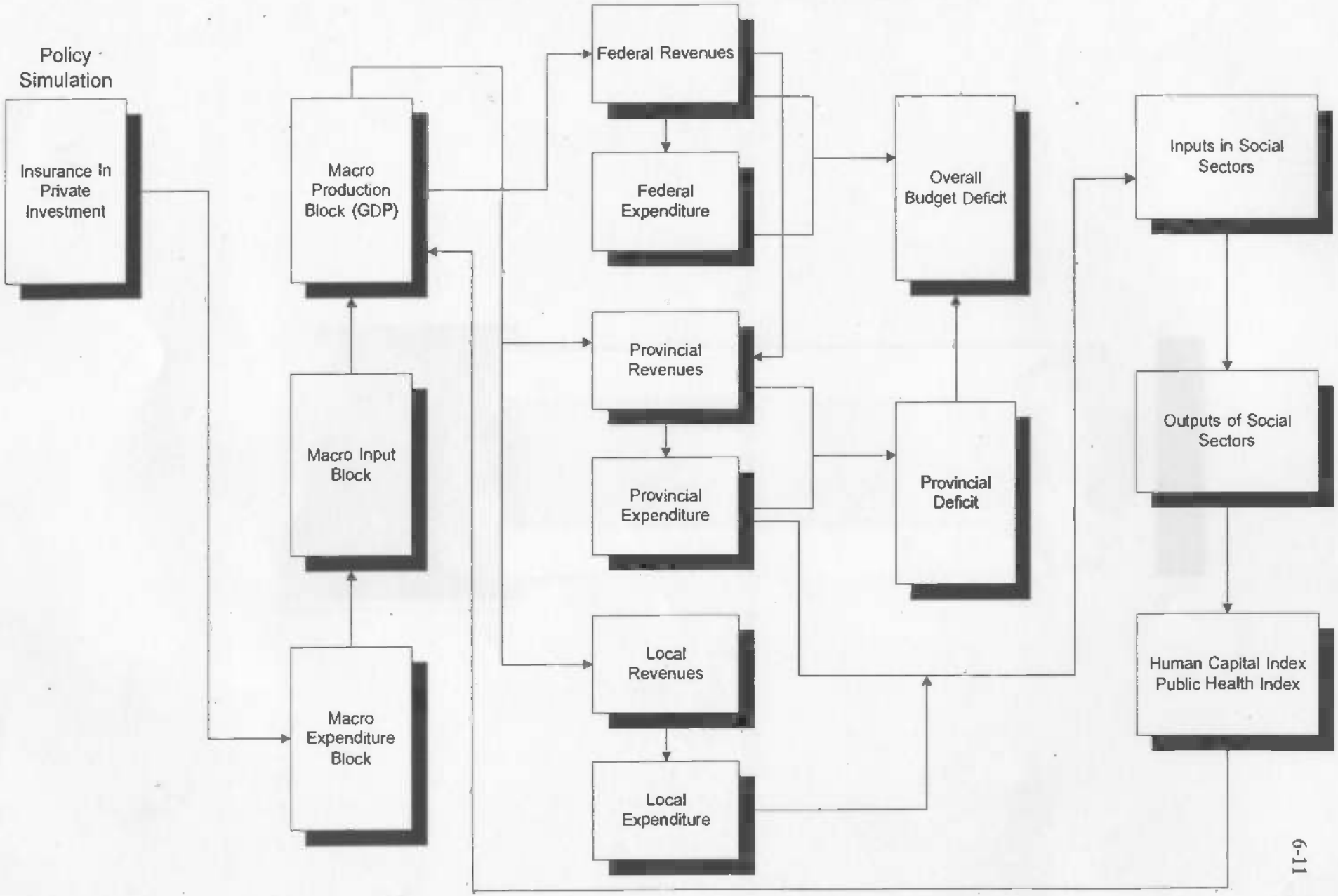


TABLE 6.4

KEY IMPACTS OF AN INCREASE IN PRIVATE INVESTMENT
(50 percent Increase in 1993-94)

(Rs in Million)

FISCAL MAGNITUDES	Short-run 1994-95	Medium-run 1997-98	Long-run 2002-03
FEDERAL FINANCES:			
Change in:			
Revenue Receipts(Net)	142.77	781.31	3149.09
Federal Expenditures	17.93	-170.81	-3772.04
Budget Deficit	-113.14	-882.66	-6525.36
PROVINCIAL FINANCES:			
Change in:			
Provincial Own Revenues	12.24	70.57	308.44
Federal Tax Assignments	154.74	872.72	3584.38
Provincial Recurring Expenditures	50.35	359.01	1820.86
Provincial Development Expenditures	11.68	69.46	395.76
Expenditures on Social Sectors	37.49	267.34	1391.05
Expenditures on Economic Sectors	24.51	161.13	825.60
Provincial Revenue Deficit	-116.62	-584.28	-2071.97
LOCAL FINANCES:			
Change in:			
Total Revenue Receipts	16.49	91.99	394.51
Total Expenditures	12.29	79.65	377.49
Local Budget Deficit	-4.20	-48.34	-17.03
MACRO ECONOMIC MAGNITUDES:			
Change in:			
Gross domestic Product	300.39	2448.88	7514.33
Overall Budget Deficit	-229.76	-1466.95	-8597.32
SOCIAL SECTOR MAGNITUDES:			
Change in:			
Human Capital Index			
(i) Agriculture	0.000%	0.000%	0.049%
(ii) Manufacturing	0.377%	1.064%	1.664%
(iii) Other Sectors	0.000%	0.006%	0.025%
Public Health Index	0.017%	0.103%	0.436%

Higher subnational resources are in part translated into higher expenditures. Expenditures on social sectors by the provincial governments are likely to be higher by over a billion rupees by the turn of the decade. Consequently, the human capital index, particularly of the manufacturing sector, and the public health index improve, stimulating the economy and increasing GDP by over Rs 7½ billion in the long run.

In short, macro economic changes like an increase in foreign aid and higher private investment have an impact on the fiscal position of different tiers of government and thereby affect social sectors also. Positive impact is registered both on the public finances and the economy in the short run and through the general equilibrium framework is likely to accentuate in the long run.

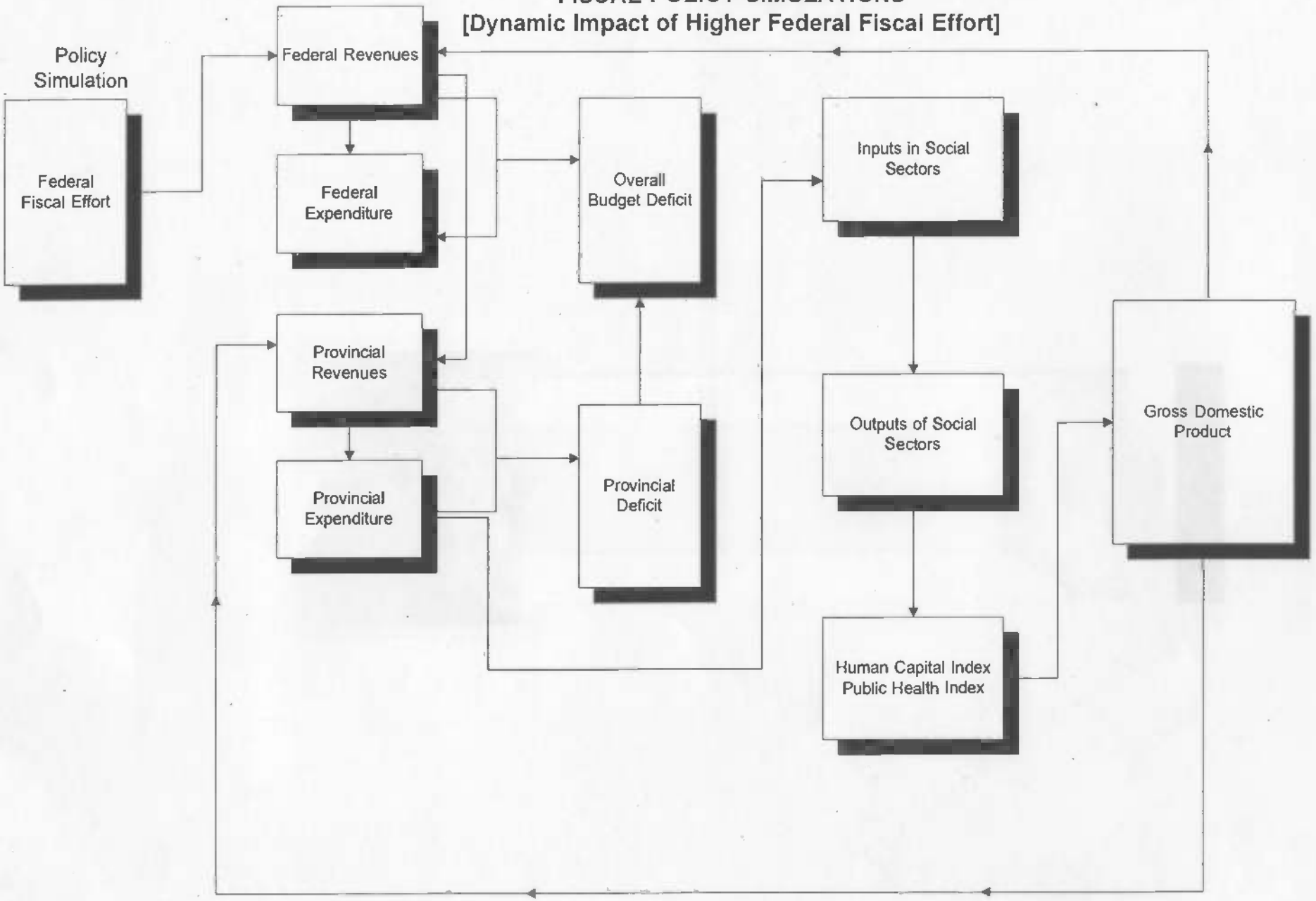
6.3.2. Fiscal Simulations

Following dicsussion highlight the results of fiscal simulations like enhancement in federal and provincial fiscal effort and decentralization of local governments.

6.3.2.1 Enhanced Federal Tax Effort [in Divisible Pool Taxes]

Turning now to fiscal simulations, as can be seen from Flow Chart 6.3, enhanced federal fiscal effort which implies an increase in federal revenues leads to both an increase in federal expenditures and revenue transfers to the provinces through an increase in federal tax assignments. Enhancement in provincial revenues on one hand increases provincial expenditures and on the other hand affects the provincial deficit and the overall (federal and provincial combined) budgetary position. Increased provincial expenditures implies higher expenditures on social sectors, higher inputs in social sectors, higher social sector output and improvement in the human capital index and public health index which in turn has a stimulatory impact on the GDP. Finally, higher GDP mean higher tax bases and therefore higher federal and provincial revenues.

FLOW CHART 6.3
FISCAL POLICY SIMULATIONS
[Dynamic Impact of Higher Federal Fiscal Effort]



In terms of magnitudes, Table 6.5 shows the key fiscal impact of 50 percent additional revenue generation by the federal government in 1993-94. As can be seen from the table an additional revenue generation in divisible pool taxes leads to first, an increase in federal receipts of Rs 1.3 billion, the remaining Rs 4.6 billion are transferred to the provincial government and, second, to a decline in federal budget deficit of Rs 0.8 billion. Increase in provincial revenues in turn leads to an increase of Rs 1.8 billion in provincial expenditures, over Rs 1 billion of which will go to social sectors and the other Rs 0.7 billion to the economic sectors. The provincial revenue deficit declines by Rs 3.3 billion and the overall public sector deficit declines by over Rs 4 billion in the short run. The long run impact is stronger and there is a decline of Rs 25 billion in overall budgetary deficit by 2002-03. Therefore, on the whole, in the long run higher mobilisation by federal governments leads to a reduction in provincial deficit by Rs 5.6 billion and in the overall budget deficit by as much as a Rs 25 billion. The impact on GDP growth rate is however relatively small of about Rs 5 billion.

6.3.2.2 Higher Provincial Fiscal Effort [both in Taxes and Non-Taxes]

The dynamic impacts of higher provincial efforts on provincial finances are likely to be similar to those of a higher fiscal effort by federal government in divisible pool taxes as can be seen from Flow Chart 6.4. That is, it simulates expenditures, improves provincial deficit and, therefore, the overall budget deficit, leads to higher expenditures on social sectors, higher social sector output and therefore improves the social sector indices.

Table 6.6 shows the consequences of additional revenue mobilisation* by the provincial governments. The immediate impact is that it increases provincial expenditures by Rs 0.5 billion and improves provincial fiscal position by reducing revenue deficit by Rs 0.8 billion. The overall fiscal position of federal and provincial governments combined is vastly better as the overall

TABLE 6.5

KEY IMPACTS OF ENHANCED FEDERAL FISCAL EFFORT
(50 percent increase in Federal Taxes in 1993-94)

(Rs in Million)

FISCAL MAGNITUDES	Short-run 1994-95	Medium-run 1997-98	Long-run 2002-03
FEDERAL FINANCES:			
Change in:			
Revenue Receipts(Net)	1301.11	1591.75	2705.55
Federal Expenditures	122.86	-2986.45	-18903.66
Budget Deficit	-848.87	-3954.21	-19695.49
PROVINCIAL FINANCES:			
Change in:			
Provincial Own Revenues	143.31	338.41	747.64
Federal Tax Assignments	4597.90	6692.68	12063.28
Provincial Recurring Expenditures	1440.60	3338.31	7205.19
Provincial Development Expenditures	329.37	623.98	1913.79
Expenditures on Social Sectors	1071.75	2528.82	5613.54
Expenditures on Economic Sectors	698.18	1433.47	3505.56
Provincial Revenue Deficit	-3300.61	-3692.78	-5605.75
LOCAL FINANCES:			
Change in:			
Total Revenue Receipts	7.10	13.85	36.82
Total Expenditures	4.13	13.04	36.45
Local Budget Deficit	-2.97	-0.80	-0.36
MACRO ECONOMIC MAGNITUDES:			
Change in:			
Gross domestic Product	1202.69	2097.74	4622.46
Overall Budget Deficit	-4149.47	-7647.00	-25301.24
SOCIAL SECTOR MAGNITUDES:			
Change in:			
Human Capital Index			
(i) Agriculture	0.007%	0.054%	0.317%
(ii) Manufacturing	0.007%	0.040%	0.191%
(iii) Other Sectors	0.000%	0.025%	0.235%
Public Health Index	0.321%	1.074%	1.984%

FLOW CHART 6.4
FISCAL POLICY SIMULATIONS
[Dynamic Impact of Provincial Fiscal Effort]

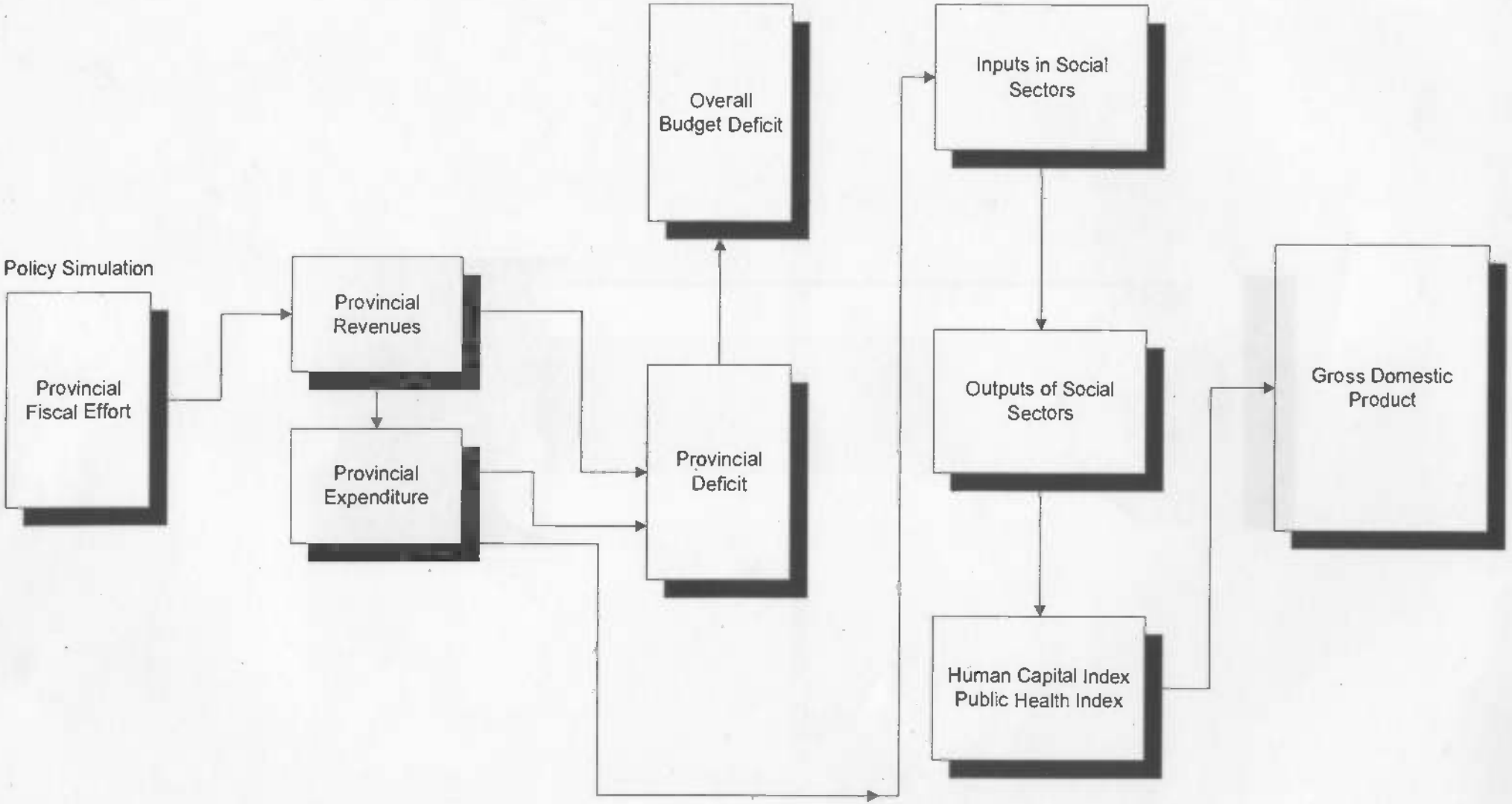


TABLE 6.6

KEY IMPACTS OF HIGHER FISCAL EFFORTS BY PROVINCIAL GOVERNMENT

(Rupees)

FISCAL MAGNITUDES	Short-run 1994-95	Medium-run 1997-98	Long-run 2002-03
FEDERAL FINANCES:			
Change in:			
Revenue Receipts(Net)	83.64	95.06	111.46
Federal Expenditures	-58.14	-817.18	-5372.01
Budget Deficit	-62.96	-691.72	-4663.66
PROVINCIAL FINANCES:			
Change in:			
Provincial Own Revenues	1144.23	2301.52	6176.96
Federal Tax Assignments	102.92	169.32	404.24
Provincial Recurring Expenditures	439.14	1121.72	3353.33
Provincial Development Expenditures	78.81	220.53	819.83
Expenditures on Social Sectors	319.62	851.32	2584.03
Expenditures on Economic Sectors	198.29	454.93	1589.17
Provincial Revenue Deficit	-808.00	-1349.12	-3227.88
LOCAL FINANCES:			
Change in:			
Total Revenue Receipts	2124.34	3379.26	6991.96
Total Expenditures	249.27	811.85	2492.66
Local Budget Deficit	-1875.05	-2567.40	-4499.30
MACRO ECONOMIC MAGNITUDES:			
Change in:			
Gross domestic Product	1149.50	1571.66	2994.47
Overall Budget Deficit	-870.95	-2040.84	-7891.53
SOCIAL SECTOR MAGNITUDES:			
Change in:			
Human Capital Index			
(i) Agriculture	0.007%	0.040%	0.186%
(ii) Manufacturing	0.007%	1.020%	1.104%
(iii) Other Sectors	0.007%	0.031%	0.170%
Public Health Index	0.221%	0.716%	0.457%

budget deficit is lower by Rs 0.9 billion. The long-run impact is even higher as the overall budgetary deficit in 2002-03 is lower by about Rs 8 billion. Therefore, irrespective of whether resources are mobilised by the federal or provincial governments, additional generation leads to a substantial improvement in the fiscal position of the public sector in the long-run while simultaneously permitting a significant increase in expenditures.

6.3.2.3 Decentralisation to Local Governments

The third fiscal simulation involves decentralisation of primary education to local governments in the country with grant transfers from the federal ADP routed through the provincial governments. Flow Chart 6.5 shows that this involves an increase in local expenditures, transfer of revenues from the federal to provincial governments to be passed on the local governments, increased local expenditures on social sectors (specifically education) and an improvement in the output of education with a subsequent impact on human capital index. Concurrently, since primary education has become a local responsibility, there will be savings in provincial expenditures which will improve the provincial and overall consolidated budgetary position by reducing deficits.

In terms of magnitudes the impacts of decentralisation with grant in aid to the local government will increase local expenditures by Rs 1.2 billion, lower provincial expenditures by Rs 0.6 billion, thereby reducing provincial revenue deficit by Rs 0.2 billion (see Table 6.7). In the long run, federal budget deficit increases by Rs 0.8 billion (due to servicing of debt incurred to give grant in aid to local governments); provincial revenue deficit declines by over Rs 2 billion; and therefore there is a substantial improvement in the overall budgetary position of the public sector. The overall budget deficit is lower by Rs 1.4 billion. Notice that while the combined provincial and federal budget deficit has declined by Rs 1.4 billion local budget deficit has increased by only Rs

FLOW CHART 6.5
FISCAL POLICY SIMULATIONS
[Dynamic Impact of Decentralisation to Local Governments]

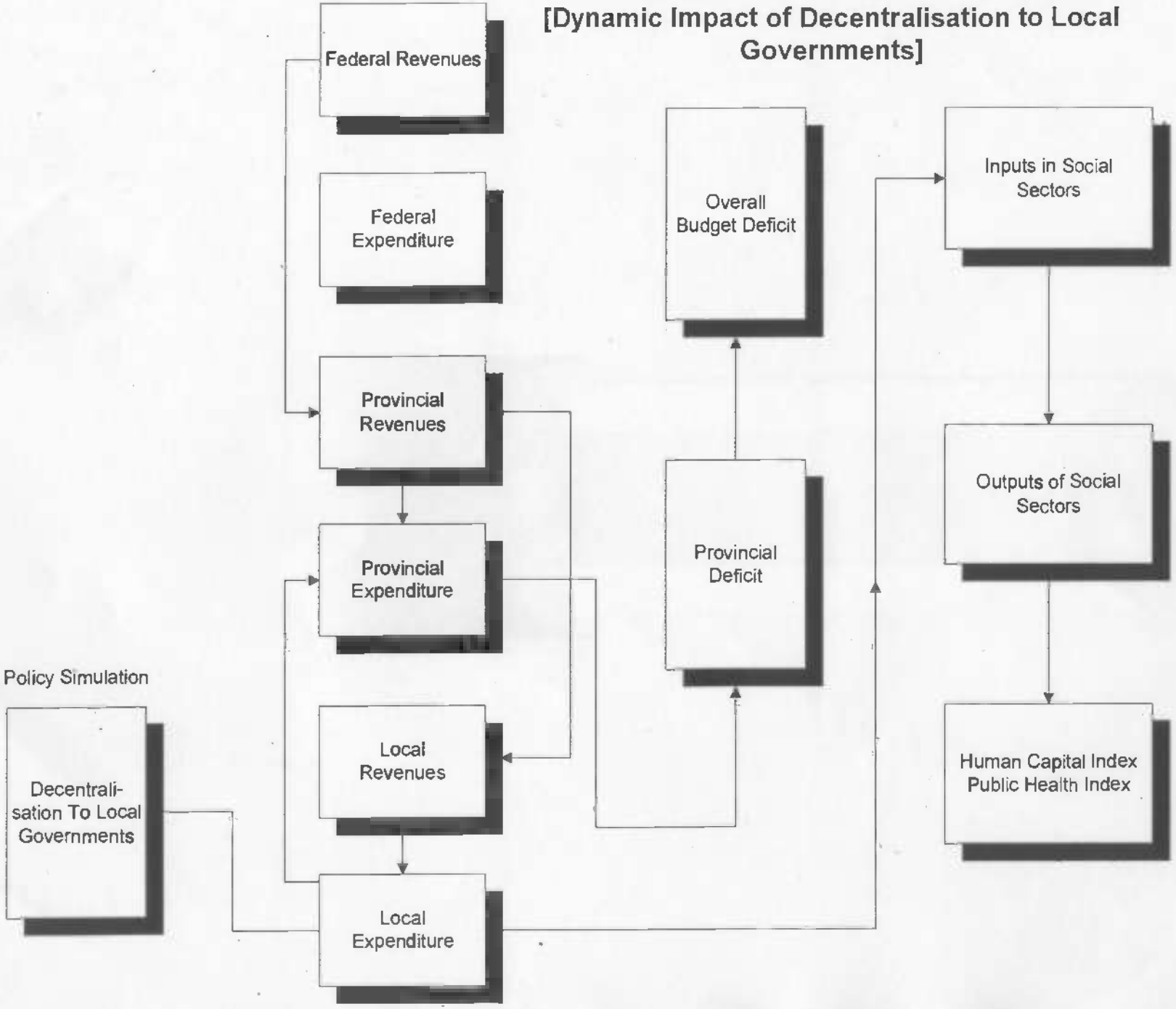


TABLE 6.7

KEY IMPACTS OF DECENTRALISATION TO LOCAL GOVERNMENT

(Rs in Million)

FISCAL MAGNITUDES	Short-run 1994-95	Medium-run 1997-98	Long-run 2002-03
FEDERAL FINANCES:			
Change in:			
Revenue Receipts(Net)	-269.39	-872.34	-2144.79
Federal Expenditures	-1767.90	-2099.11	-3222.34
Budget Deficit	+194.65	546.69	+788.18
PROVINCIAL FINANCES:			
Change in:			
Provincial Own Revenues	-35.89	-90.93	-169.42
Federal Tax Assignments	-96.34	-284.26	-423.76
Provincial Recurring Expenditures	-366.65	-1099.89	-2788.96
Provincial Development Expenditures	-207.14	-426.5	-834.0
Expenditures on Social Sectors	-242.93	-549.83	-1091.77
Expenditures on Economic Sectors	-330.61	-976.61	-2531.54
Provincial Revenue Deficit	-234.41	-724.70	-2195.79
LOCAL FINANCES:			
Change in:			
Total Revenue Receipts	2138.16	2655.77	3376.70
Total Expenditures	1204.11	2402.53	3599.69
Local Budget Deficit	-934.03	-253.23	223.00
MACRO ECONOMIC MAGNITUDES:			
Change in:			
Gross domestic Product	-679.65	-1395.08	-1170.04
Overall Budget Deficit	-39.76	-178.02	-1407.59
SOCIAL SECTOR MAGNITUDES:			
Change in:			
Human Capital Index			
(i) Agriculture	0.052%	0.195%	0.541%
(ii) Manufacturing	0.022%	1.033%	1.191%
(iii) Other Sectors	0.103%	0.283%	0.670%
Public Health Index	0.013%	-0.036%	0.084%

0.2 billion indicating that on the whole the fiscal status of the three tiers of governments in the country has improved following decentralisation. This is because, unlike provincial governments, local government are largely self-financing entities and are not dependant on transfer from higher tiers of government to finance recurring liabilities. As opposed to this provincial governments depend on federal transfers to finance 80 percent of their current liabilities. A process of decentralisation of primary education is likely, therefore, to improve the overall budgetary position because higher recurring expenditures of local governments are financed by own resources and not by incremental borrowing.

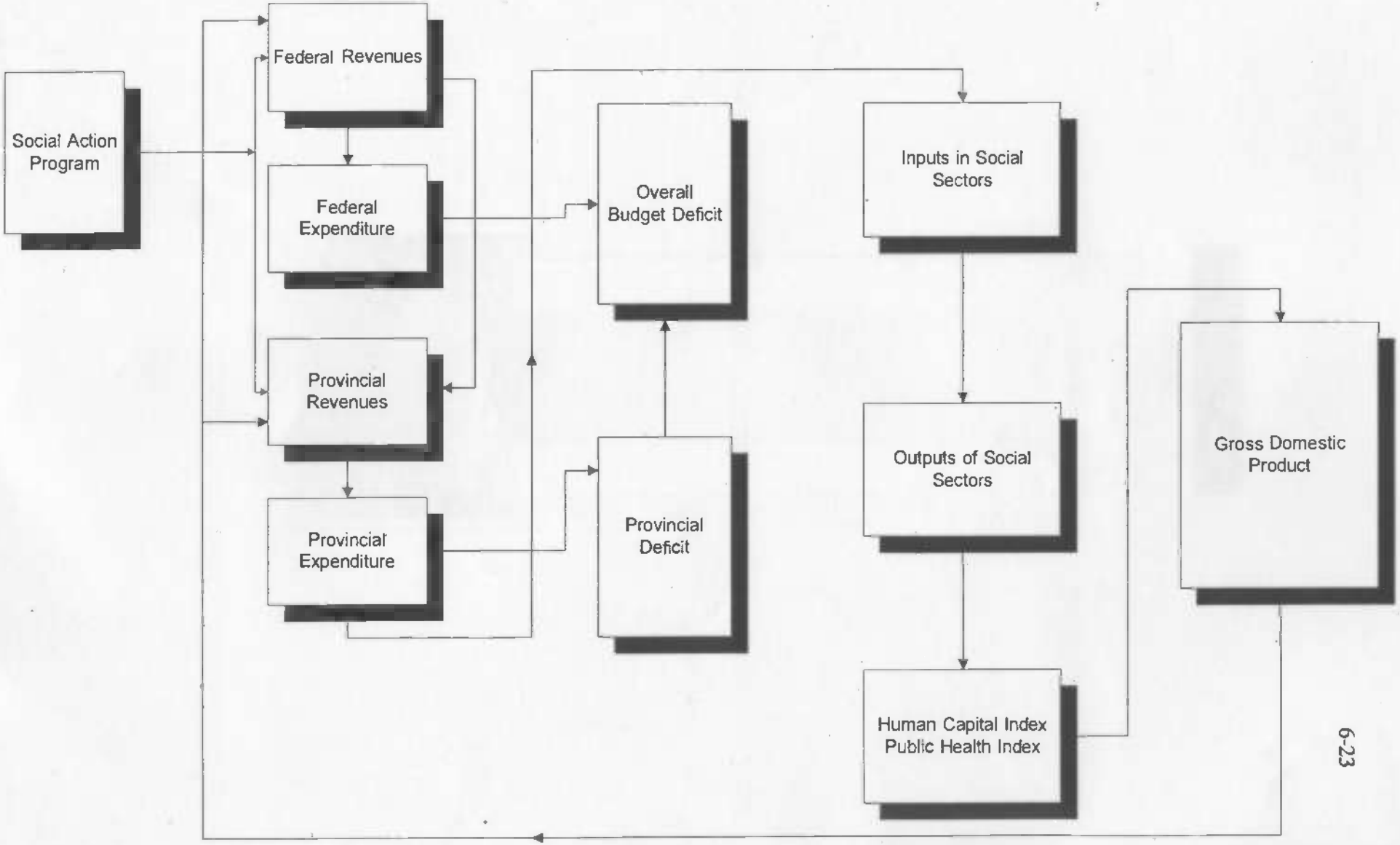
6.3.3 Social Sector Simulations

Social Action Program (SAP) and changes in investment priorities simulations in the social sector may considered to be `the finding of the model'. Following we discussed some intresting results of each simulation.

6.3.3.1 Social Action Program (SAP)

Now we turn to one of the most important policy simulations that we have undertaken using our model. That is the impact of SAP. SAP has a direct impact on federal resources since it receives foreign aid to finance part (50 percent) of the earmarked allocations for social development; these funds are transferred to the provincial governments as loans and therefore there is a direct impact on provincial resources; provincial expenditures are affected and therefore, provincial deficit and overall budget deficit is affected (see Chart 6.6). Concurrently, the federal government now has to service more foreign debt and therefore, the overall budget deficit is again affected. Earmarking of funds leads to higher expenditures on social sectors, higher inputs and higher output of social sectors and thereby an improvement in social sector indices which in turn has a positive impact on the GDP and subsequently on the federal and provincial tax bases.

FLOW CHART 6.6
SOCIAL SECTOR POLICY SIMULATIONS
[Dynamic Impact of Social Action Program]



We have estimated the impact of a Rs 3.0 billion SAP transfer to the provincial governments spread over three years, the results of which are presented in Table 6.8. The table shows that both the federal and provincial budget deficits increase due to the SAP both in the short and the long-run. In the short run, there is Rs 0.4 billion increase in federal expenditure (largely due to the increased debt servicing burden) and a Rs 1.2 billion increase in provincial expenditures, bulk of which are recurring in nature. Rs 1 billion of these additional expenditures are incurred on social sectors. There is an overall increase of Rs 1.3 billion in the combined federal and provincial budget deficit. Therefore, it appears that SAP is not financially sustainable and will significantly deteriorate the fiscal position of both the federal and provincial governments in the absence of efforts by both levels of government to mobilise resources or economize on expenditures in other sectors.

The deterioration in the fiscal status of the provincial governments will adversely affect the quality of service provision in the years to come. Schools/hospitals built by the SAP funds will not produce commensurate output simply because of inadequate recurring inputs of teachers and doctor. For example, teachers to school ratio declines by 6.5 percent over the period of analysis. Similarly, doctors to hospital ratio declines by over 13 percent. It is therefore clear that launching of SAP type programmes, involving higher development outlays in the social sectors, cannot be effective unless the subsequent requirement of recurring expenditure are provided for. Notice, however, that even though it adversely affects the public finances in the country, SAP eventually stimulates growth and leads to higher GDP in the long run (see Table 6.8).

An alternative strategy which is currently being proposed is for funding under the SAP to simultaneously include a recurring expenditure component. However, the model very convincingly demonstrates that this strategy may also fail. It appears, on the basis of past

TABLE 6.8

KEY IMPACTS OF SOCIAL ACTION PROGRAM

(Rs in Million)

	Short-run	Medium-run	Long-run
FISCAL MAGNITUDES	**1994-95**	**1997-98**	**2002-03**
FEDERAL FINANCES:			
Change in:			
Revenue Receipts(Net)	208.29	421.36	1087.55
Federal Expenditures	383.35	1538.62	4538.10
Budget Deficit	1101.66	1081.74	3550.04
PROVINCIAL FINANCES:			
Change in:			
Provincial Own Revenues	1.66	6.18	79.47
Federal Tax Assignments	4.41	53.30	507.77
Provincial Recurring Expenditures	211.28	433.15	879.84
Provincial Development Expenditures	1009.36	63.68	162.57
Expenditures on Social Sectors	1010.75	81.47	305.49
Expenditures on Economic Sectors	209.85	415.35	736.91
Provincial Revenue Deficit	-205.22	-364.67	-292.58
LOCAL FINANCES:			
Change in:			
Total Revenue Receipts	0.73	7.54	63.33
Total Expenditures	0.53	6.28	56.98
Local Budget Deficit	-0.20	-1.26	-6.35
MACRO ECONOMIC MAGNITUDES:			
Change in:			
Gross domestic Product	-239.08	228.05	1637.59
Overall Budget Deficit	1306.88	1446.40	3842.62
SOCIAL SECTOR MAGNITUDES:			
Change in:			
Human Capital Index			
(i) Agriculture	0.022%	0.114%	0.420%
(ii) Manufacturing	0.007%	1.020%	1.164%
(iii) Other Sectors	0.014%	0.086%	0.365%
Public Health Index	13.845%	29.146%	51.312%

behaviour that when SAP comes to an end (after three to five years) there is a sharp decline in the rate of growth of recurring expenditures in the social sector due to the end of earmarked funding. Consequently, we are likely to observe the same imbalance in inputs into the social sectors, with steep declines in teachers to schools ratio and in the doctors to hospital ratio.

The question then arises what is the sustainable strategy for social sector development? The answer lies in launching of SAP type programmes concurrently with a derive for higher resource mobilisation. We have analysed the impact of implementation of SAP alongwith the provincial resource mobilisation package from our previous simulation. The results are presented in Table 6.9. The table shows that even though the overall budget deficit increases in the short run, it declines by Rs 2.7 billion in the long run. As far as the provincial governments are concerned, there is a decline in provincial revenue deficit both in the short and in the long-run. Also, notice the increase in growth in the economy reflected by the increase in GDP. The bottom line is that programs like the SAP which not only have social benefits but long term economic benefits in terms of GDP growth will only be successful if an effort is made by the provincial governments to concurrently enhance their own revenues otherwise such programs adversely affect the public finances of the country.

6.3.3.2 Change in Provincial Investment Priorities

Perhaps another way of developing social sectors in the country is to partly divert existing funds from economic to social sectors. We have analysed the impact of such a change in public sector investment priorities. Chart 6.7 traces the key impacts. Changed priorities will imply higher expenditures to social sectors, higher inputs and higher outputs from the social sector; these will lead to an improvement in social sector indices and have an expansionary effect on GDP. Simultaneously, there will be lower investment in economic sectors which will have a

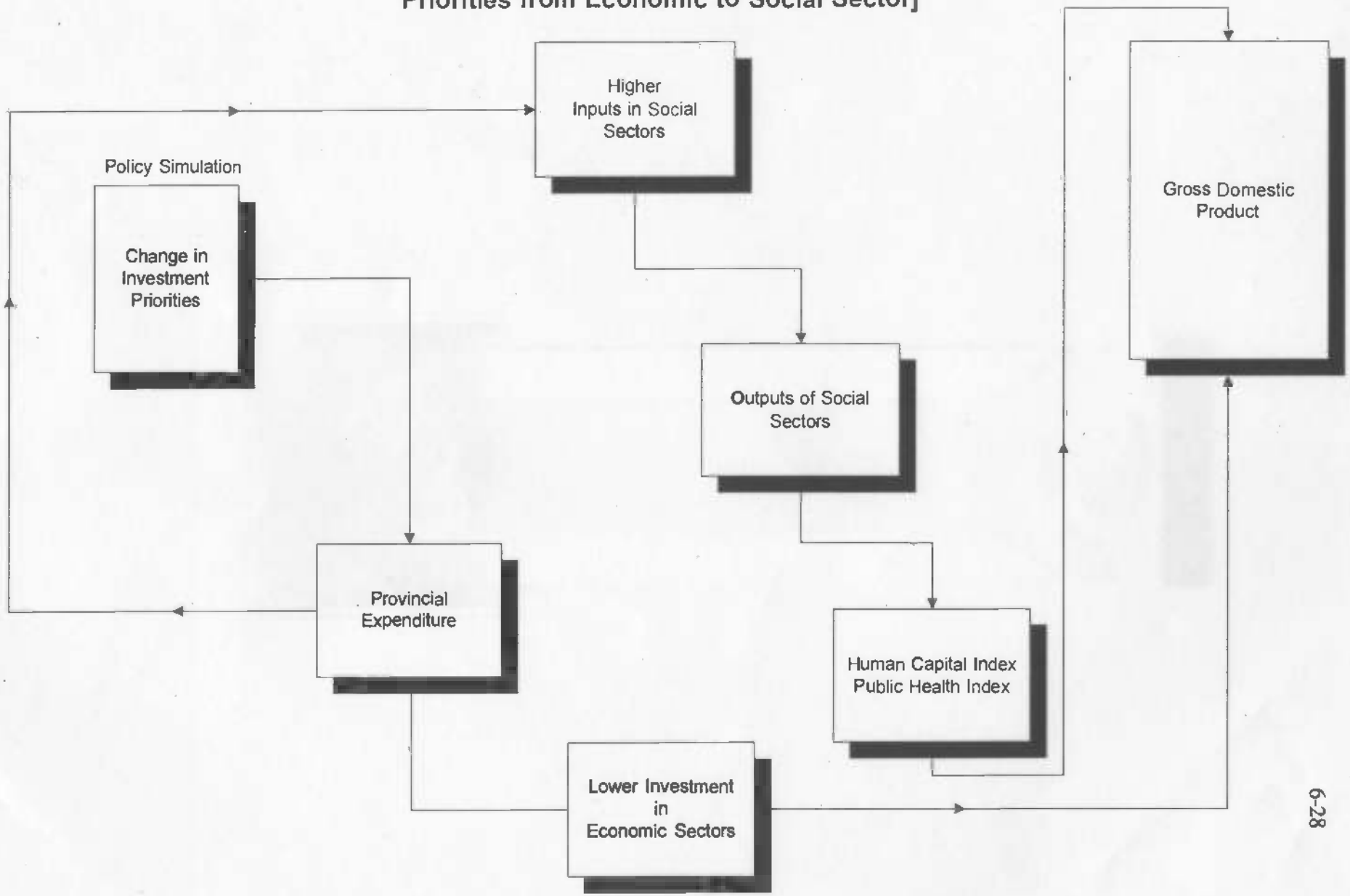
TABLE 6.9

KEY IMPACTS OF SAP WITH HIGHER PROVINCIAL RESOURCE MOBILISATION

(Rs in Million)

FISCAL MAGNITUDES	Short-run 1994-95	Medium-run 1997-98	Long-run 2002-03
FEDERAL FINANCES:			
Change in:			
Revenue Receipts(Net)	214.15	354.88	824.53
Federal Expenditures	323.20	825.36	-112025.70
Budget Deficit	1108.63	641.07	21.48
PROVINCIAL FINANCES:			
Change in:			
Provincial Own Revenues	1130.31	2292.57	6210.14
Federal Tax Assignments	30.17	94.26	607.11
Provincial Recurring Expenditures	617.28	1482.12	4047.73
Provincial Development Expenditures	1082.34	269.81	934.82
Expenditures on Social Sectors	1306.23	877.34	2746.21
Expenditures on Economic Sectors	393.27	874.60	2236.33
Provincial Revenue Deficit	-543.21	-904.78	-2669.51
LOCAL FINANCES:			
Change in:			
Total Revenue Receipts	3.61	11.49	73.43
Total Expenditures	3.04	10.29	66.88
Local Budget Deficit	-0.57	-1.22	-6.55
MACRO ECONOMIC MAGNITUDES:			
Change in:			
Gross domestic Product	65.37	719.57	2821.33
Overall Budget Deficit	565.42	-263.72	-2748.01
SOCIAL SECTOR MAGNITUDES:			
Change in:			
Human Capital Index			
(i) Agriculture	0.022%	0.135%	0.530%
(ii) Manufacturing	0.007%	1.033%	0.299%
(iii) Other Sectors	0.014%	0.099%	0.455%
Public Health Index	13.949%	29.437%	52.075%

FLOW CHART 6.7
SOCIAL SECTOR POLICY SIMULATIONS
[Dynamic Impact of Changes in Investment Priorities from Economic to Social Sector]



contractionary affect on GDP. Therefore, it is not readily clear what the net impact on growth will be of a change in public sector investment priorities. There will, however, be clear social gains due to improvements in the quality of life.

Perhaps the most important conclusion of our model simulation which is being highlighted for the first time in Pakistan is that in the long run, investment in social sectors stimulates higher growth in the economy than the same amount of investment in economic infrastructure. Table 6.10 shows that diversion of funds from economic to social sectors, in the long run result in higher economic growth. This is a very important conclusion because the common perception of policy maker is generally that investment in social infrastructure is non-productive and only has social gains while investment in economic sectors are relatively more productive and lead to higher growth. This perception is true in the short run but is not valid in the long run framework. There is in fact a U-shaped curve in existence as shown in Flow Chart 6.8. In the initial years diversion of funds lead to a decline in GDP. However, after the eighth year there is a change in the trend and the GDP shoots up and there are substantial gains to be had from diversion of funds in terms of GDP growth.

TABLE 6.10

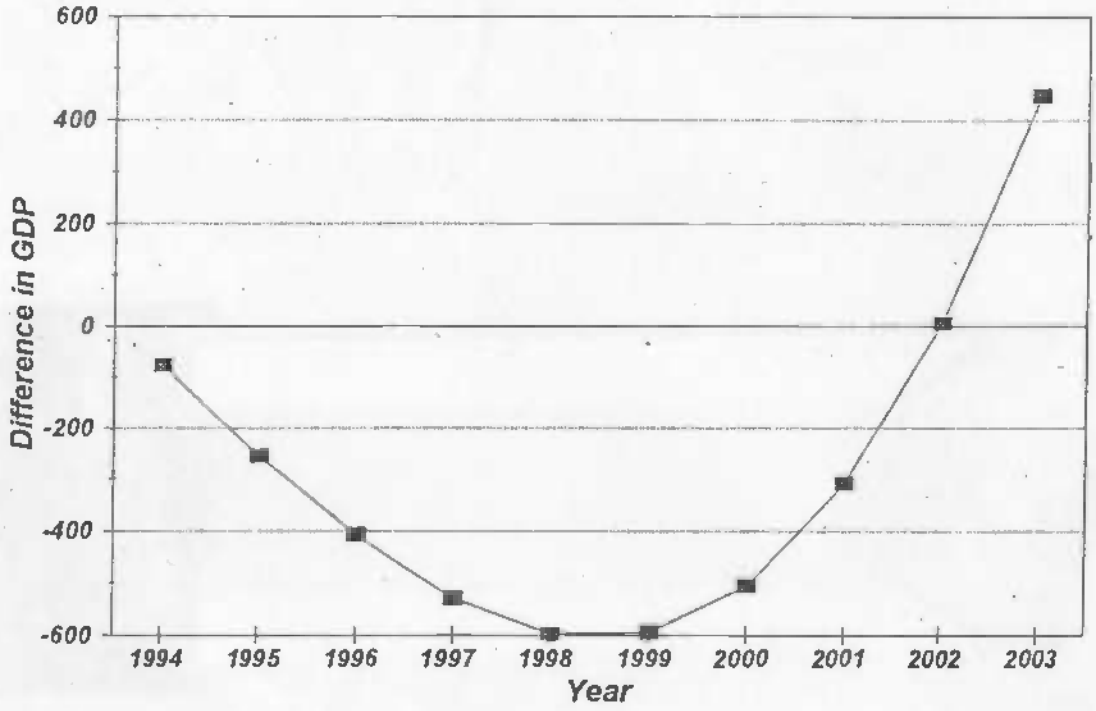
KEY IMPACTS OF CHANGE IN INVESTMENT PRIORITIES
[Division from Economic to Social Sectors]

(Rs in Million)

FISCAL MAGNITUDES	Short-run 1994-95	Medium-run 1997-98	Long-run 2002-03
FEDERAL FINANCES:			
Change in:			
Revenue Receipts(Net)	-226.44	-511.38	1105.57
Federal Expenditures	-653.20	-456.57	3510.22
Budget Deficit	187.18	1051.41	3662.05
PROVINCIAL FINANCES:			
Change in:			
Provincial Own Revenues	1.26	-6.46	24.83
Federal Tax Assignments	-137.43	-455.29	-344.19
Provincial Recurring Expenditures	156.40	490.85	1598.34
Provincial Development Expenditures	613.92	960.64	1257.40
Expenditures on Social Sectors	604.30	874.67	1186.96
Expenditures on Economic Sectors	165.98	576.81	1668.80
Provincial Revenue Deficit	-292.55	-952.53	-1917.70
LOCAL FINANCES:			
Change in:			
Total Revenue Receipts	-13.71	-23178.51	-80.48
Total Expenditures	-9.53	-46.53	-82.81
Local Budget Deficit	4.19	3.82	-2.33
MACRO ECONOMIC MAGNITUDES:			
Change in:			
Gross domestic Product	-522.22	-597.71	446.18
Overall Budget Deficit	479.74	1967.92	5579.77
SOCIAL SECTOR MAGNITUDES:			
Change in:			
Human Capital Index			
(i) Agriculture	0.022%	0.108%	0.360%
(ii) Manufacturing	0.015%	0.066%	0.284%
(iii) Other Sectors	0.041%	0.191%	0.550%
Public Health Index	0.088%	1.157%	1.679%

CHART 6.8

GDP* CONSEQUENCES
SAP OF RS. 1000 MILLION (FOR 3 YEARS)



* Difference in the projected GDP under the policy and base simulations.

CHAPTER 7

CONCLUSIONS

This report has described the feature of the Integrated Social Policy and Macroeconomic Planning Model for Pakistan, which attempts perhaps for the first time an integration into a conventional macroeconomic model of public finance at different levels (federal, provincial and local) of government and explicitly models the process of interaction between social development and economic growth. The resulting 196 equation model consists of three large modules relating to the macro economy, public finance and the social sectors respectively. Individual chapters of this report give the specification, data base development, estimated results, validation and policy simulations of the model.

Given the features of the model it has the potential for answering a large number of key policy questions like, for example, the long-run macroeconomic consequences of a shift in investment priorities away from physical infrastructure to the social sectors, impact of investment programs like the SAP on the level and quality of service provision and on the financial position of provincial governments, consequences of the process of decentralization and privatization of the provision of social services, etc. Therefore, the model can act not only as standard forecasting tool, but also as a critical input into the planning and budgeting process at the federal and provincial levels. It will enable proper analysis in a medium -- to long-run setting of the impact of changes in the level and composition of public sector development plans and of different strategies of resource mobilisation and expenditure management on the macro economy, on the budgetary position and on the key social indicators.

The process of development of a large and complex model like the one presented in this report must, however, be seen as evolutionary in character. The model will be refined and developed

even further following detailed interaction with officials of the planning, finance and other relevant minister/departments of the federal and provincial governments and with international experts. We believe that development of the Integrated Social Policy and Macroeconomic Planning Model will constitute a milestone in the process of social development in Pakistan by promoting analysis within a comprehensive and rational framework of the implications of different forms of financing and modalities of delivery of social services in the country.

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APPENDIX A

SPECIFICATION OF THE MODEL

SPECIFICATION OF THE INTEGRATED REVENUE AND EXPENDITURE PLANNING MODEL FOR THE SOCIAL SECTORS 1995

A. MACRO ECONOMIC PRODUCTION BLOCK

A-1 Gross Domestic Product

$$Y^r = Y_A^r + Y_M^r + Y_{OT}^r + IT^r - SUB^r$$

A-2 Value Added in Agriculture Sector

$$Y_A^r = f(\bar{A}, SPIE_F, SPIE_P, HCI_A)$$

A-3 Value Added in Manufacturing Sector

$$Y_M^r = f(L_M, HCI_M, SPIE_F, K_M^r)$$

A-4 Value Added in Other Sectors

$$Y_{OT}^r = f(K_{OT}^r, HCI_{OT}, SPIE_F, L_{OT})$$

A-5 Indirect Taxes

$$IT^r = \left[\frac{IT_F + IT_P + IT_L}{PI_{WG}/100}\right]$$

A-6 Subsidies

$$SUB^r = \frac{\overline{SUB}}{PI_{WG}/100}$$

A-7 Gross National Product

$$Y_N^r = Y^r + NFI^r$$

A-8 Net Factor Income

$$NFI^r = \overline{RM}^r - \left[\frac{INTED_F}{\overline{PI}_{IMP}/100}\right]$$

B. MACRO INPUT DEMAND BLOCK

B-1 Capital Stock in Agriculture Sector

$$K_A^r = (1 - \delta_1) K_{A-1}^r + I_{PA}^r$$

B-2 Capital Stock in Manufacturing Sector

$$K_M^r = (1 - \delta_2) K_{M-1}^r + I_{PM}^r$$

B-3 Capital Stock in Other Sectors

$$K_{OT}^r = (1 - \delta_3) K_{OT-1}^r + I_{POT}^r$$

B-4 Labour Input Demand in Agriculture Sector

$$L_A = f(Y_A^r, L_{A-1}, K_A^r, SPIE_F, SPIE_P)$$

B-5 Labour Input Demand in Manufacturing Sector

$$L_M = f(Y_M^r, K_M^r)$$

B-6 Labour Input Demand in Other Sectors

$$L_{OT} = f(Y_{OT}^r, SPIE_F, SPIE_P)$$

B-7 Total Labonr Input Demand

$$LABIND = L_A + L_M + L_{OT}$$

B-8 Total Labour Force

$$LABFO = f(\overline{POP10}_M, \overline{POP10}_F)$$

B-9 Unemployment Rate

$$U = \left[1 - \frac{LABIND}{LABFO}\right] \cdot 100$$

C. MACRO ECONOMIC EXPENDITURE BLOCK

C-1 Total Consumption Expenditure

$$C^r = C_p^r + C_g^r$$

C-2 Private Consumption Expenditure

$$C_p^r = f\left[Y^r, \frac{ITR_F}{PI_{WG}}, \overline{RM}^r\right]$$

C-3 Public Consumption Expenditure

$$C_g^r = \left[\frac{RE_F + RE_P + RE_L - INTDD_F - INTED_F - REP_F - DS_P - \overline{GP}_F}{PI_{GC} / 100} \right]$$

C-4 Total Investment

$$I^r = I_p^r + I_g^r$$

C-5 Total Private Investment

$$I_p^r = I_{PA}^r + I_{PM}^r + I_{POT}^r$$

C-6 Private Investment in Agriculture Sector

$$I_{PA}^r = f(\overline{RM}^r, SPIE_P, SPIE_{P-1}, I_{PA-1}^r)$$

C-7 Private Investment in Manufacturing Sector

$$I_{PM}^r = f(X_g^r, \overline{INT}_A, DEEI^r, I_{PM-1}^r, X_{g-1}^r)$$

C-8 Private Investment in Other Sectors

$$I_{POT}^r = f(Y_{OT}^r, SPIE_P, I_{POT-1}^r, Y_{OT-1}^r)$$

C-9 Real Public Investment

$$I_g^r = \left[\frac{DE_F + DE_P + DE_L + \overline{DEAUB}}{PI_{GI} / 100} \right]$$

C-10 Domestic Resource Gap

$$RG^r = C^r + I^r - Y^r$$

C-11 Change in Stock

$$STOK^r = X^r - IMP^r + RG^r$$

D. FEDERAL REVENUE BLOCK

D-1 Net Revenue Receipt

$$NRR_F = GTR_F + DS_P + \overline{RNT}_F - DPT_F$$

D-2 Gross Federal Tax Revenues

$$GTR_F = IT_F + ITR_F + \overline{HYDRO} + \overline{SG}_F$$

D-3 Indirect Taxes

$$IT_F = ETR_F + STR_F + MTR_F + \overline{SUR}_F$$

D-4 Excise Tax Revenue

$$ETR_F = f\left[(Z + IFE_{F-1}),\ \overline{DESCET}_F,\ Y_M^r + PI_M,\ Z \right]$$

$$Where \quad Z = (Y_M^r + PI_M + Y_{OT}^r + PI)$$

D-5 Sales Tax Revenue

$$STR_F = f\left[(Z + IFS_{F-1}),\ \overline{DESCST}_F,\ Z \right]$$

$$Where \quad Z = (Y_M^r + PI_M + IMP_g^r + \overline{PI}_{IMP} + MTR_F)$$

D-6 Import Duties

$$MTR_F = f\left[(Z + IFM_{F-1}),\ \overline{DESCMT}_F,\ Z \right]$$

$$Where \quad Z = (IMP_g^r + \overline{PI}_{IMP})$$

D-7 Income Tax Revenue

$$ITR_F = f\left[(IFI_{F-1} + (Y^r - Y_A^r) + PI),\ \overline{DESCIT}_F,\ (Y^r - Y_A^r) + PI \right]$$

D-8 Revenue Transfer to Provincial Government

$$DPT_F = DPTX_F + \bar{\beta} \cdot \overline{SUR}_F + \overline{HYDRO} + \overline{SG}_F$$

D-9 Divisible Pool Transfers

$$DPTX_F = f(ITR_F,\ STR_F,\ ETR_F)$$

E. FEDERAL EXPENDITURE BLOCK

E-1 Total Recurring Expenditure

$$RE_F = \overline{DEF}_F + INTDD_F + INTED_F + \overline{GP}_F + ORE_F + REP_F$$

E-2 Interest on Domestic Debt

$$INTDD_F = f\left[DDEBT_{F-1}, \overline{INT}_A \right]$$

E-3 Interest on External Debt

$$INTED_F = f(EDEBT_{F-1}, INTED_{F-1})$$

E-4 Repayment of External Debt

$$REP_F = f(EDEBT_F)$$

E-5 Other Recurring Expenditure

$$ORE_F = f(NRR_F)$$

E-6 Federal Development Expenditure

$$DE_F = DE - DE_P$$

E-7 Annual Development Programme

$$DE = f(DE_{-1}, \overline{GFB}_F, NRR_F, GRR_P)$$

F. FEDERAL DEFICIT BLOCK

F-1 Outstanding External Debt

$$EDEBT_F = EDEBT_{F-1} + \overline{GFB}_F - REP_F$$

F-2 Outstanding Internal Debt

$$DDEBT_F = DDEBT_{F-1} + BDOV - \overline{GFB}_F + REP_F$$

F-3 Federal Budget Deficit

$$BDEF_F = DE + RE_F - NRR_F - \overline{SAB}_F - REP_F$$

G. PROVINCIAL REVENUE BLOCK

G-1 Gross Revenue Receipt

$$GRR_P = TT_P + TNT_P + DPT_F + \overline{GP}_F$$

G-2 Total Tax Revenue

$$TT_P = IT_P$$

G-3 Indirect Tax Revenue

$$IT_P = SD_P + MVT_P + 0.15 * PT + OIT_P$$

G-4 Revenue from Stamp Duties

$$SD_P = f(Y' * PI)$$

G-5 Revenue from Motor Vehicle Tax

$$MVT_P = f(Y' * PI)$$

G-6 Revenue from Property Tax

$$PT = f(Y'_{OT} * PI, \overline{RM}^r * \overline{PI}_{IMP})$$

G-7 Revenue from Other Taxes

$$OIT_P = f(Y' * PI)$$

G-8 Total Non-Tax Revenue

$$TNT_P = RED_P + RH_P + ROT_P$$

G-9 User Charges in Education

$$RED_P = \overline{CRE}_P * REED_P$$

G-10 User Charges in Health

$$RH_P = \overline{CRH}_P * REH_P$$

G-11 User Charges in Other Sectors

$$ROT_P = \overline{CROT}_P * REOT_P$$

H. PROVINCIAL EXPENDITURE BLOCK

H-1 Total Provincial Recurring Expenditure

$$RE_P = REED_P + REH_P + REOTS_P + REOT_P + DS_P$$

H-2 Recurring Expenditure on Education

$$REED_P = f(REED_{P-1}, GRR_P)$$

H-3 Recurring Expenditure on Health

$$REH_P = f(DETF_P, REH_{P-1}, GRR_P)$$

H-4 Recurring Expenditure on Other Social Sectors

$$REOTS_P = f(GRR_P, REOTS_{P-1})$$

H-5 Recurring Expenditure on Other Sectors

$$REOT_P = f(REOT_{P-1}, GRR_P, DETF_P)$$

H-6 Debt Servicing by Provincial Governments

$$DS_P = f(DETF_P, DS_{P-1})$$

H-7 Development Transfers by Federal Government

$$DETF_P = f(DE_P, RSD_{P-1})$$

H-8 Total Provincial Development Expenditure

$$DE_P = DES_P + DEOT_P + \overline{GR}_P$$

H-9 Provincial Development Expenditure on Social Services

$$DES_P = DEED_P + DEH_P + DEOTS_P$$

H-10 Development Expenditure on Education

$$DEED_P = f(DETF_P, GRR_P, DEED_{P-1})$$

H-11 Development Expenditure on Health

$$DEH_P = f(GRR_P, DEH_{P-1})$$

H-12 Development Expenditure on Other Social Sectors

$$DEOTS_P = f(DETF_P, GRR_P, DEOTS_{P-1})$$

H-13 Development Expenditure on Other Sectors

$$DEOT_P = f(GRR_P, DEOT_{P-1})$$

I PROVINCIAL AND TOTAL BUDGET DEFICIT BLOCK

I-1 Provincial Revenue Surplus or Deficit

$$RSD_P = GRR_P - RE_P$$

I-2 Use of Cash Balance by Province

$$UCB_P = DE_P - RSD_P - DETF_P$$

I-3 Total Budget Deficit

$$BDOV = BDEF_F - RSD_P$$

J. LOCAL REVENUE BLOCK

J-1 Local Gross Revenue Receipt

$$GRR_L = TT_L + TNT_L + \overline{GR}_P$$

J-2 Indirect Local Tax Revenue

$$IT_L = TT_L$$

J-3 Total Tax Revenue

$$TT_L = OCT_L + ET_L + 0.85 * PT + OT_L$$

J-4 Revenue from Octroi

$$OCT_L = f\left[C_P^r * PI * \frac{(L_M + L_{OT})}{LABIND} + Y_M^r * PI\right]$$

J-5 Revenue from Export Tax

$$ET_L = f(Y_M^r * PI_M + Y_A^r * PI, ET_{L-1})$$

J-6 Revenue from Other Taxes

$$OT_L = f(Y^r * PI)$$

J-7 Non-Tax Revenue

$$TNT_L = \overline{CRNT}_L * RE_L$$

K. LOCAL EXPENDITURE BLOCK

K-1 Total Recurring Expenditure

$$RE_L = REED_L + REH_L + REOTS_L + REOT_L$$

K-2 Local Recnrring Expenditure on Education

$$REED_L = f(GRR_L, \overline{CAR}_L, REED_{L-1})$$

K-3 Local Recurring Expenditure on Health

$$REH_L = f(GRR_L, \overline{CAR}_L, REH_{L-1})$$

K-4 Local Recurring Expenditure on Other Social Sectors

$$REOTS_L = f(GRR_L, \overline{CAR}_L, REOTS_{L-1})$$

K-5 Local Recurring Expenditure on Other Sectors

$$REOT_L = f(GRR_L, \overline{CAR}_L, REOT_{L-1})$$

K-6 Total Development Expenditure

$$DE_L = DEED_L + DEH_L + DEOTS_L + DEOT_L$$

K-7 Development Expenditure on Education

$$DEED_L = f(GRR_L, \overline{CAR}_L, DEED_{L-1})$$

K-8 Development Expenditure on Health

$$DEH_L = f(GRR_L, \overline{CAR}_L, DEH_{L-1})$$

K-9 Development Expenditure on Other Social Sectors

$$DEOTS_L = f(DEOTS_{L-1}, GRR_L, \overline{CAR}_L)$$

K-10 Revenue Surplus/Deficit

$$RSD_L = GRR_L - RE_L$$

K-11 Budget Deficit

$$BDEF_L = DE_L - RSD_L - \overline{CAR}_L$$

K-12 Development Expenditure on Other Sectors

$$DEOT_L = f(DE_L, DEOT_{L-1})$$

L TRADE BLOCK

L-1 Total Export Demand Function

$$X^r = X_g^r + \overline{X_s^r}$$

L-2 Real Exports Supply for Goods

$$X_g^r = f\left[\frac{PI}{(\overline{PI}_W \cdot e^r)}, Y^r\right]$$

L-3 Total Imports

$$IMP^r = IMP_g^r + IMP_s^r$$

L-4 Real Import Demand for Goods

$$IMP_g^r = f\left[\frac{\overline{PI}_{IMP}}{PI}, Y_N^r, IMP_{g-1}^r\right]$$

L-5 Real Import Demand for Services

$$IMP_s^r = f\left[(X_g^r + IMP_g^r), \frac{\overline{PI}_{IMP}}{PI}, I_g^r\right]$$

L-6 Current Account Gap

$$CAG = \left[(IMP^r \cdot \overline{PI}_{IMP}) - (X^r \cdot \overline{PI}_X) - (NFI^r \cdot \overline{PI}_{IMP})\right]$$

M. MONETARY BLOCK

M-1 Money Supply

$$M = M_{-1} + \Delta M$$

M-2 Change in Money Supply

$$\blacktriangle M = f\left[(BDOV + UCB_P - \overline{GFB}_F + REP_F),\ (CAG - \overline{GFB}_F + REP_F),\ (Y_N^r - Y_{N-1}^r + PI)\right]$$

N PRICE BLOCK

N-1 Implicit GDP Deflator

$$PI = f\left[\overline{PI}_{IMP},\ \frac{M_{-1}}{Y_{N-1}^r},\ PI_{-1}\right]$$

N-2 Manufacturing Price Index

$$PI_M = f\left[PI,\ (ETR_F + STR_F)\right]$$

N-3 Price Index for Wholesale General

$$PI_{WG} = f(PI)$$

N-4 Price Index for Government Consumption

$$PI_{GC} = f\left[PI,\ PI_{GC-1}\right]$$

N-5 Price Index for Government Investment

$$PI_{GI} = f\left[\overline{PI}_{IMP},\ PI_{GI-1}\right]$$

N-6 Real Exchange Rate

$$e^r = f(CAG,\ \overline{GFB}_F,\ REP_F,\ e_{-1}^r)$$

N-7 Nominal Exchange Rate

$$e = e^r \left[\frac{\overline{PI}_W}{PI}\right]$$

O HUMAN CAPITAL INDEX BLOCK

O-1 Total Development Expenditure on Education

$$DEED = DEED_P + DEED_L$$

O-2 Development Expenditure on Male Primary Education

$$DEEDPR_M = f(DEED, DEEDPR_{M-1})$$

O-3 Development Expenditure on Male Secondary Education

$$DEEDSE_M = f(DEED, DEEDSE_{M-1})$$

O-4 Development Expenditure on Female Primary Education

$$DEEDPR_F = f(DEED, DEEDPR_{F-1})$$

O-5 Development Expenditure on Female Secondary Education

$$DEEDSE_F = f(DEED, DEEDSE_{F-1})$$

O-6 Development Expenditure on Higher Education

$$DEEDHE = DEED - DEEDPR_M - DEEDSE_M - DEEDPR_F - DEEDSE_F$$

O-7 Total Recurring Expenditure on Education

$$REED = REED_P + REED_L$$

O-8 Recurring Expenditure on Male Primary Education

$$REEDPR_M = f(REEDPR_{M-1}, REED)$$

O-9 Recurring Expenditure on Male Secondary Education

$$REEDSE_M = f(REEDSE_{M-1}, REED)$$

O-10 Recurring Expenditure on Female Primary Education

$$REEDPR_F = f(REEDPR_{F-1}, REED)$$

O-11 Recurring Expenditure on Female Secondary Education

$$REEDSE_F = f(REEDSE_{F-1}, REED)$$

O-12 Recurring Expenditure on Higher Education

$$REEDHE = REED - REEDPR_M - REEDSE_M - REEDPR_F - REEDSE_F$$

O-13 New Male Primary School

$$NPS_M = DEEDPR_M / \overline{UCPS}_M$$

O-14 New Female Primary School

$$NPS_F = DEEDPR_F / \overline{UCPS}_F$$

O-15 New Male Secondary School

$$NSS_M = DEEDSE_M / \overline{UCSS}_M$$

O-16 New Female Secondary School

$$NSS_F = DEEDSE_F / \overline{UCSS}_F$$

O-17 Total Male Primary School

$$SPS_M = SPS_{M-1} + NPS_M$$

O-18 Total Female Primary School

$$SPS_F = SPS_{F-1} + NPS_F$$

O-19 Total Male Secondary School

$$SSS_M = SSS_{M-1} + NSS_M$$

O-20 Total Female Secondary School

$$SSS_F = SSS_{F-1} + NSS_F$$

O-21 Total Male Primary Teacher

$$TEPS_M = REEDPR_M / \overline{WPS}_M$$

O-22 Total Female Primary Teacher

$$TEPS_F = REEDPR_F / \overline{WPS}_F$$

O-23 Total Male Secondary Teacher

$$TESS_M = REEDSE_M / \overline{WSS}_M$$

O-24 Total Female Secondary Teacher

$$TESS_F = REEDSE_F / \overline{WSS}_F$$

O-25 Enrollment Ratio for Males at Primary Level

$$PRENR_M = f\left[\frac{SPS_M}{\overline{SGAPR}_M}, \frac{TEPS_M}{SPS_M}, PRENR_{M-1}, \frac{Y^r}{\overline{POP10}_M + \overline{POP10}_F}\right]$$

O-26 Enrollment Ratio for Females at Primary Level

$$PRENR_F = f\left[\frac{SPS_F}{\overline{SGAPR}_F}, \frac{TEPS_F}{SPS_F}, PRENR_{F-1}, LR_F\right]$$

O-27 Enrollment Ratio for Males at Secondary Level

$$SEENR_M = f\left[\frac{SSS_M}{\overline{SGASE}_M}, \frac{TESS_M}{SSS_M}, SEENR_{M-1}, \frac{Y^r}{\overline{POP10}_M + \overline{POP10}_F}\right]$$

O-28 Enrollment Ratio for Females at Secondary Level

$$SEENR_F = f\left[\frac{SSS_F}{\overline{SGASE}_F}, \frac{TESS_F}{SSS_F}, SEENR_{F-1}, LR_F\right]$$

O-29 Number of Male Enrollment at Primary Level

$$NENPR_M = PRENR_M * \overline{SGAPR}_M$$

O-30 Number of Female Enrollment at Primary Level

$$NENPR_F = PRENR_F * \overline{SGAPR}_F$$

O-31 Number of Male Enrollment at Secondary Level

$$NENSE_M = SEENR_M * \overline{SGASE}_M$$

O-32 Number of Female Enrollment at Secondary Level

$$NENSE_F = SEENR_F * \overline{SGASE}_F$$

O-33 Output of Male From Primary Level

$$OUTPR_M = \overline{SHPR}_M * NENPR_M$$

O-34 Output of Female From Primary Level

$$OUTPR_F = \overline{SHPR}_F * NENPR_F$$

O-35 Output of Male From Secondary Level

$$OUTSE_M = \overline{SHSE}_M * NENSE_M$$

O-36 Output of Female From Secondary Level

$$OUTSE_F = \overline{SHSE}_F * NENSE_F$$

O-37 Male Literate

$$NLR_M = NLR_{M-1} (1 - \delta_4) + OUTPR_M (1 - \delta_5)$$

O-38 Male Literacy Ratio

$$LR_M = \frac{NLR_M}{\overline{POP10}_M}$$

O-39 Female Literate

$$NLR_F = NLR_{F-1} (1 - \delta_6) + OUTPR_F (1 - \delta_7)$$

O-40 Female Literacy Ratio

$$LR_F = \frac{NLR_F}{\overline{POP10}_F}$$

O-41 Male Labor Force Entrants with Primary Education or In-complete Secondary Education

$$LFEPR_M = \overline{LFPR}_M * OUTPR_M$$

O-42 Female Labor Force Entrants with Primary Education or In-complete Secondary Education

$$LFEPR_F = \overline{LFPR}_F * OUTPR_F$$

O-43 Male Labor Force Entrants with Secondary Education

$$LFESE_M = \overline{LFSE}_M * OUTSE_M$$

O-44 Female Labor Force Entrants with Secondary Education

$$LFESE_F = \overline{LFSE}_F * OUTSE_F$$

O-45 Number of Male Workers with Primary Education

$$NWPR_M = NWPR_{M-1} (1 - \delta_8) + LFEPR_M$$

O-46 Number of Female Workers with Primary Education

$$NWPR_F = NWPR_{F-1} (1 - \delta_8) + LFEPR_F$$

O-47 Number of Male Workers with Secondary Education

$$NWSE_M = NWSE_{M-1} (1 - \delta_9) + LFESE_M$$

O-48 Number of Female Workers with Secondary Education

$$NWSE_F = NWSE_{F-1} (1 - \delta_9) + LFESE_F$$

O-49 Human Capital Index in Agriculture Sector

$$HCI_A = \left[\frac{HCIL_A}{L_A} \right]$$

O-50 Human Capital Index in Manufacturing Sector

$$HCI_M = \left[\frac{HCIL_M}{L_M} \right]$$

O-51 Human Capital Index in Other Sectors

$$HCI_{OT} = \left[\frac{HCIL_{OT}}{L_{OT}} \right]$$

O-52 Labor Force Adjusted for Human Capital in Agriculture Sector

$$HCIL_A = f \left[(NWPR_M + NWPR_F), (NWSE_M + NWSE_F) \right]$$

O-53 Labor Force Adjusted for Human Capital in Manufacturing Sector

$$HCIL_M = f \left[(NWPR_M + NWPR_F), (NWSE_M + NWSE_F) \right]$$

O-54 Labor Force Adjusted for Human Capital in Other Sectors

$$HCIL_{OT} = f\left[(NWPR_M + NWPR_F), (NWSE_M + NWSE_F)\right]$$

P. PUBLIC SECTOR HEALTH INDEX BLOCK

P-1 Total Development Expenditure on Health

$DEH = DEH_P + DEH_L$

P-2 Development Expenditure on Hospital Beds

$DEBED = f(DEH_{-6}, PTHOS_{-4})$

P-3 Development Expenditure on Rural Health Centre (including BHUs)

$DERHC = f(DEH_{-2}, DERHC_{-1})$

P-4 Development Expenditure on Other Facilities (MCH, TBC, SHC)

$DEHOT = DEH - DEBED - DERHC$

P-5 Total Recurring Expenditure on Health

$REH = REH_P + REH_L$

P-6 Recurring Expenditure on Doctors in Hospital

$REDOH = f(REH, REDOH_{-1})$

P-7 Recurring Expenditure on Nurses in Hospital

$RENUH = f(REH, RENUH_{-1})$

P-8 Recurring Expenditure on Paramedics in Hospital

$REPAH = f(REH, REPAH_{-1})$

P-9 Recurring Expenditure on Doctors in RHCs

$REDOR = f(REH, REDOR_{-1})$

P-10 Recurring Expenditure on Paramedics in RHCs

$REPAR = f(REH, REPAR_{-1})$

P-11 Recurring Expenditure on Other Facilities (MCH, TBC, SHC)

REHOT = REH - REDOH - RENUH - REPAH - REDOR - REPAR

P-12 New Hospital Beds

NHBED = DEBED / $\overline{UCBED}$

P-13 Total Beds in Hospital

THBED = $THBED_{-1}$ + NHBED

P-14 New RHCs

NRHC = DERHC / $\overline{UCRHC}$

P-15 Additional RHCs

TRHC = $TRHC_{-1}$ + NRHC

P-16 Total Doctors in Hospitals

TDOH = REDOH / $\overline{UCDOH}$

P-17 Total Nurses in Hospitals

TNUH = RENUH / $\overline{UCNUH}$

P-18 Total Paramedics in Hospitals

TPAH = REPAH / $\overline{UCPAH}$

P-19 Total Doctors in RHCs

TDOR = REDOR / $\overline{UCDOR}$

P-20 Total Paramedics in RHCs

TPAR = REPAR / $\overline{UCPAR}$

P-21 Patients Treated Production Function for Hospitals

PTHOS = f (TDOH, TNUH, TPAH, THBED)

P-22 Patients Treated Production Function for RHCs

$$PTRHC = f(TDOR, TPAR, TRHC)$$

P-23 Public Sector Health Index

$$PHI = f\left[PTHOS, PTRHC, \frac{DEOTS_P + DEOTS_L + DEHOT}{PI_{GI} \cdot 100} + \frac{REOTS_L + REHOT + REOTS_P}{PI_{GI} \cdot 100}\right]$$

Q. INDEX OF ECONOMIC INFRASTRUCTURE BLOCK

Q-1 Total Public Investment in Economic Infrastructure

$$DEEI_F = \overline{DEAUB} + DE_F + DEOT_L$$

Q-2 Total Provincial Investment in Economic Infrastructure

$$DEEI_P = DEOT_P$$

Q-3 Real Public Investment in Economic Infrastructure

$$DEEI_F^r = \frac{DEEI_F}{PI_{GI}}$$

Q-4 Real Provincial Investment in Economic Infrastructure

$$DEEI_P^r = \frac{DEEI_P}{PI_{GI}}$$

Q-5 Total Real Public Investment in Economic Infrastructure

$$DEEI^r = DEEI_F^r + DEEI_P^r$$

Q-6 Stock of Public Infrastructure (Economic)

$$SPIE_F = SPIE_{F-1}(1 - \delta_{10}) + DEEI_F^r$$

Q-7 Stock of Provincial Infrastructure (Economic)

$$SPIE_P = SPIE_{P-1}(1 - \delta_{10}) + DEEI_P^r$$

R. INDEX OF FISCAL EFFORT BLOCK

R-1 Index of Fiscal Effort in Direct Taxes

$$IFI_F = IFI_{F-1} + \left[\frac{\overline{DESCIT}_F}{Y^r \cdot PI/100}\right]$$

R-2 Index of Fiscal Effort in Excise Duty

$$IFE_F = IFE_{F-1} + \left[\frac{\overline{DESCET}_F}{Y_M^r \cdot PI_M/100}\right]$$

R-3 Index of Fiscal Effort in Sales Taxes

$$IFS_F = IFS_{F-1} + \left[\frac{\overline{DESCST}_F}{IMP_R^r \cdot \overline{PI}_{IMP}/100 + MTR_F \cdot Y_M^r \cdot PI_M/100}\right]$$

R-4 Index of Fiscal Effort in Import Duties

$$IFM_F = IFM_{F-1} + \left[\frac{\overline{DESCMT}_F}{IMP_R^r \cdot \overline{PI}_{IMP}/100}\right]$$

APPENDIX B

ESTIMATED OLS REGRESSION RESULTS OF THE MODEL

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

A. MACRO ECONOMIC PRODUCTION BLOCK

A-1 Gross Domestic Product

$$Y^r = Y_A^r + Y_M^r + Y_{OT}^r + IT^r - SUB^r$$

A-2 Value Added in Agriculture Sector

$$\ln Y_A^r = \underset{(34.0)^*}{+ 4.640} + \underset{(19.8)^*}{0.649 \ln \overline{A}} + \underset{(7.62)^*}{0.350 \ln \left[SPIE_P + SPIE_F\right]} + 0.003\ HCI_A$$

$$\underset{(-3.55)^*}{- 0.083\ DA2_{84}} \underset{(-4.63)^*}{- 0.072\ DA2_{85\text{-}87}} + \underset{(4.85)^*}{0.083\ DA2_{74,92}}$$

0.99	2.54	433.4	0.022	11.3

A-3 Value Added in Manufacturing Sector

$$\ln Y_M^r = \underset{(4.13)^*}{+ 1.276} + \underset{(9.13)^*}{0.309 \ln L_M} + 0.686 \ln \left[K_M^r + SPIE_F\right]$$

$$+ \underset{(2.84)^*}{0.004\ HCI_M} \underset{(-8.66)^*}{- 0.201\ DA3_{76\text{-}81}} + \underset{(1.83)^{**}}{0.079\ DA3_{81}}$$

0.99	1.44	717	0.039	10.6

A-4 Value Added in Other Sectors

$$\ln Y_{OT}^r = \underset{(3.15)^*}{+ 1.642} + \underset{(13.9)^*}{0.750 \ln \left[K_{OT}^r + SPIE_F\right]} + \underset{(2.64)^*}{0.001\ HCI_{OT}}$$

$$+ \underset{(6.09)^*}{0.249 \ln L_{OT}} + 0.131\ DA4_{73\text{-}76}$$

0.99	1.90	2352	0.020	11.9

A-5 Indirect Taxes

$$IT^r = \left[\frac{IT_F + IT_P + IT_L}{PI_{WG} / 100}\right]$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

A-6 **Subsidies**

$$SUB^r = \frac{\overline{SUB}}{PI_{WG} / 100}$$

A-7 **Gross National Product**

$$Y_N^r = Y^r + NFI^r$$

A-8 **Net Factor Income**

$$NFI^r = \overline{RM}^r - \left[\frac{INTED_F}{\overline{PI}_{IMP} / 100}\right]$$

B. MACRO INPUT DEMAND BLOCK

B-1 **Capital Stock in Agriculture Sector**

$$K_A^r = (1 - \delta_1) K_{A-1}^r + I_{PA}^r$$

B-2 **Capital Stock in Manufacturing Sector**

$$K_M^r = (1 - \delta_2) K_{M-1}^r + I_{PM}^r$$

B-3 **Capital Stock in Other Sectors**

$$K_{OT}^r = (1 - \delta_3) K_{OT-1}^r + I_{POT}^r$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
B-4 Labour Input Demand in Agriculture Sector					
$\ln L_A = \underset{(-2.40)^*}{-1.669} + \underset{(2.17)^{**}}{0.187} \ln Y_A^r + \underset{(2.07)^{**}}{0.485} \ln L_{A-1} \underset{(-0.32)}{-0.024} \ln K_A^r + \underset{(0.70)}{0.091} \ln \left[SPIE_F + SPIE_P\right] \underset{(-7.19)^*}{-0.117} DB4_{93} + \underset{(2.10)^{**}}{0.029} DB4_{86}$	0.99	1.40	533.9	0.010	2.59
B-5 Labour Input Demand in Manufacturing Sector					
$\ln L_M = \underset{(-3.62)^*}{-1.228} + \underset{(12.2)^*}{0.484} \ln Y_M^r \underset{(-4.56)^*}{-0.254} \ln K_M^r + \underset{(5.95)^*}{0.012} \ln K_M^r * DB5_{75\text{-}79} + \underset{(4.02)^*}{0.099} DB5_{80\text{-}81} + \underset{(2.45)^{**}}{0.068} DB5_{91\text{-}92}$	0.96	1.67	80.52	0.030	1.23
B-6 Labour Input Demand in Other Sectors					
$\ln L_{OT} = \underset{(-34.1)^*}{-4.628} + \underset{(6.44)^*}{0.358} \ln Y_{OT}^r + \underset{(4.42)^*}{0.201} \ln \left[SPIE_F + SPIE_P\right] \underset{(-7.95)^*}{-0.123} DB6_{86} + \underset{(1.48)}{0.024} DB6_{79}$	0.99	1.50	1199	0.014	2.16
B-7 Total Labour Input Demand					
$LABIND = L_A + L_M + L_{OT}$					

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
B-8 Total Labour Force					
$\ln LABFO = + 0.660 \ln \overline{POP10}_M + 0.291 \ln \overline{POP10}_F$ (9.47)* (4.02)* $+ 0.035\ DB8_{77\text{-}84} - 0.032\ DB8_{91\text{-}93}$ (8.31)* (-4.57)*	0.99	2.72	2299	0.008	3.27
B-9 Unemployment Rate					
$U = \left[1 - \frac{LABIND}{LABFO}\right] * 100$					

C. MACRO ECONOMIC EXPENDITURE BLOCK

C-1 Total Consumption Expenditure

$$C^r = C_p^r + C_g^r$$

C-2 Private Consumption Expenditure

$$C_P^r = + 57298 + 0.568 \left[Y^r - \frac{ITR_F}{PI_{WG} / 100}\right] + 0.379\ \overline{RM}^r + 15918\ DC2_{88\text{-}89}$$

(6.93)* (37.9)* (1.66) (2.77)*

$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
0.99	2.06	577.5	7327	254346

C-3 Public Consumption Expenditure

$$C_g^r = \left[\frac{RE_F + RE_P + RE_L - INTDD_F - INTED_F - REP_F - DS_P - \overline{GP}_F}{PI_{GC} / 100}\right]$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
C-4 Total Investment					
$I^r = I_p^r + I_g^r$					
C-5 Total Private Investment					
$I_p^r = I_{PA}^r + I_{PM}^r + I_{POT}^r$					
C-6 Private Investment in Agriculture Sector					
$I_{PA}^r = -870.1 + 0.059\ \overline{RM}^r + 0.005\ [SPIE_F + SPIE_P]$ (-1.67) (3.24)* (2.32)*					
$+ 0.567\ I_{PA\text{-}1}^r + 2133\ DC6_{76}$ (3.42)* (4.27)*	0.94	1.81	60.01	420.4	5051
C-7 Private Investment in Manufacturing Sector					
$I_{PM}^r = + 2228 + 0.023\ [X_g^r - X_{g\text{-}1}^r] - 583.8\ \overline{INT}_A$ (0.72) (0.53) (-1.73)					
$+ 0.207\ DEEI^r + 0.861\ I_{PM\text{-}1}^r + 3096\ DC7_{92}$ (3.12)* (11.3)* (2.96)*	0.98	1.98	151.5	871.9	8699
C-8 Private Investment in Other Sectors					
$I_{POT}^r = + 2972 + 0.162\ I_{POT\text{-}1}^r + 0.095\ [Y_{OT}^r - Y_{OT\text{-}1}^r] + 0.026\ SPIE_F$ (4.38)* (1.23) (1.80)** (6.72)*					
$+ 1716\ DC8_{81} + 2153\ DC8_{75} - 1511\ DC8_{88}$ (3.61)* (4.19)* (-3.07)*	0.99	2.04	226.1	456.8	12812

EQUATION NUMBER	$\overline{R^2}$	D.W.	F	SER	$\overline{Y}$

C-9 Real Public Investment

$$I_g' = \left[\frac{DE_F + DE_P + DE_L + \overline{DEAUB}}{PI_{GI} / 100}\right]$$

C-10 Domestic Resource Gap

$$RG' = C' + I' - Y'$$

C-11 Change in Stock

$$STOK' = X' - IMP' + RG'$$

D. FEDERAL REVENUE BLOCK

D-1 Net Revenue Receipt

$$NRR_F = GTR_F + DS_P + \overline{RNT}_F - DPT_F$$

D-2 Gross Federal Tax Revenues

$$GTR_F = IT_F + ITR_F + \overline{HYDRO} + \overline{SG}_F$$

D-3 Indirect Taxes

$$IT_F = ETR_F + STR_F + MTR_F + \overline{SUR}_F$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
D-4 Excise Tax Revenue					
$ETR_F = +\underset{(6.70)^*}{5157} + \underset{(3.02)^*}{0.052}\left[\frac{Y_M^r \cdot PI_M}{100} + \frac{Y_{OT}^r \cdot PI}{100}\right] \cdot IFE_{F-1} \cdot DD4_{80\text{-}84}$ $+\underset{(0.75)}{0.139}\ \overline{DESCET}_F + \underset{(1.85)^{**}}{0.069}\left[\frac{Y_M^r \cdot PI_M}{100}\right] \underset{(-4.09)^*}{-2973}\ DD4_{73\text{-}76}$ $+ 0.064\left[\frac{Y_M^r \cdot PI_M}{100} + \frac{Y_{OT}^r \cdot PI}{100}\right] \cdot IFE_{F-1}$ (1.59)	0.99	1.50	327.6	994.5	13744
D-5 Sales Tax Revenue					
$STR_F = \underset{(-0.13)}{-76.65} + \underset{(3.80)^*}{0.012}\left[\frac{Y_M^r \cdot PI_M}{100} + \frac{IMP_g^r \cdot \overline{PI}_{IMP}}{100} \cdot MTR_F\right] \cdot IFS_{F-1} + \underset{(0.09)}{0.044}\ \overline{DESCST}_F$ $+ \underset{(4.64)^*}{0.0003}\left[\frac{IMP_g^r \cdot \overline{PI}_{IMP}}{100} \cdot MTR_F + \frac{Y_M^r \cdot PI_M}{100}\right] \underset{(5.10)^*}{225.5}\ DD5_{88\text{-}90} \cdot TIME$	0.98	1.67	235.9	1061	6876
D-6 Import Duties					
$MTR_F = \underset{(0.42)}{688.1} + \underset{(0.51)}{0.082}\left[\frac{IMP_g^r \cdot \overline{PI}_{IMP}}{100}\right] \cdot IFM_{F-1} + \underset{(0.76)}{0.285}\ \overline{DESCMT}_F$ $+ \underset{(4.86)^*}{0.244}\left[\frac{IMP_g^r \cdot \overline{PI}_{IMP}}{100}\right] \underset{(4.17)^*}{5726}\ DD6_{85\text{-}90}$	0.98	1.72	360.8	2281	24472

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
D-7 Income Tax Revenue					
$ITR_F = +\underset{(2.87)^*}{648.9} + \underset{(16.1)^*}{1.851}\left[(Y^r - Y_A^r) * \frac{PI}{100}\right] * IFI_{F-1}$					
$+\underset{(7.26)^*}{1.145}\ \overline{DESCIT}_F + \underset{(4.11)^*}{0.006}\left[(Y^r - Y_A^r) * \frac{PI}{100}\right] + \underset{(8.66)^*}{2586}\ DD7_{80}$	0.99	1.70	1383	450.7	10008
$+\underset{(8.29)^*}{2739}\ DD7_{83\text{-}86} - \underset{(-3.22)^*}{1320}\ DD7_{90\text{-}91}$					
D-8 Revenue Transfer to Provincial Government					
$DPT_F = DPTX_F + \bar{\beta} * \overline{SUR}_F + \overline{HYDRO} + \overline{SG}_F$					
D-9 Divisible Pool Transfers					
$DPTX_F = +0.80 * ITR_F + 0.80 * STR_F$					
$+\underset{(15.9)^*}{0.303}\ DD9_{92\text{-}93} * ETR_F + \underset{(5.75)^*}{2944}\ DD9_{89\text{-}91}$	0.99	1.56	6502	885.7	14868

E. FEDERAL EXPENDITURE BLOCK

E-1 Total Recurring Expenditure

$$RE_F = \overline{DEF}_F + INTDD_F + INTED_F + \overline{GP}_F + ORE_F + REP_F$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
E-2 Interest on Domestic Debt					
$INTDD_F = + 0.163\ DDEBT_{F-1} + 0.005\ \overline{INT}_A * DDEBT_{F-1}$ (4.93)* (2.06)** $- 565.7\ DE2_{80\text{-}83} + TIME + 6484\ DE2_{90}$ (-7.97)* (4.94)*	0.99	1.62	900.8	1208	20225
E-3 Interest on External Debt					
$INTED_F = - 448.2 + 0.025\ EDEBT_{F-1} + 0.509\ INTED_{F-1}$ (-1.8)** (4.49)* (4.51)* $- 841.8\ DE3_{79\text{-}83} + 3189\ DE3_{90} + 1611.5\ DE3_{91\text{-}92}$ (-3.78)* (7.62)* (4.17)*	0.99	2.81	699.5	354.8	4802
E-4 Repayment of External Debt					
$REP_F = - 3461.6 + 0.094\ EDEBT_F - 5497\ DE4_{90\text{-}93}$ (-7.13)* (22.1)* (-5.99)*	0.98	1.80	484.5	928.6	8198
E-5 Other Recurring Expenditure					
$ORE_F = + 175.8 + 0.089\ NRR_F + 25794\ DE5_{91\text{-}93}$ (0.22) (7.43)* (14.9)*	0.97	2.07	420.9	1984	9750
E-6 Federal Development Expenditure					
$DE_F = DE - DE_P$					

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
E-7 Annual Development Programme					
$DE = +\underset{(4.65)^*}{4522} + \underset{(1.23)}{0.169}\ \overline{GFB}_F + \underset{(2.85)^*}{0.092}\left[GRR_P + NRR_F\right] + \underset{(5.88)^*}{0.551}\ DE_{-1}$ $- \underset{(-2.51)^{**}}{5381}\ DE7_{92} + \underset{(3.77)^*}{6161}\ DE7_{86\text{-}88}$	0.99	1.58	517.6	1801	34250

F. FEDERAL DEFICIT BLOCK

F-1 Outstanding External Debt

$$EDEBT_F = EDEBT_{F\text{-}1} + \overline{GFB}_F - REP_F$$

F-2 Outstanding Internal Debt

$$DDEBT_F = DDEBT_{F\text{-}1} + BDOV - \overline{GFB}_F + REP_F$$

F-3 Federal Budget Deficit

$$BDEF_F = DE + RE_F - NRR_F - \overline{SAB}_F - REP_F$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

G. PROVINCIAL REVENUE BLOCK

G-1 Gross Revenue Receipt

$$GRR_P = TT_P + TNT_P + DPT_F + \overline{GP}_F$$

G-2 Total Tax Revenue

$$TT_P = IT_P$$

G-3 Indirect Tax Revenue

$$IT_P = SD_P + MVT_P + 0.15 * PT + OIT_P$$

G-4 Revenue from Stamp Duties

$$SD_P = \underset{(-1.41)}{-\ 77.55} + \underset{(17.8)^*}{0.00002}\left[\frac{Y^r * PI}{100}\right] + \underset{(5.29)^*}{710.5\ DG4_{91\text{-}93}}$$

$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
0.98	1.69	661.8	131.4	1100

G-5 Revenue from Motor Vehicle Tax

$$MVT_P = \underset{(-26.1)^*}{-\ 461.13} + \underset{(60.9)^*}{0.003}\left[\frac{Y^r * PI}{100}\right] + \underset{(2.81)^*}{79.71\ DG5_{91}}$$

$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
0.99	1.54	2110	26.36	584

G-6 Revenue from Property Tax

$$PT = \underset{(-3.9)^*}{-\ 40.00} + \underset{(26.9)^*}{0.0008}\left[\frac{Y^r_{OT} * PI}{100}\right] + \underset{(5.92)^*}{0.0023}\left[\frac{\overline{RM}^r * \overline{PI}_{IMP}}{100}\right]$$

$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
0.98	1.47	688.6	19.88	203.7

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
G-7 Revenue from Other Taxes					
$OIT_P = \underset{(15.8)^*}{+ 572.04} + \underset{(21.3)^*}{0.0015}\left[\frac{Y' \cdot PI}{100}\right] + \underset{(5.70)^*}{487.2\ DG7_{91\text{-}93}} - \underset{(-2.54)^{**}}{242.1\ DG7_{73}}$	0.98	1.39	383.3	89.49	1315
G-8 Total Non-Tax Revenue					
$TNT_P = RED_P + RH_P + ROT_P$					
G-9 User Charges in Education					
$RED_P = \overline{CRE}_P \cdot REED_P$					
G-10 User Charges in Health					
$RH_P = \overline{CRH}_P \cdot REH_P$					
G-11 User Charges in Other Sectors					
$ROT_P = \overline{CROT}_P \cdot REOT_P$					

H. PROVINCIAL EXPENDITURE BLOCK

H-1 Total Provincial Recurring Expenditure

$$RE_P = REED_P + REH_P + REOTS_P + REOT_P + DS_P$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
H-2 Recurring Expenditure on Education					
$REED_P$ = - 90.65 + 0.107 GRR_P + 0.663 $REED_{P-1}$ (-0.67) (4.84)* (6.61)* + 1495 $DH2_{91}$ + 940.7 $DH2_{88}$ (3.60)* (2.30)**	0.99	2.35	1404	386.3	7213
H-3 Recurring Expenditure on Health					
REH_P = - 100.3 + 0.012 $DETF_P$ + 0.025 GRR_P (-3.06)* (1.82)*** (6.21)* + 0.704 REH_{P-1} + 330.5 $DH3_{87}$ (10.8)* (4.33)*	0.99	2.06	2949	73.72	1902
H-4 Recurring Expenditure on Other Social Sectors					
$REOTS_P$ = + 38.24 + 0.007 GRR_P + 0.481 $REOTS_{P-1}$ + 854 $DH4_{93}$ (2.11)** (3.53)* (3.64)* (12.4)* + 414.8 $DH4_{91}$ + 195 $DH4_{89}$ (7.54)* (3.63)*	0.99	1.51	429.2	49.17	524.7
H-5 Recurring Expenditure on Other Sectors					
$REOT_P$ = 387.5 + 0.124 $DETF_P$ + 0.113 GRR_P + 0.701 $REOT_{P-1}$ (1.20) (1.87)*** (3.07)* (7.13)*	0.99	1.52	1173	727.5	12719
H-6 Debt Servicing by Provincial Governments					
DS_P = - 212.9 + 0.131 $DETF_P$ + 0.996 DS_{P-1} (-1.12) (3.40)* (21.9)*	0.99	2.05	2149	432..6	6764

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
H-7 Development Transfers by Federal Government					
$DETF_P$ = + 1723 + 0.7271 DE_P - 0.393 RSD_{P-1} (4.59)* (24.3)* (-3.87)* + 4722 $DH7_{91}$ - 3761 $DH7_{89}$ (3.83)* (-3.38)*	0.98	2.00	212.1	1054	9404
H-8 Total Provincial Development Expenditure					
DE_P = DES_P + $DEOT_P$ + $\overline{GR}_P$					
H-9 Provincial Development Expenditure on Social Services					
DES_P = $DEED_P$ + DEH_P + $DEOTS_P$					
H-10 Development Expenditure on Education					
$DEED_P$ = - 112.8 + 0.061 $DETF_P$ + 0.013 GRR_P (-1.61) (3.14)* (2.49)** + 0.451 $DEED_{P-1}$ + 984.3 $DH10_{86}$ - 1352 $DH10_{91}$ (6.32)* (6.65)* (-5.87)*	0.98	1.75	268.3	143.2	1377
H-11 Development Expenditure on Health					
DEH_P = + 72.41 + 0.006 GRR_P + 0.797 DEH_{P-1} (3.00)* (3.51)* (14.5)* + 251.2 $DH11_{86,88,92}$ + 644.8 $DH11_{87}$ (5.15)* (8.75)*	0.99	2.51	708.7	70.57	1051

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
H-12 Development Expenditure on Other Social Sector					
$DEOTS_P$ = + 93.05 + 0.032 GRR_P + 0.134 $DETF_P$ (1.01) (3.76)* (6.74)* + 0.519 $DEOTS_{P-1}$ + 1478 $DH12_{86\text{-}88}$ (9.82)* (10.4)*	0.99	2.07	1322	219.1	4579
H-13 Development Expenditure on Other Sectors					
$DEOT_P$ = - 63.75 + 0.010 GRR_P + 1.007 $DEOT_{P-1}$ (-0.52) (1.55) (13.6)* + 3842 $DH13_{91}$ + 1264 $DH13_{92}$ + 758.3 $DH13_{73}$ (10.1)* (3.00)* (2.12)**	0.99	1.98	329.6	338.5	2722

I. PROVINCIAL AND TOTAL BUDGET DEFICIT BLOCK

I-1 Provincial Revenue Surplus or Deficit

$RSD_P = GRR_P - RE_P$

I-2 Use of Cash Balance by Province

$UCB_P = DE_P - RSD_P - DETF_P$

I-3 Total Budget Deficit

$BDOV = BDEF_F - RSD_P$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

J. LOCAL REVENUE BLOCK

J-1 Local Gross Revenue Receipt

$$GRR_L = TT_L + TNT_L + \overline{GR}_P$$

J-2 Indirect Local Tax Revenue

$$IT_L = TT_L$$

J-3 Total Tax Revenue

$$TT_L = OCT_L + ET_L + 0.85 * PT + OT_L$$

J-4 Revenue from Octroi

$$OCT_L = \underset{(-1.93)^{**}}{+\ 67.19} + \underset{(57.8)^{*}}{0.007}\left[\frac{C_P^r * PI * \frac{(L_M + L_{OT})}{LABIND} + Y_M^r * PI}{100}\right] + \underset{(4.69)^{*}}{334.9}\ DJ4_{87} + \underset{(3.79)^{*}}{292.7}\ DJ4_{90\text{-}91}$$

$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
0.99	1.49	1401	95.03	1825

J-5 Revenue from Export Tax

$$ET_L = \underset{(-1.64)}{-\ 60.07} + \underset{(2.12)^{**}}{0.0007}\left[\frac{Y_M^r * PI_M + Y_A^r * PI}{100}\right] + \underset{(6.71)^{*}}{0.995}\ ET_{L\text{-}1}$$

$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
0.97	1.90	391.9	67.82	292.4

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
J-6 Revenue from Other Taxes					
$OT_L = -30.39 + 0.001\left[\frac{Y^r * PI}{100}\right] + 617.7\ DJ6_{92\text{-}93}$ (-1.17) (20.4)* (9.07)*	0.98	2.74	762.5	64.6	553.7
J-7 Non-Tax Revenue					
$TNT_L = \overline{CRNT}_L * RE_L$					
K. LOCAL EXPENDITURE BLOCK					
K-1 Total Recurring Expenditure					
$RE_L = REED_L + REH_L + REOTS_L + REOT_L$					
K-2 Local Recurring Expenditure on Education					
$REED_L = -31.16 + 0.026\ (GRR_L * \overline{CAR}_L) + 0.738\ REED_{L\text{-}1} + 19.89\ DK2_{73\text{-}79} - 76.34\ DK2_{90}$ (-1.72) (2.64)* (3.60)* (0.99) (-2.03)**	0.98	1.92	294.9	33.70	283
K-3 Local Recurring Expenditure on Health					
$REH_L = -18.37 + 0.021\ (GRR_L * \overline{CAR}_L) + 0.576\ REH_{L\text{-}1} + 6.228\ DK3_{73\text{-}79}$ (-1.26) (2.48)** (2.13)** (0.38)	0.97	1.63	265.3	27.01	179.9

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
K-4 Local Recurring Expenditure on Other Social Sector					
$REOTS_L$ = + 210.9 + 0.415 $(GRR_L + \overline{CAR}_L)$ + 0.120 $REOTS_{L-1}$ (5.32)* (7.29)* (1.03) - 281.4 $DK4LOC_{73-79}$ - 607.1 $DK4_{84}$ + 271.1 $DK4_{88-91}$ (-6.35)* (-7.98)* (4.92)*	0.99	2.19	4050	70.24	2591
K-5 Local Recurring Expenditure on Other Sector					
$REOT_L$ = + 17.23 + 0.022 $(GRR_L + \overline{CAR}_L)$ + 0.592 $REOT_{L-1}$ (1.91)** (3.11)* (3.47)* - 27.97 $DK5LOC_{73-79}$ (-2.44)**	0.99	1.71	1244	16.16	251
K-6 Total Development Expenditure					
$DE_L = DEED_L + DEH_L + DEOTS_L + DEOT_L$					
K-7 Development Expenditure on Education					
$DEED_L$ = - 6.293 + 0.004 $(GRR_L + \overline{CAR}_L)$ + 0.738 $DEED_{L-1}$ + 3.718 $DK9LOC_{73-79}$ (-1.43) (2.32)** (3.31)* (0.78)	0.97	1.56	226.6	8.02	48.4
K-8 Development Expenditure on Health					
DEH_L = - 5.164 + 0.002 $(GRR_L + \overline{CAR}_L)$ + 0.650 DEH_{L-1} + 2.81 $DK8LOC_{73-79}$ (-1.62) (2.42)** (2.38)** (0.83)	0.95	1.82	111.4	5.65	21.9

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
K-9 Development Expenditure on Other Social Sectors					
$DEOTS_L = -109.3 + 0.129\ (GRR_L + \overline{CAR}_L) + 0.525\ DEOTS_{L-1} + 3.52\ DK9LOC_{73\text{-}79} - 145.6\ DK9_{91} + 50.23\ DK9_{81,82,89}$ (-6.06)* (6.94)* (5.25)* (0.31) (-7.38)* (4.24)*	0.99	2.12	16458	17.01	1199
K-10 Revenue Surplus/Deficit					
$RSD_L = GRR_L - RE_L$					
K-11 Budget Deficit					
$BDEF_L = DE_L - RSD_L - \overline{CAR}_L$					
K-12 Development Expenditure on Other Sectors					
$DEOT_L = +6.593 + 0.204\ DE_L + 0.282\ DEOT_{L-1} + 103.2\ DK12_{91}$ (0.67) (4.82)* (1.58) (3.00)*	0.99	1.79	1430	30.89	469.4

L TRADE BLOCK

L-1 Total Export Demand Function

$$X^r = X_g^r + \overline{X_s^r}$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
L-2 Real Exports Supply for Goods					
$\ln X_g^r = -3.48 - 0.783 \ln \left[\frac{PI}{\overline{PI}_W * e} \right] + 0.952 \ln Y^r$ $(-1.79)^{***}$ $(-2.15)^{**}$ $(4.43)^{*}$ $- 0.167\ DL2_{85} - 0.220\ DL2_{90}$ (-1.25) (-1.46)	0.95	1.25	84.84	0.123	10.39
L-3 Total Imports					
$IMP^r = IMP_g^r + IMP_s^r$					
L-4 Real Import Demand for Goods					
$\ln IMP_g^r = -0.686 - 0.438 \ln \frac{\overline{PI}_{IMP}}{PI} + 0.318 \ln Y_N^r$ (-0.78) $(-2.48)^{**}$ $(1.85)^{***}$ $+ 0.694 \ln IMP_{g-1}^r + 0.231\ DL4_{92}$ $(4.13)^{*}$ $(3.43)^{*}$	0.97	1.74	129.2	0.054	10.95
L-5 Real Import Demand for Services					
$\ln IMP_S^r = -7.118 + 0.837 \ln \left[IMP_g^r + X_g^r \right] + 0.638 \ln I_g^r - 0.96 \ln \left[\frac{\overline{PI}_{IMP}}{PI} \right]$ $(-4.57)^{*}$ $(4.54)^{*}$ $(3.23)^{*}$ $(-2.71)^{*}$ $- 0.726\ DL5_{91\text{-}92} + 0.275\ DL5_{83\text{-}85}$ $(-6.50)^{*}$ $(3.41)^{*}$	0.93	1.66	41.29	0.125	9.04

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

L-6 Current Account Gap

$$CAG = \left[(IMP^r \cdot \overline{PI}_{IMP}) - (X^r \cdot \overline{PI}_X) - (NFI^r \cdot \overline{PI}_{IMP}) \right]$$

M. MONETARY BLOCK

M-1 Money Supply

$$M = M_{-1} + \Delta M$$

M-2 Change in Money Supply

$$\Delta M = \underset{(1.86)^{***}}{+ 6825} + \underset{(0.84)}{0.139} \left[BDOV + UCB_F - \overline{GFB}_F + REP_F \right] + DM2_{91\text{-}93}$$

$$+ \underset{(1.95)^{***}}{0.342} \left[(Y_N^r - Y_{N\text{-}1}^r) + \frac{PI}{100} \right] + \underset{(1.27)}{0.154} \left[BDOV + UCB_F - \overline{GFB}_F + REP_F \right]$$

$$- \underset{(-2.67)^{*}}{0.457} \left[CAG - \overline{GFB}_F + REP_F \right] + \underset{(4.27)^{*}}{60940}\ DM2_{92\text{-}93} - \underset{(-1.39)}{6250}\ DM2_{73\text{-}77}$$

0.97	3.10	90.245	5123	27005

N. PRICE BLOCK

N-1 Implicit GDP Deflator

$$\ln PI = + \underset{(3.50)^{*}}{1.087} + \underset{(7.90)^{*}}{0.273} \ln \overline{PI}_{IMP} + \underset{(1.64)}{0.081} \ln \left[\frac{M_{-1}}{Y_{N\text{-}1}^r} \right]$$

$$+ \underset{(8.48)^{*}}{0.524} \ln PI_{-1} + \underset{(4.01)^{*}}{0.052}\ DN1_{92\text{-}93}$$

0.99	2.12	4555	0.015	4.74

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
N-2 Manufacturing Price Index					
$\ln PI_M = + 0.013 + 0.795 \ln PI + 0.098 \ln (ETR_F + STR_F)$ $(0.12) \quad (7.02)^* \quad (1.50)$ $- 0.050\ DN2_{82\text{-}83} + 0.079\ DN2_{91\text{-}92}$ $(-3.71)^* \quad (5.25)^*$	0.99	1.62	3963	0.017	4.69
N-3 Price Index for Wholesale General					
$\ln PI_{WG} = - 0.244 + 1.049 \ln PI$ $(-7.00)^* \quad (141.7)^*$	0.99	1.31	20094	0.017	4.67
N-4 Price Index for Government Consumption					
$\ln PI_{GC} = 0.45 + 0.248 \ln PI + 0.667 \ln PI_{GC\text{-}1}$ $(3.93)^* \quad (1.27) \quad (3.45)^*$ $+ 0.202\ DN4_{88} + 0.077\ DN4_{91\text{-}93}$ $(4.74)^* \quad (2.45)^{**}$	0.99	1.60	687.6	0.037	4.80
N-5 Price Index for Government Investment					
$\ln PI_{GI} = 0.489 + 0.186 \ln \overline{PI}_{IME} + 0.708 \ln PI_{GI\text{-}1} + 0.182\ DN5_{75,80}$ $(5.45)^* \quad (5.15)^* \quad (14.02)^* \quad (5.83)^*$	0.99	2.44	1055	0.038	4.65

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
N-6 Real Exchange Rate					
$e^r = + 3.414 + 0.008 \left[CAG - \overline{GFB}_F * REP_F\right] + 0.988\ e^r_{-1}$ (2.17)** (2.34)** (16.3)* $- 0.0001 \left[CAG - \overline{GFB}_F * REP_F\right] * DN6_{92} + 12.51\ DN6_{73}$ (-2.42)** (7.06)* $- 3.021\ DN6_{82}$ (-2.98)*	0.98	2.00	178.1	1.546	20.2
N-7 Nominal Exchange Rate					
$e = e^r \left[\frac{\overline{PI}_W}{PI}\right]$					
O. HUMAN CAPITAL INDEX BLOCK					
O-1 Total Development Expenditure on Education					
$DEED = DEED_P + DEED_L$					
O-2 Development Expenditure on Male Primary Education					
$DEEDPR_M = - 21.78 + 0.141\ DEED + 0.322\ DEEDPR_{M-1}$ (-1.15) (7.75)* (3.35)* $+ 333.14\ DO2_{93} + 238.42\ DO2_{90}$ (5.37)* (4.37)*	0.97	2.04	167.3	50.63	294

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
O-3 Development Expenditure on Male Secondary Education					
$DEEDSE_M$ = - 5.13 + 0.070 $DEED$ + 0.514 $DEEDSE_{M-1}$ (-0.86) (8.35)* (9.63)* + 149.2 $DO3_{92}$ + 73.35 $DO3_{88-89}$ (7.35)* (5.76)*	0.99	2.10	733.9	15.70	206
O-4 Development Expenditure on Female Primary Education					
$DEEDPR_F$ = + 6.781 + 0.034 $DEED$ + 0.411 $DEEDPR_{F-1}$ (1.23) (6.27)* (5.69)* + 98.56 $DO4_{90,92}$ + 175.3 $DO4_{93}$ (7.65)* (9.49)*	0.98	1.65	307.7	14.18	116
O-5 Development Expenditure on Female Secondary Education					
$DEEDSE_F$ = - 4.195 + 0.032 $DEED$ + 0.594 $DEEDSE_{F-1}$ (-2.26)** (12.6)* (19.6)* + 83.72 $DO5_{92}$ + 34.86 $D05_{88-89}$ - 14.72 $DO5_{82,87}$ (13.4)* (8.83)* (-3.87)*	0.99	1.81	1768	4.78	100
O-6 Development Expenditure on Higher Education					
DEEDHE = DEED - $DEEDPR_M$ - $DEEDSE_M$ - $DEEDPR_F$. $DEEDSE_F$					
O-7 Total Recurring Expenditure on Education					
REED = $REED_P$ + $REED_L$					

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
O-8 Recurring Expenditure on Male Primary Education					
$REEDPR_M$ = - 52.09 + 0.060 $REED$ + 0.886 $REEDPR_{M-1}$ (-0.83) (2.03)** (5.46)*	0.98	2.16	681.6	184.6	1400
O-9 Recurring Expenditure on Male Secondary Education					
$REEDSE_M$ = - 5.67 + 0.063 $REED$ + 0.866 $REEDSE_{M-1}$ (-0.12) (2.23)** (6.11)*	0.99	1.85	1273	145.2	1643
O-10 Recurring Expenditure on Female Primary Education					
$REEDPR_F$ = - 36.34 + 0.080 $REED$ + 0.465 $REEDPR_{F-1}$ (-2.28)** (8.74)* (6.03)* + 316.06 $DO10_{89-90}$ (8.21)*	0.99	1.58	2984	46.32	942
O-11 Recurring Expenditure on Female Secondary Education					
$REEDSE_F$ = - 6.97 + 0.038 $REED$ + 0.742 $REEDSE_{F-1}$ (-0.55) (5.62)* (10.5)* + 236.13 $DO11_{89-90}$ (7.94)*	0.99	1.36	2844	38.03	770
O-12 Recurring Expenditure on Higher Education					
REEDHE = REED - $REEDPR_M$ - $REEDSE_M$ - $REEDPR_F$ - $REEDSE_F$					

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

O-13 New Male Primary School

$$NPS_M = DEEDPR_M / \overline{UCPS}_M$$

O-14 New Female Primary School

$$NPS_F = DEEDPR_F / \overline{UCPS}_F$$

O-15 New Male Secondary School

$$NSS_M = DEEDSE_M / \overline{UCSS}_M$$

O-16 New Female Secondary School

$$NSS_F = DEEDSE_F / \overline{UCSS}_F$$

O-17 Total Male Primary School

$$SPS_M = SPS_{M-1} + NPS_M$$

O-18 Total Female Primary School

$$SPS_F = SPS_{F-1} + NPS_F$$

O-19 Total Male Secondary School

$$SSS_M = SSS_{M-1} + NSS_M$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

O-20 Total Female Secondary School

$$SSS_F = SSS_{F-1} + NSS_F$$

O-21 Total Male Primary Teacher

$$TEPS_M = REEDPR_M / \overline{WPS}_M$$

O-22 Total Female Primary Teacher

$$TEPS_F = REEDPR_F / \overline{WPS}_F$$

O-23 Total Male Secondary Teacher

$$TESS_M = REEDSE_M / \overline{WSS}_M$$

O-24 Total Female Secondary Teacher

$$TESS_F = REEDSE_F / \overline{WSS}_F$$

O-25 Enrollment Ratio for Males at Primary Level

$$\ln PRENR_M = \underset{(-2.34)^{**}}{-1.35} + \underset{(2.05)^{**}}{0.213} \ln\left[\frac{SPS_M}{\overline{SGAPR}_M}\right] + \underset{(1.62)}{0.115} \ln\left[\frac{TEPS_M}{SPS_M}\right] + \underset{(7.36)^{*}}{0.84} \ln PRENR_{M-1} + \underset{(0.41)}{0.0005} \frac{Y^r}{\overline{POP10}_M + \overline{POP10}_F}$$

	0.98	2.01	362	0.019	4.13

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
O-26 Enrollment Ratio for Females at Primary Level					
$\ln PRENR_F = -2.074 + 0.106 \ln\left[\frac{TEPS_F}{SPS_F}\right] + 0.850 \ln PRENR_{F-1}$ $(-1.83)^{**} \quad (1.56) \quad (6.31)^{*}$ $+ 0.301 \ln\left[\frac{SPS_F}{\overline{SGAPR}_F}\right] + 0.0034\ LR_F$ $(1.71) \quad (0.35)$	0.99	2.1	415	0.01	3.42
O-27 Enrollment Ratio for Males at Secondary Level					
$\ln SEENR_M = -1.329 + 0.326 \ln\left[\frac{SSS_M}{\overline{SGASE}_M}\right] + 0.045 \ln\left[\frac{TESS_M}{SSS_M}\right] - 0.030\ DO27_{79\text{-}80}$ $(-3.45)^{*} \quad (2.64)^{**} \quad (0.60) \quad (3.19)^{*}$ $+ 0.0005\left[\frac{Y^r}{\overline{POP}_{10F} + \overline{POP}_{10M}}\right] + 0.686 \ln SEENR_{M-1} + 0.023\ DO27_{73\text{-}76}$ $(0.50) \quad (5.75)^{*} \quad (2.71)^{**}$	0.99	2.60	370.9	0.01	3.27
O-28 Enrollment Ratio for Females at Secondary Level					
$\ln SEENR_F = -1.475 + 0.282 \ln\left[\frac{SSS_F}{\overline{SGASE}_F}\right] + 0.07 \ln\left[\frac{TESS_F}{SSS_F}\right]$ $(-1.76)^{**} \quad (1.95)^{**} \quad (0.44)$ $+ 0.657 \ln SEENR_{F-1} + 0.028\ LR_F + 0.074\ DO28_{75}$ $(3.08)^{*} \quad (2.18)^{**} \quad (2.51)^{**}$	0.99	1.49	295.3	0.02	2.41

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

O-29 Number of Male Enrollment at Primary Level

$$NENPR_M = PRENR_M * \overline{SGAPR}_M$$

O-30 Number of Female Enrollment at Primary Level

$$NENPR_F = PRENR_F * \overline{SGAPR}_F$$

O-31 Number of Male Enrollment at Secondary Level

$$NENSE_M = SEENR_M * \overline{SGASE}_M$$

O-32 Number of Female Enrollment at Secondary Level

$$NENSE_F = SEENR_F * \overline{SGASE}_F$$

O-33 Output of Male From Primary Level

$$OUTPR_M = \overline{SHPR}_M * NENPR_M$$

O-34 Output of Female From Primary Level

$$OUTPR_F = \overline{SHPR}_F * NENPR_F$$

O-35 Output of Male From Secondary Level

$$OUTSE_M = \overline{SHSE}_M * NENSE_M$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

O-36 Output of Female From Secondary Level

$$OUTSE_F = \overline{SHSE}_F * NENSE_F$$

O-37 Male Literate

$$NLR_M = NLR_{M-1} (1 - \delta_4) + OUTPR_M (1 + \delta_5)$$

O-38 Male Literacy Ratio

$$LR_M = \frac{NLR_M}{\overline{POP10}_M}$$

O-39 Female Literate

$$NLR_F = NLR_{F-1} (1 - \delta_6) + OUTPR_F (1 + \delta_7)$$

O-40 Female Literacy Ratio

$$LR_F = \frac{NLR_F}{\overline{POP10}_F}$$

O-41 Male Labor Force Entrants with Primary Education or In-complete Secondary Education

$$LFEPR_M = \overline{LFPR}_M * OUTPR_M$$

O-42 Female Labor Force Entrants with Primary Education or In-complete Secondary Education

$$LFEPR_F = \overline{LFPR}_F * OUTPR_F$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

O-43 Male Labor Force Entrants with Secondary Education

$$LFESE_M = \overline{LFSE}_M * OUTSE_M$$

O-44 Female Labor Force Entrants with Secondary Education

$$LFESE_F = \overline{LFSE}_F * OUTSE_F$$

O-45 Number of Male Workers with Primary Education

$$NWPR_M = NWPR_{M-1} (1 - \delta_8) + LFEPR_M$$

O-46 Number of Female Workers with Primary Education

$$NWPR_F = NWPR_{F-1} (1 - \delta_8) + LFEPR_F$$

O-47 Number of Female Workers with Secondary Education

$$NWSE_F = NWSE_{F-1} (1 - \delta_9) + LFESE_F$$

O-48 Number of Male Workers with Secondary Education

$$NWSE_M = NWSE_{M-1} (1 - \delta_9) + LFESE_M$$

O-49 Human Capital Index in Agriculture Sector

$$HCI_A = \left[\frac{HCIL_A}{L_A}\right]$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

O-50 Human Capital Index in Manufacturing Sector

$$HCI_M = \left[\frac{HCIL_M}{L_M}\right]$$

O-51 Human Capital Index in Other Sectors

$$HCI_{OT} = \left[\frac{HCIL_{OT}}{L_{OT}}\right]$$

O-52 Labor Force Adjusted for Human Capital in Agriculture Sector

$$HCIL_A = \underset{(-5.51)^*}{-\ 1099} + \underset{(8.82)^*}{483.5}\left[NWPR_M + NWPR_F\right] + \underset{(8.67)^*}{116.6}\left[NWSE_F + NWSE_M\right] + \underset{(3.43)^*}{251.2}\ D052_{85,86} + \underset{(1.95)^{**}}{202.9}\ D052_{90}$$

0.96	1.45	101.1	97.28	1391

O-53 Labor Force Adjustment for Human Capital in Manufacturing Sector

$$HCIL_M = \underset{(12.0)^*}{203.6} + \underset{(0.97)}{4.236}\left[NWPR_M + NWPR_F\right] + \underset{(27.2)^*}{33.19}\left[NWSE_F + NWSE_M\right] + \underset{(5.05)^*}{43.34}DO53_{92} + \underset{(2.81)^*}{17.81}\ D053_{90\text{-}91} + \underset{(3.41)^*}{17.05}\ DO53_{75\text{-}78}$$

0.99	1.80	351.5	7.402	365

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
O-54 Labor Force Adjustment for Human Capital in Other Sectors					
$HCIL_{OT} = -485.7 + 228.8 \left[NWPR_M + NWPR_F\right] + 138.4 \left[NWSE_M + NWSE_F\right]$ (-4.55)* (7.96)* (17.2)* $+ 167.2\ DO54_{92\text{-}93} - 172.8\ DO54_{86}$ (3.46)* (-3.22)*	0.98	1.34	274.6	51.30	1030

P. PUBLIC SECTOR HEALTH INDEX BLOCK

P-1 Total Development Expenditure on Health

$DEH = DEH_P + DEH_L$

P-2 Development Expenditure on Hospital Beds

$DEBED = -105.4 + 0.611\ DEH_{-6} + 0.031\ PTHOS_{-4} + 132.6\ DP2_{86} + 108.5\ DP2_{81}$ (-2.02)** (10.65)* (2.72)** (3.32)* (2.60)**	0.99	1.98	287	38.26	497

P-3 Development Expenditure on Rural Health Centre (including BHUs)

$DERHC = +58.15 + 0.241\ DEH_{-2} + 0.362\ DERHC_{-1} - 244.7\ DP3_{92\text{-}93} + 384.3\ DP3_{87\text{-}88} - 82.3\ DP3_{81}$ (3.70)* (4.35)* (3.13)* (-5.75)* (11.5)* (-1.99)**	0.98	2.04	229.7	39.49	441

EQUATION NUMBER	$\bar{R}^2$	D.W.	F	SER	$\bar{Y}$
P-4 Development Expenditure on Other Facilities (MCH, TBC, SHC)					
DEHOT = DEH - DEBED - DERHC					
P-5 Total Recurring Expenditure on Health					
$REH = REH_P + REH_L$					
P-6 Recurring Expenditure on Doctors in Hospital					
$REDOH = + 5.037 + 0.097\ REH + 0.539\ REDOH_{-1}$ (0.83) (6.59)* (6.83)* $+ 6.325\ DP6_{88\text{-}92} + TIME + 95.31\ DP6_{84\text{-}85}$ (8.81)* (7.04)*	0.99	1.95	3034	17.44	459
P-7 Recurring Expenditure on Nurses in Hospital					
$RENUH = + 0.527 + 0.023\ REH + 0.511\ RENUH_{-1}$ (0.20) (2.67)** (2.25)** $+ 13.90\ DP7_{92\text{-}93}$ (2.05)**	0.99	1.87	1459	5.98	90.6
P-8 Recurring Expenditure on Paramedics in Hospital					
$REPAH = + 12.17 + 0.053\ REH + 0.378\ REPAH_{-1}$ (1.99)** (5.84)* (2.82)* $+ 91.13\ DP8_{92\text{-}93} - 87.85\ DP8_{89}$ (4.69)* (-4.63)*	0.99	1.94	580	16.41	187

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
P-9 Recurring Expenditure on Doctors in RHCs					
$REDOR = -8.474 + 0.034\ REH + 0.645\ REDOR_{-1}$ (-2.57)** (7.96)* (12.2)* $+ 55.15\ DP9_{87\text{-}88} + 82.96\ DP9_{90}$ (8.54)* (9.05)*	0.99	1.89	2376	8.351	161
P-10 Recurring Expenditure on Paramedics in RHCs					
$REPAR = -6.651 + 0.026\ REH + 0.743\ REPAR_{-1}$ (-0.88) (2.27)** (3.68)* $- 14.47\ DP10_{92\text{-}93}$ (-0.72)	0.98	1.91	340	18.39	121
P-11 Recurring Expenditure on Other Facilities (MCH, TBC, SHC)					
REHOT = REH - REDOH - RENUH - REPAH - REDOR - REPAR					
P-12 New Hospital Bed					
NHBED = DEBED / $\overline{UCBED}$					
P-13 Total Beds in Hospital					
THBED = $THBED_{-1}$ + NHBED					
P-14 New RHCs					
NRHC = DERHC / $\overline{UCRHC}$					
P-15 Additional RHCs					
TRHC = $TRHC_{-1}$ + NRHC					

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

P-16 Total Doctors in Hospitals

TDOH = REDOH / $\overline{UCDOH}$

P-17 Total Nurses in Hospitals

TNUH = RENUH / $\overline{UCNUH}$

P-18 Total Paramedics in Hospitals

TPAH = REPAH / $\overline{UCPAH}$

P-19 Total Doctors in RHCs

TDOR = REDOR / $\overline{UCDOR}$

P-20 Total Paramedics in RHCs

TPAR = REPAR / $\overline{UCPAR}$

P-21 Patients Treated Production Function for Hospitals

$$\ln PTHOS = \underset{(-8.06)^{*}}{-0.753} + \underset{(1.12)}{0.123} \ln TDOH + \underset{(2.42)^{**}}{0.285} \ln TNUH + 0.484 \ln THBED + \underset{(1.33)}{0.105} \ln TPAH + \underset{(3.63)^{*}}{0.143} DP21_{76\text{-}77} + \underset{(4.68)^{*}}{0.300} DP21_{73\text{-}75}$$

0.99	2.32	400.7	0.037	8.94

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$
P-22 Patients Treated Production Function for RHCs					
$\ln PTRHC = \underset{(9.71)^*}{2.587} + \underset{(2.40)^{**}}{0.1213} \ln TDOR + \underset{(0.85)}{0.1022} \ln TPAR + \underset{(3.33)^*}{0.776} \ln TRHC + \underset{(3.36)^*}{0.2024} DP22_{92\text{-}93} + 0.2669\ DP22_{81} + \underset{(2.06)^{**}}{0.182} DP22_{75}$	0.99	1.90	349	0.07	9.44
P-23 Public Sector Health Index					
$PHI = \underset{(15.9)^*}{68.48} + \underset{(3.13)^*}{0.005} PTHOS + \underset{(4.82)^*}{0.001} PTRHC + \underset{(1.99)^{**}}{0.002} \left[\frac{DEOTS_P + DEOTS_L + DEHOT}{PI_{GI} * 100} \right] + \underset{(1.06)}{0.002} \left[\frac{REOTS_L + REHOT + REOTS_P}{PI_{GC} * 100} \right]$	0.99	1.47	1251	2.832	154

Q. INDEX OF ECONOMIC INFRASTRUCTURE BLOCK

Q-1 Total Public Investment in Economic Infrastructure

$$DEEI_F = \overline{DEAUB} + DE_F + DEOT_L$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

Q-2 Total Provincial Investment in Economic Infrastructure

$$DEEI_P = DEOT_P$$

Q-3 Real Public Investment in Economic Infrastructure

$$DEEI_F^r = \frac{DEEI_F}{PI_{GI}}$$

Q-4 Real Provincial Investment in Economic Infrastructure

$$DEEI_P^r = \frac{DEEI_P}{PI_{GI}}$$

Q-5 Total Real Investment in Economic Infrastructure

$$DEEI^r = DEEI_F^r + DEEI_P^r$$

Q-6 Stock of Public Infrastructure (Economic)

$$SPIE_F = SPIE_{F-1}(1 - \delta_{10}) + DEEI_F^r$$

Q-7 Stock of Provincial Infrastructure (Economic)

$$SPIE_P = SPIE_{P-1}(1 - \delta_{10}) + DEEI_P^r$$

EQUATION NUMBER	$\overline{R}^2$	D.W.	F	SER	$\overline{Y}$

R. INDEX OF FISCAL EFFORT BLOCK

R-1 Index of Fiscal Effort in Direct Taxes

$$IFI_F = IFI_{F-1} + \left[\frac{\overline{DESCIT}_F}{Y^r \cdot PI/100} \right]$$

R-2 Index of Fiscal Effort in Excise Duty

$$IFE_F = IFE_{F-1} + \left[\frac{\overline{DESCET}_F}{Y_M^r \cdot PI_M/100} \right]$$

R-3 Index of Fiscal Effort in Sales Taxes

$$IFS_F = IFS_{F-1} + \left[\frac{\overline{DESCST}_F}{IMP_g^r \cdot \overline{PI}_{IMP}/100 \cdot MTR_F \cdot Y_M^r \cdot PI_M/100} \right]$$

R-4 Index of Fiscal Effort in Import Duties

$$IFM_F = IFM_{F-1} + \left[\frac{\overline{DESCMT}_F}{IMP_g^r \cdot \overline{PI}_{IMP}/100} \right]$$

APPENDIX C

LIST OF ENDOGENOUS VARIABLES, LIST OF EXOGENOUS VARIABLES AND PARAMETERS

LIST OF ENDOGENOUS VARIABLES

B

$BDEF_F$	Federal Budget Deficit
$BDEF_L$	Local Budget Deficit
BDOV	Overall Budget deficit

C

CAG	Current Account Gap
C^r	Total Consumption in Real Terms
C^r_g	Government Current Consumption in Real Terms
C^r_P	Private Current Consumption in Real Terms

D

$DDEBT_F$	Outstanding Domestic Debt
DE	Total Development Expenditure
DEBED	Development Expenditure on Hospital Beds
DEED	Total Development Expenditure on Education
DEEDHE	Development Expenditure on Higher Education
$DEED_L$	Local Social Development Expenditure on Education
$DEED_P$	Provincial Social Development Expenditure on Education
$DEEDPR_F$	Development Expenditure on Education Female Primary
$DEEDPR_M$	Development Expenditure on Education Male Primary
$DEEDSE_F$	Development Expenditure on Education Female Secondary
$DEEDSE_M$	Development Expenditure on Education Male Secondary
$DEEI^r$	Total Real Investment in Economic Infra-structure
$DEEI_F$	Total Public Investment in Economic Infra-structure
$DEEI^r_F$	Total Real Public Investment in Economic Infra-structure
$DEEI_P$	Total Provincial Investment in Economic Infra-structure
$DEEI^r_P$	Total Real Provincial Investment in Economic Infra-structure
DE_F	Total Development Expenditure Federal
DEH	Total Development Expenditure on Health
DEH_L	Local Social Development Expenditure on Health
DEHOT	Development Expenditure on Other Facilities (MCH, TBC)
DEH_P	Provincial Social Development Expenditure on Health

DE_L	Total Development Expenditure Local
$DEOT_L$	Local Development Expenditure on Other Sectors
$DEOT_P$	Provincial Development Expenditure on Other Services
$DEOTS_L$	Local Development Expenditure on Other Social Sector
$DEOTS_P$	Provincial Development Expenditure on Other Social Sector
DE_P	Total Provincial Development Expenditure
DERHC	Development Expenditure on Rural Health Centre
DES_P	Provincial Development Expenditure for Social Sector
$DETF_P$	Development Transfers to Provinces
DPT_F	Divisible Pool Transfers
$DPTX_F$	Divisible Pool Transfers from Taxes
DS_P	Debt Servicing

E

e	Exchange Rate in Nominal Terms
e^r	Exchange Rate in Real Terms
$EDEBT_F$	External Outstanding Debt
ET_L	Local Export Tax
ETR_F	Federal Revenues from Excise Duties

G

GRR_L	Gross Local Revenue Receipts
GRR_P	Gross Provincial Revenue Receipts
GTR_F	Gross Federal Tax Revenue

H

HCI_A	Human Capital Index in Agriculture Sector
HCI_M	Human Capital Index in Manufacturing Sector
HCI_{OT}	Human Capital Index in Other Sectors
$HCIL_A$	Labor Force Adjusted for Human Capital Index in Agriculture Sector
$HCIL_M$	Labor Force Adjusted for Human Capital Index in Manufacturing Sector
$HCIL_{OT}$	Labor Force Adjusted for Human Capital Index in Other Sectors

I

IFE_F	Index of Fiscal Effort in Excise Duties
IFI_F	Index of Fiscal Effort in Income Tax
IFM_F	Index of Fiscal Effort in Import Taxes
IFS_F	Index of Fiscal Effort in Sales Taxes
IMP^r	Total Import in Real Terms
IMP^r_g	Total Import of Goods in Real Terms
IMP^r_s	Total Import of Services in Real Terms
$INTDD_F$	Interest on Domestic Debt
$INTED_F$	Interest on External Debt
I^r	Total Investment in Real Terms
I^r_g	Total Government Investment in Real Terms
I^r_{POT}	Private Investment in Other Sectors in Real Terms
I^r_P	Total Private Investment in Real Terms
I^r_{PA}	Private Investment in Agriculture Sector in Real Terms
I^r_{PM}	Private Investment in Manufacturing Sector in Real Terms
ISI_A	Index of Physical Infra Structure in Agriculture
ISI_M	Index of Physical Infra Structure in Manufacturing
ISI_{OT}	Index of Physical Infra Structure in Other Sector
IT_F	Federal Indirect Taxes
IT_L	Local Indirect Taxes
IT_P	Provincial Indirect Taxes
IT^r	Indirect Taxes in Real Terms
ITR_F	Federal Revenues from Income Tax

K

K^r_A	Capital Stock in Agriculture Sector in Real Terms
K^r_M	Capital Stock in Manufacturing Sector in Real Terms
K^r_{OT}	Capital Stock in Other sectors in Real Terms

L

L_A	Labour in Agriculture Sector
LABFO	Total Labour Force
LABIND	Labour Force Input Demand
$LFEPR_F$	Female Labour Force Entrants with Primary Education

$LFEPR_M$	Male Labour Force Entrants with Primary Education
$LFESE_F$	Female Labour Force Entrants with Secondary Education
$LFESE_M$	Male Labour Force Entrants with Secondary Education
L_M	Labour in Manufacturing Sector
L_{OT}	Labour in Other Services
LR_F	Female Literacy Ratio
LR_M	Male Literacy Ratio

M

M	Money Supply
MTR_F	Federal Revenues from Import Taxes
MVT_P	Motor Vehicles Tax, Provincial

N

$NENPR_F$	Number of Female Enrollment at Primary Level
$NENPR_M$	Number of Male Enrollment at Primary Level
$NENSE_F$	Number of Female Enrollment at Secondary Level
$NENSE_M$	Number of Male Enrollment at Secondary Level
NFI^r	Net Factor Income from Abroad in Real Terms
NHBED	New Hospital Beds
NLR_F	Total Female Literate
NLR_M	Total Male Literate
NPS_F	New Female Primary School
NPS_M	New Male Primary School
NRCH	New RHCs
NRR_F	Federal Net Revenue Receipts
NSS_F	New Female Secondary School
NSS_M	New Male Secondary School
$NWPR_F$	Number of Female Workers with Primary Education
$NWPR_M$	Number of Male Workers with Primary Education
$NWSE_F$	Number of Female Workers with Secondary Education
$NWSE_M$	Number of Male Workers with Secondary Education

O

OCT_L	Local Octroi
OIT_P	Other Indirect Taxes Provincial
ORE_F	Other Federal Recurring Expenditure
OT_L	Local Taxes Others
$OUTPR_F$	Output of Female from Primary Level
$OUTPR_M$	Output of Male from Primary Level
$OUTSE_F$	Output of Female from Secondary Level
$OUTSE_M$	Output of Male from Secondary Level

P

PHI	Public Health Index
PI	Price Index (Implicit GDP Deflator)
PI_{GC}	Price Index for Government Consumption
PI_{GI}	Price Index for Government Investment
PI_M	Price Index of Manufacturing Goods
PI_{WG}	Price Index Wholesale General
$PRENR_F$	Female Primary Enrollment
$PRENR_M$	Male Primary Enrollment
PT	Property Tax
PTHOS	Patient Treated Production Function for Hospitals
PTRHC	Patient Treated Production Function for RHCs

R

REDOH	Recurring Expenditure on Doctors in Hospital
REDOR	Recurring Expenditure on Doctors in RHCs
RED_P	Provincial Revenue from Education
REED	Total Recurring Expenditure on Education
REEDHE	Recurring Expenditure on Higher Education
$REED_L$	Local Recurring Expenditure on Education
$REED_P$	Provincial Recurring Expenditure on Education
$REEDPR_F$	Recurring Expenditure on Education Female Primary
$REEDPR_M$	Recurring Expenditure on Education Male Primary
$REEDSE_F$	Recurring Expenditure on Education Female Secondary
$REEDSE_M$	Recurring Expenditure on Education Male Secondary

RE_F	Total Recurring Expenditure Federal
REH	Total Recurring Expenditure on Health
REH_L	Local Recurring Expenditure on Health
REHOT	Recurring Expenditure on Other facilities (MCH, TBC, SHC)
REH_P	Provincial Recurring Expenditure on Health
RE_L	Total Local Recurring Expenditure
RENUH	Recurring Expenditure on Nurses in Hospital
$REOT_L$	Local Recurring Expenditure on Other Services
$REOT_P$	Provincial Recurring Expenditure on Other Sectors
$REOTS_L$	Local Recurring Expenditure on Other Social Sectors
$REOTS_P$	Provincial Recurring Expenditure on Other Social Sectors
RE_P	Total Provincial Recurring Expenditure
REPAH	Recurring Expenditure on Paramedics in Hospital
REPAR	Recurring Expenditure on Paramedics in RHCs
REP_F	Repayment of External Debt
RG^r	Resource Gap in Real Term
RH_P	Provincial Revenue from Health
ROT_P	Provincial Revenue from Other Non-Taxes
RSD_L	Local Revenue Surplus or Deficit
RSD_P	Provincial Revenue Surplus or Deficit

S

SD_P	Stamp Duties
$SEENR_M$	Male Secondary Enrollment Ratio
$SEENR_F$	Female Secondary Enrollment Ratio
$SPIE_F$	Stock of Physical Economic Infra-Structure Federal
$SPIE_P$	Stock of Physical Economic Infra-Structure Provincial
SPS_F	Total Female Primary School
SPS_M	Total Male Primary School
SSS_F	Total Female in Secondary School
SSS_M	Total Male in Secondary School
$STOK^r$	Stock in Real Terms
STR_F	Federal Revenues from Sales Tax
SUB^r	Subsidies in Real Terms

T

TDOH	Total Doctors in Hospitals
TDOR	Total Doctors in RHCs
$TEPS_F$	Teacher Female Primary School
$TEPS_M$	Teacher Male Primary School
$TESS_F$	Teacher Female Secondary School
$TESS_M$	Teacher Male Secondary School
THBED	Total Stock of Beds in Hospital
TNT_L	Total Local Non-Taxes
TNT_P	Total Provincial Non-Taxes
TNUH	Total Nurses in Hospitals
TPAH	Total Paramedics in Hospitals
TPAR	Total Paramedics in RHCs
TRHC	Total Stock of RHCs
TT_L	Total Local Taxes
TT_P	Total Provincial Taxes

U

U	Unemployment Rate
UCB_P	Provincial Use of Cash Balances

X

X^r	Total Export in Real Terms
X^r_g	Total Export of Goods in Real Terms

Y

Y^r	Gross Domestic Product in Real Terms
Y^r_A	Value-added in Agriculture Sector in Real Terms
Y^r_M	Value-added in Manufacturing Sector in Real Terms
Y^r_N	Gross National Product in Real Term
Y^r_{OT}	Value-added in Other Sectors in Real Terms

LIST OF EXOGENOUS POLICY VARIABLES

A

$\overline{A}$	Cultivated Area

C

$\overline{CARL}$	Local Capital Account Receipt
$\overline{CRE}_P$	Provincial Cost Recovery Ratio for Education
$\overline{CRH}_P$	Provincial Cost Recovery Ratio for Health
$\overline{CRNT}_L$	Cost Recovery Ratio for Local Services
$\overline{CROT}_P$	Provincial Cost Recovery Ratio for Other Services

D

$\overline{DEAUB}$	Development Expenditure in Autonomous Bodies
$\overline{DEF}_F$	Defence Expenditures
$\overline{DESCET}_F$	Discretionary Changes in Federal Excise Tax
$\overline{DESCIT}_F$	Discretionary Changes in Federal Income Tax
$\overline{DESCMT}_F$	Discretionary Changes in Federal Import Duties
$\overline{DESCST}_F$	Discretionary Changes in Federal Sales Tax

G

$\overline{GFB}_F$	Gross Foreign Borrowing
$\overline{GP}_F$	Grants to Provinces (Non-Obligatory)
$\overline{GR}_P$	Grants to Local Governments

H

$\overline{HYDRO}$	Revenues from Hydro Electricity

I

$\overline{INT}_A$	Interest Rate on Advances

L

$\overline{LFPR}_F$	Female Labour Force Participation from Primary Level
$\overline{LFPR}_M$	Male Labour Force Participation from Primary Level

$\overline{LFSE}_F$	Female Labour Force Participation from Secondary Level
$\overline{LFSE}_M$	Male Labour Force Participation from Secondary Level

P

$\overline{PI}_{IME}$	Price Index of Imports for Machinery and Equipment
$\overline{PI}_{IMP}$	Price Index of Imports
$\overline{PI}_W$	Price Index of World Exports
$\overline{PI}_X$	Price Index of Exports
$\overline{POP10}_F$	Female Population above 10 Year of Age
$\overline{POP10}_M$	Male Population above 10 Year of Age

R

$\overline{RM}^r$	Remittances in Real Terms
$\overline{RNT}_F$	Federal Non-tax Revenues

S

$\overline{SAB}_F$	Surplus from Autonomous Bodies
$\overline{SGAPR}_M$	School Going Age Male Primary
$\overline{SGAPR}_F$	School Going Age Female Primary
$\overline{SGASE}_M$	School Going Age Male Secondary
$\overline{SGASE}_F$	School Going Age Female Secondary
$\overline{SG}_F$	Federal Surcharges from Gas
$\overline{SHPR}_F$	Female Share of Primary
$\overline{SHPR}_M$	Male Share of Primary
$\overline{SHSE}_F$	Female Share of Secondary
$\overline{SHSE}_M$	Male Share of Secondary
$\overline{SUB}$	Subsidies in Real Terms
$\overline{SUR}_F$	Federal Surcharges on Gas and Petroleum

U

$\overline{UCPS}_F$	Unit Cost of Female Primary School
$\overline{UCPS}_M$	Unit Cost of Male Primary School

$\overline{UCSS}_F$	Unit Cost of Female Secondary School
$\overline{UCSS}_M$	Unit Cost of Male Secondary School
$\overline{UCBED}$	Unit Cost of Hospital Bed
$\overline{UCDOH}$	Unit Cost of Doctors in Hospital
$\overline{UCDOR}$	Unit Cost of Doctors in RHCs
$\overline{UCNUH}$	Unit Cost of Nurses in Hospital
$\overline{UCPAH}$	Unit Cost of Paramedics in Hospital
$\overline{UCPAR}$	Unit Cost of Paramedics in RHCs
$\overline{UCRHC}$	Unit Cost of RHCs

W

$\overline{WPS}_F$	Wages Female Primary School
$\overline{WPS}_M$	Wages Male Primary School
$\overline{WSS}_F$	Wages Female Secondary School
$\overline{WSS}_M$	Wages Male Secondary School

X

$\overline{X}_s^r$	Total Export of Services in Real Terms

** All the variables are expressed in constant 1980-81 million rupees unless otherwise states.

APPENDIX D

SUMMARY
RESULTS OF POLICY SIMULATIONS

MACRO ECONOMIC POLICY SIMULATIONS

- Increase in Foreign Aid
- Change in Import Price Index
- Increase in Export Price Index
- Increase in Interest Rate on Advances
- Increase in Home Remittances
- Increase in Private Investment
- Increase in ADP
- Increase Investment in Power, Telecom Sector
- Decline in Population Growth Rate

TABLE D-1

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO INCREASE IN FOREIGN AID (BY 50% IN 1993-94)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.34%	5.75%	5.86%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		7.18%	5.88%	5.32%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.00%	5.40%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.38%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.76%	30.09%	30.06%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.84%	9.37%	9.87%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.73%	5.08%	5.33%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.10%	0.21%	0.34%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.82%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.75%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.58%	119.22%	134.73%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.30%	67.80%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.83%	42.98%	48.93%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.58%	43.99%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.05	153.92	189.73
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.11	251.71	275.69

TABLE D-2

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO CHANGE IN IMPORT PRICE INDEX (BY 50% IN 1993-94)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		8.09%	5.83%	5.86%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		4.26%	5.89%	5.25%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		21.95%	5.36%	5.41%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		15.03%	14.89%	15.30%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.49%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.00%	7.59%	7.90%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		27.40%	29.81%	29.86%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.08%	9.36%	9.84%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.38%	5.08%	5.30%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		-0.37%	0.27%	0.37%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.98%	62.92%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.30%	26.80%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.74%	119.81%	134.85%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.25%	57.68%	67.82%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.87%	43.06%	48.95%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.35%	28.72%	44.17%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.14	154.22	190.15
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		242.17	252.91	274.57

TABLE D-3

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO INCREASE IN EXPORT PRICE INDEX (BY 25% IN 1993-94)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.12%	5.75%	5.87%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.82%	6.10%	5.66%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	5.99%	5.39%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.23%	30.22%	30.36%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.37%	9.87%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.08%	5.33%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.22%	0.34%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.79%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.74%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.13%	134.56%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.28%	67.75%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	42.96%	48.90%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.57%	43.96%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.21	154.16	189.90
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.08	251.56	275.44

TABLE D-4

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO INCREASE IN INTEREST RATE ON ADVANCES (BY 10% IN 1993-94)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.07%	5.73%	5.87%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.98%	6.21%	5.80%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.05%	5.42%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.39%	30.36%	30.51%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.39%	9.87%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.08%	5.32%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.22%	0.34%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.91%	62.77%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.73%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.08%	134.41%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.24%	67.67%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	42.95%	48.87%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.56%	43.91%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.18	154.13	189.84
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.06	251.36	275.12

TABLE D-5

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO INCREASE IN HOME REMMITENCES (BY 50% IN 1993-94)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.12%	5.74%	5.87%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.81%	6.13%	5.68%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.03%	5.41%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.41%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.23%	30.28%	30.39%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.38%	9.87%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.08%	5.33%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.22%	0.34%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.78%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.73%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.12%	134.49%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.26%	67.71%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	42.96%	48.89%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.56%	43.93%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.20	154.19	189.90
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.12	251.47	275.29

TABLE D-5

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO INCREASE IN HOME REMMITENCES (BY 50% IN 1993-94)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.12%	5.74%	5.87%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.81%	6.13%	5.68%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.03%	5.41%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.41%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.23%	30.28%	30.39%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.38%	9.87%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.08%	5.33%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.22%	0.34%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.78%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.73%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.12%	134.49%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.26%	67.71%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	42.96%	48.89%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.56%	43.93%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.20	154.19	189.90
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.12	251.47	275.29

TABLE D-6

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO INCREASE IN PRIVATE INVESTMENT

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.13%	5.83%	5.96%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.81%	6.08%	5.47%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.04%	5.40%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.11%	15.47%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.71%	8.02%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.22%	30.22%	30.18%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.37%	9.85%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.08%	5.33%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.20%	0.30%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.82%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.75%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.18%	134.89%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.29%	67.91%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	42.97%	48.97%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.57%	44.03%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.22	154.35	190.28
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.08	251.68	276.45

TABLE D-7

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO INCREASE IN ADP (50% IN INTERCEPT TERM)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.19%	5.84%	5.92%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.96%	6.44%	6.12%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.06%	5.44%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.39%	15.08%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.36%	30.53%	30.75%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.35%	9.82%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.07%	5.31%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.20%	0.31%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.83%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.75%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.21%	134.92%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.29%	67.89%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.83%	42.98%	48.97%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.57%	44.02%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.14	153.82	189.36
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.09	251.71	276.31

TABLE D-8

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO INCREASE INVESTMENT IN POWER, TELECOM SECTOR

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.10%	5.74%	5.87%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.82%	6.15%	5.71%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.05%	5.42%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.23%	30.30%	30.42%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.39%	9.87%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.08%	5.33%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.22%	0.34%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.78%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.73%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.10%	134.47%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.25%	67.70%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	42.95%	48.88%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.56%	43.92%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.20	154.16	189.88
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.07	251.42	275.25

TABLE D-9

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO DECLINE IN POPULATION GROWTH RATE (0.2% DECLINE)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.09%	5.73%	5.88%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.82%	6.16%	5.72%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.05%	5.42%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.23%	30.31%	30.43%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.39%	9.87%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.08%	5.33%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.22%	0.34%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.91%	53.21%	63.69%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.23%	22.37%	27.16%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.60%	119.76%	136.78%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.14%	57.70%	69.44%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.85%	43.24%	49.74%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.31%	28.85%	45.62%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.18	154.02	189.69
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.07	251.41	275.20

FISCAL POLICY SIMULATION

- Increase in Fiscal Efforts in Federal Taxes
- Higher Fiscal Efforts by Provincial Governments
- Higher Revenue from Federal Surcharges
- Changes in Inter-governmental Revenue Sharing Arrangements
- Decentralisation of Fiscal Services to Local Government
- Retirement of Domestic Debt
- Lower Interest Rate on Intergovernmental Borrowing
- Cut in Defence Expenditure and Diversion to Federal Development Expenditure

TABLE D-10

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO INCREASE IN FISCAL EFFORTS IN FEDERAL TAXES (50% IN 1993-94)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.11%	5.77%	5.92%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.73%	5.84%	5.11%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.01%	5.38%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.52%	15.41%	15.75%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.25%	7.96%	8.27%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.27%	30.29%	30.13%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.89%	9.53%	10.06%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.76%	5.18%	5.45%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.04%	0.13%	0.27%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.96%	63.03%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.29%	26.89%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.59%	119.77%	136.50%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.13%	57.74%	69.03%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.83%	43.08%	49.23%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.71%	44.68%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.20	154.23	190.39
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.31	254.12	280.71

TABLE D-11

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO HIGHER FISCAL EFFORTS BY PROVINCIAL GOVTS.

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.29%	5.75%	5.90%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.77%	6.06%	5.51%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.04%	5.40%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.38%	15.08%	15.41%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.55%	0.52%	0.49%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.20%	7.78%	8.12%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.21%	30.30%	30.38%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.86%	9.42%	9.95%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.75%	5.13%	5.42%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.06%	0.18%	0.29%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.94%	62.91%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.27%	26.81%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.59%	119.44%	135.52%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.13%	57.49%	68.41%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.83%	43.03%	49.10%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.64%	44.34%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.20	154.22	190.19
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.34	253.23	279.26

TABLE D-12

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO HIGHER REVENUES FROM FEDERAL SURCHARGES

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.55%	5.74%	5.87%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.48%	6.09%	5.60%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.05%	5.41%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.76%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.34%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.23%	30.24%	30.31%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.89%	9.40%	9.88%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.77%	5.09%	5.33%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		-0.05%	0.22%	0.34%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.94%	62.83%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.27%	26.76%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.62%	119.32%	134.69%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.16%	57.38%	67.81%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.84%	42.99%	48.92%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.33%	28.61%	44.03%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.19	154.20	189.98
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.62	251.92	275.44

TABLE D-13

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO CHANGE IN INTERGOVERNMENTAL REVENUE SHARING ARRANGEMENTS

(45% SHARE OF PROVINCIAL GOVERNMENTS)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.10%	5.73%	5.88%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.82%	6.28%	5.93%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.04%	5.44%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	8.04%	8.02%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.23%	30.43%	30.62%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.55%	9.95%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.18%	5.37%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.12%	0.37%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.91%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.83%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.33%	135.69%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.47%	68.53%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	43.01%	49.08%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.62%	44.37%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.20	154.21	190.27
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.07	252.75	278.60

TABLE D-14

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO DECENTRALIZATION OF FISCAL SERVICES TO LOCAL GOVTS.

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.03%	5.72%	5.91%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.82%	6.16%	5.68%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.05%	5.41%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.98%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.28%	30.40%	30.44%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.96%	9.43%	9.86%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.77%	5.16%	5.38%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.13%	0.22%	0.31%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.96%	62.98%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.29%	26.89%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.61%	119.71%	135.85%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.16%	57.78%	68.90%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.84%	43.19%	49.51%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.33%	28.78%	44.85%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.24	154.49	190.93
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.05	251.34	275.01

TABLE D-15

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO RETIREMENT OF DOMESTIC DEBT (30 BILLION IN 1993-94)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.10%	5.74%	5.87%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.82%	5.61%	4.81%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.01%	5.36%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.10%	15.43%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.23%	29.77%	29.55%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.39%	9.89%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.09%	5.33%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.22%	0.35%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.78%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.73%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.10%	134.42%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.25%	67.66%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	42.95%	48.88%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.56%	43.91%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.20	154.16	189.88
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.07	251.40	275.06

TABLE D-16

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO LOWER INTEREST RATE ON INTERGOVERNMENTAL BORROWING

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.10%	5.73%	5.86%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.81%	6.09%	5.50%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.04%	5.39%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.98%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.19%	30.09%	29.95%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.82%	9.21%	9.52%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.07%	5.28%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.07%	0.10%	0.12%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.78%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.72%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.10%	134.42%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.24%	67.55%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	42.93%	48.67%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.55%	43.76%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.20	154.16	189.78
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.07	251.10	274.19

TABLE D-17

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO CUT IN DEFENCE EXP AND DIVERSION TO FED. DEV. EXPENDITURE

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.47%	5.73%	5.86%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.17%	5.93%	5.34%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.03%	5.40%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.38%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.14%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		29.53%	30.06%	30.05%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.83%	9.38%	9.87%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.73%	5.08%	5.33%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.10%	0.21%	0.34%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.81%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.26%	26.74%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.58%	119.21%	134.68%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.29%	67.77%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.83%	42.98%	48.92%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	28.57%	43.97%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		136.98	153.98	189.78
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.14	251.66	275.57

SOCIAL SECTOR POLICY SIMULATION

- Increased Cost Effectiveness in the Provision of Social Services
- Lower School Drop-out Rates
- Change in Investment Priorities within Education
- Change in Investment Priorities within Primary Education
- Change in Investment Priorities
- SAP with Recurring Expenditure Component
- SAP with only Development

TABLE D-18

CHANGES IN KEY ECONOMIC AND SOCIAL INDICATORS DUE TO INCREASED COST EFFECTIVENESS IN THE PROVISION OF SOCIAL SERVICES (10% DECLINE IN UNIT COST)

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.10%	5.78%	5.98%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.82%	6.14%	5.62%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.05%	5.41%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.41%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.23%	30.27%	30.28%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.38%	9.84%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.08%	5.32%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.22%	0.32%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.93%	62.87%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.30%	26.97%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.59%	119.36%	135.21%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.17%	57.92%	69.79%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.90%	43.72%	50.70%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.35%	29.02%	45.75%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.21	154.54	191.54
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		249.48	261.90	287.16

TABLE D-19

INCREASED COST EFFECTIVENESS IN THE PROVISION OF SOCIAL LOWER SCHOOL DROPOUT RATES

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.45%	7.86%	10.92%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.78%	5.31%	1.87%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	5.97%	5.06%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.38%	14.88%	14.97%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.14%	7.60%	7.82%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.14%	28.82%	24.53%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.83%	9.02%	8.63%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.73%	4.92%	4.83%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.10%	0.05%	-0.30%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		46.23%	56.84%	78.52%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.43%	24.45%	35.92%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.58%	119.91%	141.87%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.14%	58.38%	76.70%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.83%	43.17%	50.59%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.41%	31.72%	75.27%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		138.50	175.54	273.22
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.13	253.58	292.97

TABLE D-20

INCREASED COST EFFECTIVENESS IN THE PROVISION OF SOCIAL CHANGE IN INVESTMENT PRIORITIES WITHIN EDUCATION

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.12%	6.01%	6.62%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.82%	6.06%	5.10%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.04%	5.36%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.08%	15.39%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.23%	30.14%	29.53%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.35%	9.69%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.07%	5.26%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.20%	0.23%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.97%	52.75%	62.10%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.42%	27.79%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.36%	116.98%	129.77%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.26%	59.92%	77.83%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		37.19%	48.30%	63.38%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.47%	31.39%	56.24%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.26	156.27	200.42
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.08	251.66	277.66

TABLE D-21

INCREASED COST EFFECTIVENESS IN THE PROVISION OF SOCIAL CHANGE IN INVESTMENT PRIORITIES WITHIN PRIMARY EDUCATION

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.10%	5.74%	5.96%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.82%	6.15%	5.67%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.05%	5.41%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.23%	30.30%	30.36%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.85%	9.39%	9.86%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.74%	5.08%	5.32%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.22%	0.33%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.97%	52.75%	62.03%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.28%	22.74%	29.79%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.36%	116.91%	128.92%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.54%	64.97%	97.10%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	42.95%	48.89%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.32%	29.16%	51.78%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.19	154.16	190.61
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		240.07	251.42	275.35

TABLE D-22

INCREASED COST EFFECTIVENESS IN THE PROVISION OF SOCIAL CHANGE IN INVESTMENT PRIORITIES

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.08%	5.74%	5.91%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.83%	6.19%	5.76%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.05%	5.42%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.42%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.24%	30.36%	30.49%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.88%	9.46%	9.94%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.77%	5.13%	5.36%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.12%	0.25%	0.37%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.91%	62.78%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.27%	22.27%	26.80%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.09%	134.46%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.12%	57.42%	68.28%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.84%	43.30%	49.74%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.33%	28.75%	44.65%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.21	154.37	190.71
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		258.15	320.36	414.57

TABLE D-23

INCREASED COST EFFECTIVENESS IN THE PROVISION OF SOCIAL SAP WITH RECURRING EXPENDITURE

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.10%	5.76%	5.91%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.89%	6.24%	5.83%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.06%	5.42%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.41%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.98%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.27%	30.40%	30.53%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.92%	9.43%	9.88%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.81%	5.11%	5.33%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.11%	0.24%	0.35%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	53.02%	63.05%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.28%	22.55%	27.67%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.74%	120.29%	135.67%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.60%	60.93%	73.72%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	42.98%	48.97%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.33%	28.98%	46.55%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.21	154.42	190.74
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		261.30	324.67	414.21

TABLE D-24

INCREASED COST EFFECTIVENESS IN THE PROVISION OF SOCIAL SAP WITH ONLY DEVELOPMENT EXPENDITURE

INDICATORS	HISTORICAL	EX - ANTE		
	1992-93	1993-94	1997-98	2002-03
GROWTH RATE OF GDP				
- In Base Simulation	3.56%	7.10%	5.74%	5.87%
- In Policy Simulation		7.10%	5.75%	5.91%
BUDGET DEFICIT AS % OF GDP				
- In Base Simulation	7.10%	6.82%	6.15%	5.71%
- In Policy Simulation		6.89%	6.21%	5.78%
RATE OF INFLATION				
- In Base Simulation	9.20%	9.15%	6.05%	5.42%
- In Policy Simulation		9.15%	6.06%	5.42%
FEDERAL TAX TO GDP RATIO				
- In Base Simulation	13.44%	14.40%	15.09%	15.42%
- In Policy Simulation		14.40%	15.09%	15.41%
PROVINCIAL TAX TO GDP RATIO				
- In Base Simulation	0.60%	0.50%	0.47%	0.45%
- In Policy Simulation		0.50%	0.47%	0.45%
PROVINCIAL REVENUE TO GDP RATIO				
- In Base Simulation	6.92%	7.15%	7.69%	7.99%
- In Policy Simulation		7.15%	7.69%	7.99%
TOTAL PUBLIC EXP. TO GDP RATIO				
- In Base Simulation	29.67%	30.23%	30.30%	30.42%
- In Policy Simulation		30.24%	30.37%	30.48%
TOTAL PROVINCIAL EXP. TO GDP RATIO				
- In Base Simulation	8.90%	8.85%	9.39%	9.87%
- In Policy Simulation		8.92%	9.40%	9.87%
TOTAL SOCIAL SECTOR EXP. TO GDP RATIO				
- In Base Simulation	4.78%	4.74%	5.08%	5.33%
- In Policy Simulation		4.81%	5.08%	5.32%
USE OF CASH BALANCES AS % OF GDP				
- In Base Simulation	0.32%	0.11%	0.22%	0.34%
- In Policy Simulation		0.12%	0.23%	0.34%
LITERACY RATE				
MALE				
- In Base Simulation	46.01%	45.98%	52.92%	62.78%
- In Policy Simulation		45.98%	52.92%	62.78%
FEMALE				
- In Base Simulation	18.96%	19.27%	22.26%	26.73%
- In Policy Simulation		19.28%	22.61%	28.02%
PRIMARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	99.42%	98.57%	119.10%	134.47%
- In Policy Simulation		98.57%	119.11%	134.52%
FEMALE				
- In Base Simulation	45.21%	47.12%	57.25%	67.70%
- In Policy Simulation		47.61%	62.01%	76.65%
SECONDARY ENROLLMENT RATIO				
MALE				
- In Base Simulation	34.56%	36.82%	42.95%	48.88%
- In Policy Simulation		36.82%	42.96%	48.92%
FEMALE				
- In Base Simulation	19.17%	20.32%	28.56%	43.92%
- In Policy Simulation		20.33%	29.03%	47.43%
HUMAN CAPITAL INDEX				
- In Base Simulation	136.22	137.20	154.16	189.88
- In Policy Simulation		137.20	154.31	190.58
PUBLIC HEALTH INDEX				
- In Base Simulation	241.38	240.07	251.42	275.25
- In Policy Simulation		258.38	324.70	416.47

APPENDIX E

EXPLANATORY NOTES ON MACRO AND FISCAL AND SOCIAL SECTOR VARIABLES

EXPLANATORY NOTES

ON MACRO, FISCAL AND SOCIAL SECTOR VARIABLES

Cultivated area (A):

Data on this variable is collected from Economic Survey, 1992-93. The cultivated area is in million hectars. This variable is used in Block A only.

Federal Budget Deficit ($BDEF_F$):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93, in billion rupees. This variable is used in Blocks F, I and M.

Provincial Budget Deficit ($BDEF_P$):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, used in Blocks I and M.

Local Budget Deficit ($BDEF_L$):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, used in Block K.

Local Capital Account Receipts (CAR_L):

Information on this has been collected from NCRD data base. Data for the local finances was available for the year 1979-80 to 1986-87 and 1989-90 to 1991-92. The datas for the missing

years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, used in Block K.

Government Consumption in Real Term (C_g^r):

Data on this variable is collected from Economic Survey, 1985-86 1987-88 and 1992-93. This variable is used in Block C. With the help of regression analysis, data before 1980-81 has been estimated as to remove the inconsistency due to change in methodology.

Private Consumption in Real Term (C_p^r):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93. This variable is used in Block C. With the help of regression analysis, data before 1980-81 has been estimated as to remove the inconsistency due to change in methodology.

Outstanding Domestic Debt ($DDEBT_F$):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93 and Federal Budget in Brief, in billion rupees. This variable is used in Blocks E and F.

Total Development Expenditure (DE_F):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93, in billion rupees. This variable is used in Blocks E and F.

Local Development Expenditure on Education ($DEED_L$):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used in the sum of all local councils, used in Block K.

Procincial Social Development Expenditure on Education ($DEED_P$):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provincies, which is used in Block H.

Defcnce Expenditure (DEF_F):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93 and Federal Budget in Brief, in billion rupees. This variable is used in Block E.

Local Development Expenditure on Health (DEH_L):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block K.

Provincial Development Expenditure on Health (DEH_P):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Block H.

Local Development Expenditure on Other Sectors ($DEOT_L$):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block K.

Provincial Development Expenditure on Other Sector ($DEOT_P$):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Block H.

Discretionary Changes in Federal Excise Duty ($DESCET_F$):

Data has been collected from CBR Yearbook, 1988 and Budget Speeches of Finance Ministers, 1988-89 to 1992-93. The variable used is the sum of four provinces which used in Blocks D.

Discretionary Changes in Federal Income Tax ($DESCIT_F$):

Data has been collected from CBR Yearbook, 1988 and Budget Speeches of Finance Ministers, 1988-89 to 1992-93. The variable used is the sum of the four provinces which used in Blocks D.

Discretionary Changes in Federal Import Duties ($DESCMT_F$):

Data has been collected from CBR Yearbook, 1988 and Budget Speeches of Finance Ministers, 1988-89 to 1992-93. The variable used is the sum of the four provinces which used in Blocks D.

Discretionary Changes in Federal Sales Tax ($DESCST_F$):

Data has been collected from CBR Yearbook, 1988 and Budget Speeches of Finance Ministers, 1988-89 to 1992-93. The variable used is the sum of the four provinces which used in Blocks D.

Provincial Development Expenditure For Social Sector (DES_P):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in nillion rupees. The variable used is the sum of the four provinces which used in Blocks H.

Total Development Expenditure Federal (DE_F):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93 and Federal Budget in Brief, in billion rupees. This variable is used in Blocks C and E.

Total Development Expenditure Local (DE_L):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block C and K.

Total Development Expenditure Provincial (DE_P):

Data bas been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Blocks C, E, H and I.

Divisible Pool Transfers from Taxes ($DPTX_F$):

Data has been collected from Explanatory Memorandum on the Budget 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Block D.

Divisible Pool Transfers (DPT_F):

Data has been collected from Explanatory Memorandum on the Budget 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which used in Blcok D and G.

Provincial Debt Servicing (DS_P):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Blocks, C, D and H.

External Excise Duty (ETR_F):

Data on this variable is collected from CBR Yearbook, 1986-87, 1988-89 and 1992-93 and 1992-93 and Federal Budget in Brief, in billion rupees. This variable is used in Block D.

Local Export Tax(ET_L):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the mising years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block J.

Federal Gross Foreign Borrowing (GFB_F):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93 and Federal Budget in Brief, in billion rupees. This variable is used in Blocks E, F and M.

Non-Obligatory Grants to Provinces (GP_F):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Blocks C, E and G.

Gross Local Revenue Receipts (GRR_L):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block J and K.

Gross Provincial Revenue Receipts (GRR_P):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Blocks G, H and I.

Grants to Local Governments (GR_P):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block H and J.

Gross Federal Taxes (GTR_F):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93 and CBR Yearbook, 1988-89 to 1990-91, in billion rupees. This variable is used in Block D.

Revenue from Hydro Electricity (HYDRO):

Data jas neem cp;;ected frp, Ammia; Nidget State,emts pf tje {rpvomcoa; Gpverm,emts. 1072-73 to 1993-94, in nillion rupees. The variable used is the sum of the four provinces, which is used in Block D.

Import of Goods in Real Term (IMP_g^r):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93. This variable is used in Block D, J and L.

Total Import in Real Term (IMP^r):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93. This variable is used in Block C and L.

Import of Services in Real Term (IMP_s^r):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93. This variable is used in Block L.

Interest on Domestic Debt ($INTDD_F$):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93 and Federal Budget in Brief. This variable is used in Block C and E.

Interest on External Debt ($INTED_F$):

Data on this variable is collected from Economic Survey, 1985-86, 1987-88 and 1992-93 and Federal Budget in Brief. This variable is used in Blocks A, C and E.

Interest Rate on Advance (INT_A):

Data on this variable is collected from Annual Report, State Bank of Pakistan. This variable is used in Block C.

Interest Rate on Deposit (INT_D):

Data on this variable is collected from Annual Report, State Bank of Pakistan. This variable is used in Block C, E and H.

Income Tax Revenue (IT_F):

Data on this variable is collected from CBR Yearbook, 1986-87, 1988-89 to 1990-91 and 1992-93, in billion rupees. This variable is used in Block D.

Local Indirect Taxes (IT_F):

Data on this variable is collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is

extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block A and J.

Provincial Indirect Taxes (IT_P):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Block A and G.

Federal Indirect Taxes (IT^F):

Data on this variable is collected from CBR Yearbook, 1986-87, 1988-89 to 1990-91 and 1992-93 and Economic Survey, in billion rupees. This variable is used in Block A.

Government Investment in Real Term (I_g^r)

Data has been collected from Annual Report, State Bank of Pakistan, 1987-88 and 1991-92 and Economic Survey, 1992-93. This variable is used in Block C and L.

Private Investment in Agriculture in Real Term (I_{PA}^r)

Data has been collected from Annual Report, State Bank of Pakistan, 1987-88 and 1991-92. This variable is used in Block B and C.

Private Investment in Manufacturing in Real Term (I_{PM}^r)

Data has been collected from Annual Report, State Bank of Pakistan, 1987-88 and 1991-92. This variable is used in Block B and C.

Private Investment in Other Sector in Real Term (I_{POT}^r)

Data has been collected from Annual Report, State Bank of Pakistan, 1987-88 and 1991-92. This variable is used in Block B and C.

Total Private Investment in Real Term (I_p'):

Data has been collected from Annual Report, State Bank of Pakistan, 1987-88 and 1991-92 and Economic Survey, 1992-93. This variable is used in Block C.

Total Investment in Real Term (I'):

Data has been collected from Annual Report, State Bank of Pakistan, 1987-88 and 1991-92 and Economic Survey, 1992-93. This variable is used in Block C.

Total Labour Force (LABFO):

Data has been collected from Economic Survey, 1992-93. This variable is used in Block B.

Labour Force in Agriculture (L_A):

Data has been collected from Economic Survey, 1992-93 and Labour Force Survey, 1971-72, 1974-75, 1978-79 and 1982-83. This variable is used in Block A and B.

Labour Force in Manufacturing (L_M):

Data has been collected from Economic Survey, 1992-93 and Labour Force Survey, 1971-72, 1974-75, 1978-79 and 1982-83. This variable is used in Block A and B.

Labour Force in Other Services (L_{OT}):

Data has been collected from Economic Survey, 1992-93 and Labour Force Survey, 1971-72, 1974-75, 1978-79 and 1982-83. This variable is used in Block A and B.

Money Supply (M):

Data has been collected from Economic survey, 1992-93. This variable is used in Block M.

Federal Revenue from Import Taxes (MTR_F):

Data on this variable is collected from CBR Yearbook, 1986-87, 1988-89 to 1990-91 and 1992-93 and Economic Survey, in billion rupees. This variable is used in Block D.

Motor Vehicle Tax (MVT_P):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Block G.

Net Factor Income from Abroad (NFT^r):

Data on this variable is collected from Ecopnomic Survey, 1985-86, 1987-87 and 1992-93. This variable is used in Block A and L. With the help of regression analysis, data before 1980-81 has been estimated as to remove the inconsistency due to change in methodology.

Federal Net Revenue Receipt (NRR_F):

Data on this variable is collected from CBR Yearbook, 1986-87, 1988-89 to 1990-91 and 1992-93 and Economic Survey, in billion rupees. This variable is used in Block D, E and F.

Local Octroi (OCT_L):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block J.

Implicit GDP Deflator (PI):

Data on this variable is collected from Economic Survey, 1987-88 and 1992-93. This variable is used in Block C, D, G, J, L and M.

Price Index of Import (PI_{IMP})

Data on this variable is collected from Economic Sruvey, 1987-88 and 1992-93 and Statistical Yearbook of Pakistan, 1976. This variable is used in Block A, D, G, J and L.

Price Index of Manufacturing Goods (PI_M)

Data on this variable is collected from Economic Survey, 1987-88 and 1992-93 and Pakistan Statistical Yearbook, 1976. This variable is used in Block D and J.

Prince Index of Exports (PI_X):

Data on this variable is collected from Economic Survey, 1987-88 and 1992-93 and Pakistan Statistical Yearbook, 1976. This variable is used in Block L.

Female Population 10 Years and Above ($\overline{POP10}_F$)

Data on this variable is collected from Population Census, 1972 and 1981. This variable is used in Block B.

Male Population 10 Years and Above ($\overline{POP10}_M$)

Data on this variable is collected from Population Census, 1972 and 1981. This variable is used in Block B.

Property Tax (PT):

Data has been collected from Annual Budget Statements of the Proincial Governments, 1972-73 to 1993-94, in nillion rupees. The variable used is the sum of the four provinces, which is used in Block G and J.

Provincial Revenue from Education (RED_P):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable sued in the sum of the four provinces, which is used in Block G.

Local Recurring Expenditure on Education ($REED_L$):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block K.

Provincial Recurring Expenditure on Education ($REED_P$):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Block G and H.

Local Recurring Expenditure on Health (REH_L):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block K.

Provincial Recurring Expenditure on Health (REH_P):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Block G and H.

Local Recurring Expenditure on Other Social Sector ($REOTS_L$):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block K.

Provincial Recurring Expenditure on Other Social Sector ($REOTS_P$):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Block G and H.

Provincial Recurring Expenditure on Public Health ($REPH_P$):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Block G and H.

Repayment of External Debt (REP_F):

Data on this variable is collected from Economic Survey and Federal Budget in Brief. This variable is used in Block C, E, F and M.

Federal Recurring Expenditure (RE_F):

Data on this variable is collected from Economic Survey and Federal Budget in Brief. This variable is used in Block C, E, F and M.

Local Recurring Expenditure (RE_L):

Information on this has been collected from NCRD data base. Data for the local finances was available for the years 1979-80 to 1986-87 and 1989-90 to 1991-92. The data for the missing

years is extrapolated and interpolated on the bases of annual compound growth rate. The variable used is the sum of all local councils, which is used in Block C, J and K.

Provincial Recurring Expenditure (RE_P):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Block C, H and I.

Provincial Revenue from Health (RH_P):

Data has been collected from Annual Budget Statements of the Provincial Governments, 1972-73 to 1993-94, in million rupees. The variable used is the sum of the four provinces, which is used in Block G.

Federal Non-Tax Revenue (RNT_F):

Data on this variable is collected from CBR Yearbook and Economic Survey, 1985-86, 1987-88 and 1992-93. This variable is used in Block D.

SOCIAL SECTOR VARIABLES

Provincial Development Expenditure on Education ($DEED_P$):

The data regarding this variable is taken from Annual Budget Statements of Sindh, NWFP and Punjab (1972-73 to 1992-93). However, development expenditure of Balochistan is taken from Annual Development Programs (1972-73 to 1992-93). As the information by sub-sector was not available, therefore, expenditure on primary and secondary education is computed on the basis of shares as given in the data provided by Ministry of Eduucation, Government of Pakistan.

Local Development Expenditure on Education ($DEED_L$):

The data source of this variable is NCRD data base. The data is available for the years 1979-80 to 1991-92. Figure for the rest of years are extrpolated on the basis of annual compound growth rates.

Development Expenditure on Primary Education Male ($DEEDPR_M$):

Development expenditure on primary education by sex is calculated on the basis of sex ratio of number of schools.

Development Expenditure on Secondary Education Male ($DEEDSE_M$):

Development expenditure on secondary education by sex is also calculated on the basis of sex ratio of number of schools.

Development Expenditure on Higher Education (DEDHE):

Data on development expenditure on higher education is derived as a residual of development expenditure on primary and secondary education.

Provincial Recurring Expenditure on Education ($REED_P$):

The data regarding this variable is taken from Annual Budget Statements of Sindh, NWFP, Balochistan and Punjab (1972-73 to 1992-93). As the information by sub-sector was not available, therefore, expenditure on primary and secondary education is computed on the basis of shares as given in the data provided by Ministry of Eduucation, Government of Pakistan.

Local Recurring Expenditure on Education ($REED_L$):

The data source of this variable is NCRD data base. The data is available for the years 1979-80 to 1991-92. Figure for the rest of years are extrpolated on the basis of annual compound growth rates.

Recurring Expenditure on Primary Education Male ($REEDPR_M$)

Recurring expenditure on primary education by sex is calculated on the basis of sex ratio of number of schools.

Recurring Expenditure on Secondary Education Male ($REEDSE_M$):

Recurring expenditure on secondary education by sex is also calculated on the basis of sex ratio of number of schools.

Recurring Expenditure on Higher Education (REDHE):

Data on recurring expenditure on higher education is derived as a residual of development expenditure on primary and secondary education.

Number of Schools and Teachers:

Information on number of schools and teachers by level of education (primary & secondaey) separately for boys and girls has been ontained from variuos publications of Central Bureau of Education, Government of Pakistan. These data are published periodically. The Pakistan Education Statistics, 1979 contained data for the period 1973 to 1977. The issue 1989 provides data for 1978 to 1986. The Pakistan School Statistics, 1990 provides data for 1987 and the issue

released in 1993 covers the remaining epriod upto 1993. However, the reported data for the years 1991-92 and 1992-93 is based on estimates prepared by Central Bureau of Education.

Enrollment by Level of Education:

Due to unavailability of time series of class-wise enrollment in the CBE's publications, the data of enrollmrnt have been complied from Development Statistics published by the Bureaus of Statistics of all the four provincial governments. The issues included Punjab Development Statistics 1980, 1981, 1984, 1985, 1986, 1988, 1989 and 1992; Sindh Development Statistics 1979, 1984, 1986, 1990 and 1992; NWFP Development Statistics 1980, 1985, 1986, 1988, 1989 and 1991 and Balochistan Development Statistics 1984, 1986, 1988, 1989, 1990 and 1992. However, due to inconsistancy and reporting errors, data for some years (1973, 1978, 1982, 1983, 1986, 1987 and 1988) are extrpolated on the basis of annual compound growth rates.

Population of Relevant Age Groups:

The population of relevant age groups has been derived by extrapolating the reported figures in the last two censuses of population namely Population Census 1972 and Population Census 1981.

Share of Output Primary Level:

Enrollment of class 5 is assumed to be the output of primary level both for boys and girls.

Share of Output Secondary Level:

The output of secondary level is estimated on the basis of examination results of Secondary School Certificate published by the Central Bureau of Education, Government of Pakistan for the years 1983 to 1986.

Death Rates of 10 Years and above:

The source of these data is a publication of Federal Bureau of Statistics, Governmnet of Pakistan namely `Women and Men in Pakistan: A Statistical Profile, 1992. However, data for some years was not available, threfore, extrapolated for the years: 1973-1976, 190-83 and 1989-93.

HEALTH SECTOR VARIABLES:

The information on health sector includes number of hospitals, dispensaries, basic health units, rural health centres, hospital beds, doctors and nurses. The data on these variables have been obtained from economics survey, 1992-93, Finance Division, Economic Advisors Wing, Government of Pakistan.

APPENDIX F

LIST OF DUMMY VARIABLES

LIST OF DUMMY VARIABLES

Equation No.	Dummy Variables	Explanation
A-2:	D-74,92	Cotton Boom Effect.
A-2:	D-84	Flood Dummy.
A-2:	D-85-87	Crop Failure.
A-3:	D-76-81	Labour Force Middle East Effect.
A-3:	D-81	Capital Inflow Effect.
A-4:	D-73-76	Nationalization Effect.
B-4:	D-93	Crop Failure Effect.
B-4:	D-86	Substitution Effect from Manufacturing Sector to Agriculture Sector.
B-5:	D-75-79	Labour Force Middle East Effect.
B-5:	D-80-81	Labour Force Middle East Effect.
B-5:	D-91-92	Privatization Effect.
B-6:	D-79	Labour Force Middle East Effect.
B-6:	D-86	Substitution Effect from Manufacturing Sector to Agriculture Sector.
B-8:	D-77-84	
B-8:	D-91-93	Crop Failure.
C-2:	D-88-89	Defence & Interest Payment.
C-6:	D-76	Nationalization Effect.
C-7:	D-92	Credit in Agriculture Sector & Foreign Currency Flow.
C-8:	D-75	Nationalization effect.
C-8:	D-88	
C-8:	D-81	Privatization Effect.
D-4:	D-73-76	Cotton Failure Effect.
D-4:	D-80-84	
D-5:	D-88-90	Tax Base Increase with Time.
D-6:	D-85-90	Tax Base Increase with Time.
D-7:	D-80	Tax Base Increase with Time.
D-7:	D-83-86	Tax Base Increase with Time.
D-7:	D-90-91	N.F.C Award Effect.
D-9:	D-89-91	Surcharges Effect (Iqra Surcharge).
D-9:	D-92-93	N.F.C Award Effect.

E-2:	D-80-83	
E-2:	D-90	Change in Composition of Debt and Financial Sector Reforms.
E-3:	D-79-83	
E-3:	D-90	Nawaz Sharief Commercial Borrowing.
E-3:	D-91-92	Nawaz Sharief Commercial Borrowing.
E-4:	D-90-93	Nawaz Sharief Commercial Borrowing.
E-5:	D-91-93	Pay Committee Award.
E-7:	D-86-88	Five Point Program Effect (Junejo Effect).
E-7:	D-92	Motor Way Effect.
G-4:	D-91-93	N.F.C Award Effect.
G-5:	D-91	N.F.C Award Effect.
G-7:	D-73	
G-7:	D-91-93	N.F.C Award Effect.
H-2:	D-88	
H-2:	D-91	Social Action Program Effect.
H-3:	D-87	Five Point Effect.
H-4:	D-91	Sap Effect
H-4:	D-89	
H-7:	D-91	Special Transfers.
H-7:	D-89	Benazir Anti Nawaz Effect (Punjab).
H-10:	D-91	Increase in defence expenditure by 11.2% and interest payment increased by 31%
H-10:	D-86	Junejo's Five Point Program Effect.
H-11:	D-87	Junejo's Five Point Program Effect.
H-11:	D-86,88&92	Junejo's Five Point Program & SAP Effect.
H-12:	D-86-88	Junejo's Five Point Program Effect.
H-13:	D-92	Nawaz Sharief Motor Way Effect.
H-13:	D-73	
H-13:	D-91	Special Development Program.
J-4:	D-87	Junejo Fiscal Effort (Octroi Rates).
J-4:	D-90-91	
J-6:	D-92-93	Fiscal Effort.
K-2:	D-73-79	Data Was not Available before 1980 so Data is Extrapolated for this Period.
K-2:	D-90	Declined Investment in Education Sector.
K-3:	D-73-79	Data Was not Available before 1980 so Data is Extrapolated for this Period.

K-4:	D-73-79	Data Was not Available before 1980 so Data is Extrapolated for this Period.
K-4:	D-88-91	Local Body Election.
K-4:	D-84	Local Body Election.
K-5:	D-73-79	Data Was not Available before 1980 so Data is Extrapolated for this Period.
K-7:	D-73-79	Data Was not Available before 1980 so Data is Extrapolated for this Period.
K-8:	D-73-79	Data Was not Available before 1980 so Data is Extrapolated for this Period.
K-9:	D-73-79	
K-9:	D-91	Rising Population & urbanization.
K-9:	D-81,82,89	Special Development Program.
K-12:	D-91	SAP Effect.
L-2:	D-90	Gulf War.
L-2:	D-85	Decrease in the Value Export of Cotton Thread, Cotton, Petroleum.
L-4:	D-92	Nawaz Sharief Investment Boom.
L-5:	D-91-92	Gulf War Effect in Nawaz Sharief Regime.
L-5:	D-83-85	Boom in Labour Export in Zia-ul-Haq Period.
M-2:	D-92-93	Foreign Currency Deposit.
M-2:	D-91-93	Foreign Currency Deposit.
M-2:	D-73-77	
N-1:	D-92-93	Gulf War.
N-2:	D-82-83	
N-2:	D-91-92	Gulf War.
N-4:	D-91-93	Pay Committee Award.
N-4:	D-88	National Election.
N-5:	D-75,80	
N-6:	D-73-81	Fixed Nominal Exchange Rate.
N-6:	D-73	Devaluation Effect by Bhutto.
N-6:	D-91	Devaluation Effect by Nawaz Sharief.
O-2:	D-90	SAP Effect.
O-2:	D-93	SAP Effect.
O-3:	D-92	Special Development Program Effect.
O-3:	D-88-89	Special Development Program Effect.
O-4:	D-90&92	SAP Effect.
O-4:	D-93	SAP Effect.

O-5:	D-92	Special Development Program Effect.
O-5:	D-88-89	Special Development Program Effect.
O-5:	D-82,87	Junejo's Five Point Effect.
O-10:	D-89-90	SAP Effect.
O-11:	D-89-90	Special Development Program Effect.
O-27:	D-79-80	
O-27:	D-73-76	Nationalization Effect.
O-28:	D-75	Nationalization Effect.
O-52:	D-85-86	
O-52:	D-90	
O-53:	D-90-91	
O-53:	D-92	
O-53:	D-75-78	
O-54:	D-92-93	
O-54:	D-86	
P-2 :	D-86	Special Development Program.
P-2 :	D-81	Special Development Program.
P-3 :	D-81	
P-3 :	D-87-88	Special Development Program.
P-3 :	D-92-93	
P-6 :	D-88-92	
P-6 :	D-84-85	
P-7 :	D-92-93	
P-8 :	D-92-93	
P-8 :	D-89	
P-9 :	D-87-88	
P-9 :	D-90	
P-10:	D-92-93	
P-21:	D-76-77	
P-21:	D-73-75	
P-22:	D-75	
P-22:	D-92-93	
P-22:	D-81	