MACROECONOMETRIC AND INPUT-OUTPUT MODEL

OF

IRAN

MACROECONOMETRIC AND INPUT-OUTPUT MODEL OF IRAN

By

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ABSTRACT

This study analyses some aspects of the behaviour of the Iranian economy over the period 1959-1976 with the help of a macroeconometric and input-output model. The model is both demand and supply oriented. Supply considerations are taken to be the main constraint in the development of the Iranian economy.

Both the demand and the supply side of the model distinguish between consumer and investment goods and services. The interaction of the demand and supply side determines the equilibrium level of domestically produced consumer and investment goods and services, and their corresponding prices. For both types of goods and services, demand is considered to be price sensitive, while the corresponding supply is perfectly price inelastic (in the short-run).

As there is no direct information on consumption and investment goods and services provided by each sector of the economy, the Iranian 1973 input-output table is utilized for this purpose. Values of investment and consumer goods and services produced by each sector are calculated and

aggregated over seven sectors, namely, agriculture, construction, manufacturing and mining, transportation and communication, services, oil and water and power, to arrive at the total supplies of consumer and investment goods and services.

Demand for consumer goods and services is disaggregated into three categories: urban, rural, and government consumption. Demand for investment goods and services, which arises in all seven sectors of the economy, is distinguished for both private and government demand. The purpose of this detailed breakdown of investment demand is to analyze the behaviour of the economy with respect to different government investment policies in the various sectors.

The model is a non-linear stochastic simultaneous system of 107 equations and identities, out of which 42 are behavioural. To deal with the problem of simultanaeity, the model is estimated with a two-stage least-square procedure, using the principal components method. The estimated model is validated and its performance analyzed through a series of dynamic simulation experiments. The model is used to generate historical forecasts for the Iranian economy, and it could also be applied to ex-ante forecasting.

The present study attempts to examine the effects of different government policies on the agriculture and non-agriculture sectors and their consequence on the economy, through implementations of a series of policy simulations. The study suggests that, although the agriculture sector is less efficient in generating economic activity in the short-run, paying less attention to this sector can generate inappropriate short-run and long-run socio-economic consequences. Such problems are: increasing the gap between urban and rural standards of living, rapid emigration of the labour force from rural to urban areas, higher prices, wages and costs in the agriculture sector, and rapid increases in imports of consumer goods. Therefore, the policy simulation results suggest that any government development policy should consider both agriculture and non-agriculture sectors despite the fact that in the short-run the former is less efficient in generating higher economic activity.

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CHAPTER 1

INTRODUCTION

Large, disaggregated macroeconomic models[1] are considered to throw more light on the working of the economies that they are describing than highly aggregated models. They are useful in empirical studies of the structure of economies and provide a better basis for study of various government economic policies. In addition, they tend to be more reliable in forecasting future economic activities than small macroeconomic models. Theoretically, large scale models similar to those constructed for developed countries[2] are equally applicable to developing economies. However, data limitations impede empirical application of these models in developing nations. It seems, therefore, that for less-developed economies, moderate sized models would be both adequate and desirable[3].

In construction of appropriate models for developing nations, basic characteristics of their economies which differ from those of developed ones should be taken under consideration. The latter have adequate productive capacity; their problem is to find sufficient effective demand[4]. However, for developing countries, the problem is

different[5]: demand exists but supply is slow to respond to changes in demand. This is due to limited capability in expanding their production, either in the short-run or the long-run. This statement does not overrule the possibility of a deficiency of effective demand and underutilization of productive capacities in a less-developed economy. However, it is appropriate that macroeconomic models for developing nations should emphasize supply somewhat more than models built for the developed nations[6].

Amongst developing nations, petroleum-oriented countries have their own special economic characteristics[7]. These economies are strongly dependent on petroleum revenues. The government sector is large and almost all infra-structural investments are undertaken by this sector. Although finance (especially after 1973) is not an immediate constraint, such countries are faced with shortages of vital inputs (e.g. skilled labour). Development activity is heavily concentrated on cities, especially the capitals, while the rural areas have little share in development. The consequence is a high rate of migration from the rural to the urban areas, resulting in urban slums, overcrowding, and discontent.

Severe strain on the domestic transport system is another problem. Delays in the movement and arrival of goods, particularly into and out of the ports, are often

substantial. The result is increased cost, long delays in implementing development projects, and increased inflation resulting from the inability to import large quantities of food. The problem of inflation in these countries generally begins in 1973[8]. Although the pattern of inflation is not similar in all oil exporting countries, its causes are fairly similar. Inflation is the direct result not only of higher import prices (a result of the acceleration of inflation in the industrialized countries), but also of increasing demands on domestic resources by both government and private enterprises. In order to solve this problem, two inappropriate approaches have been adopted by authorities: i) initiating price and wage controls instead of reducing expenditures (Venezuala and Ecuador are notable exceptions)[9], and ii) emphasizing development of the agriculture sector as a means of reducing pressure on food prices. However, increasing the level of output in agriculture can only be achieved in the long-run, and it may, indeed, take years to have a significant impact on domestic prices. The above discussion indicates that inefficiency in utilization of existing resources, lack of sufficient capacities, inappropriate government policies in spending oil revenues, and other inappropriate government policies such as incomes policies are the main causes of economic problems in the oil-oriented developing countries.

In order to have a better understanding of the nature of these economies, a macroeconometric and input-output model is constructed for the Iranian economy over the period 1959-1976.

The model is both demand- and supply- oriented. Supply considerations are taken to be the main constraint in the development of the Iranian economy. The demand side of the model distinguishes between the domestic demand for domestically produced consumer goods, and the domestic demand for domestically produced investment goods. In both cases demand is considered to be price-sensitive, while the corresponding supply is perfectly price inelastic (in the short-run). As there is no direct information on consumption and investment goods produced by each sector, the 1973 Iranian input-output table[10] is utilized for this purpose. Values of investment and consumer goods produced by each sector are calculated and aggregated over seven sectors to arrive at total supplies of consumer goods and investment goods in value terms. Finally, the interaction of the demand and supply sides determines the equilibrium level of domestically-produced consumer and investment goods and their corresponding prices.

Because government fiscal and monetary policies are exerted through the monetary sector, a monetary sector is introduced into the model. This is achieved through the

definitional relationships in the government budget constraint, balance of payments, and the monetary base. The monetary base in turn determines the money supply, and is affected by changes in foreign reserves and government bonds sold to the central bank. Being affected by the money supply, total banking credit to the private sector in turn affects the real sector by entering into the private consumption function on one hand, and private sector investment on the other.

Construction of a macroeconomic model for an economy requires detailed information about that economy. Chapter 2 reviews the characteristics and historical trends of the Iranian economy. The model is macrosectoral, with the entire economy disaggregated into seven sectors; namely, agriculture, construction, manufacturing and mining, transportation and communication, services, oil and gas, and water and power. It is a non-linear stochastic simultaneous system of 107 equations and identities (of which 42 relations are stochastic). The stochastic equations are estimated using both ordinary and two-stage least-squares methods (OLS and TSLS respectively). The theoretical underpinning of the model and the results of estimated equations and their analysis are presented in Chapters 3 and 4.

The validity of estimated equations within a simultaneous system is investigated through dynamic simulation methods in Chapter 5. The model is used to generate historical forecasts for the Iranian economy. Dynamic behaviour of the model and effects of many different government monetary and fiscal policies on the economy are examined in Chapter 6. These policies include: i) increases in total government investment, in selected sectors, which can be financed by borrowing from either domestic or foreign sources or a combination of both, and ii) changes in the distribution of government investment across the various sectors, while holding total government investment unchanged. Some other aspects of the economy, such as: i) the income gap between wage-earners and profit-makers, ii) the gap between per capita consumption in urban and rural areas, and iii) the movement of population between the urban and rural areas, are also investigated.

Finally, Chapter 7 summarizes the study. Some of the major findings of the study can be briefly mentioned here. Estimation of single equations and their performance within a simultaneous dynamic equations justify the theoretical underpinning of the model. Statistical measures suggest that the majority of equations perform well, both individually or in relation with other equations in a simultaneous system. Tracking power of the model in generating the historical values of the endogenous variables, particularly at the aggregate level, is good.

FOOTNOTES

Chapter 1

1. For a good review of the state of the art in macroeconometric model building, see Samuelson (1975), pp. 3-10, and Klein (1977), pp. 133-164.

2. For a comprehensive survey of macroeconometric models of the United States, see Fromm (1975), pp. 375-414. For a multi-country survey and comparison, see Nerlove (1966), pp. 127-175; Hickman (1969), pp. 393-435; and Waelbroeck (1975), pp. 419-468. For an econometric model of Canada, see Choudhry et. al. (1972).

3. Vernardakis (1978), pp. 4.

4. Klein (1947), pp. 108-131.

5. Klein (1965), pp. 313-324, Ball (1973), pp. 141-176, Marwatt (1964), and Dar (1981).

6. Vernardakis (1978), pp. 4-5.

7. In socio-economic terms, there are two types of petroleum-oriented developing economies. In the first group, there is Saudi Arabia, Libya, Kuwart, Quatar, Abudabi, and some other small sheikdoms in the Persian Gulf. These countries have small populations and very large oil resources. They share neither the difficulties nor the potentialities of the second group of countries, which are more populated. Algeria, Ecuador, Iran, Iraq, Indonesia, Nigeria, and Venezuala are in the second group. Here we are mainly concerned with the second group.

8. Looney (1977), pp. 140-141.

9. Ibid., p. 141.

10. Statistic Centre of Iran (1977), and see the appendix to Chapter 4.

CHAPTER 2

HISTORICAL DESCRIPTION OF THE IRANIAN ECONOMY

(2-1) INTRODUCTION

A macroeconomic model which attempts to study and analyse behaviour of an economy requires a wide knowledge of and detailed information about that economy. Therefore, in this chapter the characteristic and historical trends of the Iranian economy for the period 1959-1976 will be reviewed in six sections. Section one will give a brief description of some important economic indicators such as GNP, prices and employment. Sections two and three will review components of gross national expenditure (aggregate demand), namely consumption, investment, exports and imports. Government activities, namely fiscal and monetary policies, which are exerted through annual budgetary decisions and the central bank, will be explained in sections four and five. These two sections will, therefore deal with the monetary side of the economy. Finally, section six will focus on the supply side of the economy; and in this section a detailed study of Iran's gross domestic product (GDP) and its seven components, namely value-added in agriculture, construction,

manufacturing and mining, transportation and communication, services, oil, and water and power will be presented.

(2-1) GROSS NATIONAL PRODUCT (GNPM), EMPLOYMENT, AND PRICES

Table 2-1 shows that between 1959 and 1974 real gross national product (GNPM) rose from 284.010 to 1456.65 billion 1959 Rials(3.79 to 19.42 billion US dollars, $1=75 rials), which translates into an annual growth rate of 10.2 per cent. The total population of Iran was about 22 million in 1959 and increased at approximately 2.46 per cent per annum, to reach 33.6 million in 1976. As GNP grew faster than population, during this span of 18 years, per capita GNP in constant 1959 Rials quadrupled, rising from 12.70 thousand Rials(US $171) in 1959 to 43.36 thousand Rials (US $578) in 1976, it grew at an average rate of 7 per cent per annum (see table 2-1).

The make up of the active population in terms of the percentage of people employed is given in Table 2-1. As it indicates, on the average, 98 per cent of the active population is classified as being employed. In other words, the average rate of unemployment is only 2 per cent for the period 1959-1976. On closer examination however, the given figure for unemployment may be inadequate[1], as official

Table 2-1

Gross National Product (GNP) and Employment

	GNP (billion 1959 rials)	Total Population (millions)	Ratio of Urban to Rural Population %	Labour Force (millions)	Ratio of Labour Employed to Total Labour Force %	Per Capita GNP 1000 1959 rials
1959	284.010	22.191	32.93	6.891	97.11	12.798
1960	297.599	22.230	33.66	6.895	97.04	13.387
1961	309.095	22.372	34.39	6.907	96.74	13.816
1962	324.388	22.689	35.11	6.977	96.60	14.297
1963	341.895	23.385	35.85	7.163	96.55	14.662
1964	368.745	24.114	36.57	7.365	96.49	15.291
1965	414.426	24.872	37.11	7.579	96.46	16.662
1966	456.019	25.789	38.03	7.841	96.35	17.682
1967	506.778	26.793	38.76	8.145	97.65	18.914
1968	560.269	27.578	39.49	8.357	97.37	20.315
1969	618.252	28.398	40.22	8.585	97.63	21.771
1970	687.153	29.256	40.95	8.829	97.93	23.487
1971	759.357	30.020	41.68	9.049	98.13	25.295
1972	886.760	30.820	42.41	9.283	99.25	28.772
1973	1018.760	31.645	43.14	9.535	99.23	32.193
1974	1177.040	32.496	43.87	9.795	99.42	36.221
1975	1293.930	33.375	44.60	9.716	99.90	38.769
1976	1456.650	33.592	46.78	9.987	99.91	43.363

Sources : Plan and Budget Organization, Economic Trends of Iran, 5th Edition, 1978.

figures are deficient. Since there are no unemployment benefits, there is little incentive for both men and women to register as being unemployed. In the urban areas there exist two kinds of unemployed: the relatively educated who may register, and the impoverished inhabitants of areas like southern Tehran and the shanty towns of Isfahan, who are unlikely to do so. This is confirmed by the fact that unemployment in the 15-24 age bracket in 1972 was 9 per cent, twice the average for all people over the age of 15 (4.6 per cent). Many of these were secondary school graduates.

A far more serious employment problem exists in the countryside. Here there may be no reported unemployment, since those with no jobs at all will as likely as not go to the towns. However, there is chronic under-employment in the countryside, where according to 1973 surveys, nearly 14 per cent of the total rural population were working less than 28 hours per week, and almost 40 per cent were working less than 42 hours per week in the off season. Indeed the average number of days worked in the rural areas in the early 1970s was only 108 days per year. In addition, there may be substantial misallocation of labour and overstaffing in government-run enterprises, so just as in the towns, the problem in the countryside is one of the degree of employment rather than of absolute unemployment[2].

Distribution of the total population between rural and urban areas remained relatively stable until 1930, with about 21 per cent living in urban areas. By 1956, this figure rose to 31 per cent, to 39 per cent in 1966, and by 1976 to 47 per cent. In 1976, out of the total 33.6 million people in Iran, 15.7 million lived in urban areas.

Table 2-2 summarizes the trend of prices and their rates of change per annum for the 1959-1976 period. Prior to OPEC oil price hikes and despite rapid growth rates of GNP, the three principal measures of price movements, namely the price deflator of gross national product (GNPPD), the consumer price index (CPI), and the wholesale price index (WPI), followed similar patterns and remained stable. In contrast to the 8.4 per cent annual average growth rate of GNP during 1959-1970, these indexes rose 1.4, 2.2 and 1.7 per cent respectively. In general, with the exception of food (especially meat, poultry, and fish), medical care, and house furnishing, the remaining components of CPI followed the general index closely. Among the basic ingredients of the WPI, only raw materials and food fluctuated erratically, whereas the rest followed the general trend.

Price movements of such a negligible magnitude might be explained by the following: 1) an increasing flow of imports which took pressure off of domestic prices; 2) favourable weather conditions which were conducive to the

Table 2-2

GNP Price Deflator, Consumer and Wholesale Price Indexes

YEAR	GNP* Price Deflator (GNPPD)	Consumer Price** Index (CPI)	Wholesale** Price Index (WPI)	% Change GNPPD	% Change CPI	% Change WPI
1959	100.000	100.0	100.0			
1960	103.850	107.9	102.0	3.86	7.90	4.78
1961	103.395	109.6	102.2	-0.44	1.58	0.20
1962	104.963	110.6	103.6	1.52	0.91	1.37
1963	105.491	111.7	104.0	0.50	1.00	0.39
1964	110.044	116.7	109.6	4.32	4.48	5.38
1965	110.572	117.0	110.6	0.48	0.26	0.91
1966	110.650	117.9	110.0	0.07	0.77	-0.54
1967	109.811	118.9	109.5	-0.76	0.85	-0.45
1968	112.428	120.8	110.3	2.38	1.60	0.73
1969	114.516	125.0	114.7	1.86	3.48	4.00
1970	116.709	126.6	118.6	1.91	1.28	3.40
1971	127.503	133.9	127.0	9.25	5.77	7.08
1972	139.271	142.3	132.4	9.23	6.27	4.25
1973	179.189	158.1	150.0	28.66	11.10	13.29
1974	267.597	182.6	175.9	49.34	15.50	17.27
1975	276.189	200.6	184.8	3.20	9.86	5.06
1976	321.560	234.0	209.7	16.42	16.65	13.47

Sources : * Plan and Budget Organization, Economic Trends of Iran, 5th Edition, 1978.
** Bank Markazi, The Annual Reports, various issues.

large harvest of agricultural products, especially during the 1965-1968 period; 3) the growth of investment expenditures in excess of consumption expenditures, especially for the period 1963-1970; and 4) the central bank's appropriate response in adjusting the growth rate of the money supply (7.9 per cent over the 1959-1970 period in comparison with 8.4 per cent growth rate of the real gross national product, GNP, over the same period).

In 1971-1976, a high inflationary period began. The gross national product price deflator (GNPPD), the consumer price index (CPI) and the wholesale price index (WPI) more than doubled. The rise in GNPPD was drastic - it jumped from 1.9 per cent in 1970 to 9.3 per cent in 1971, to 28.7 per cent in 1972 and it reached 49.3 per cent in 1974. It finally dropped to 16.4 per cent in 1976. The major reason for the high rate of growth in GNPPD was the rise in government revenue received from the oil sector. This led to significant increases in government demand for investment and consumption goods and services. While GNPPD was skyrocketting, CPI and WPI rose by 10.9 and 10.1 per cent respectively. Sudden increases in the consumer and wholesale price indexes in 1974 (15.5 and 17.3 per cent respectively) which were generated by a hike in the growth rate of money supply (61.4 per cent), forced the government to adopt some contractionary fiscal and monetary policies in

the following year (1975)[3]. Although CPI and WPI growth rates fell to 9.9 and 5.1 per cent respectively, they did not remain at these levels and increased drastically in 1976 (see Table 2-2).

However, these official figures do not represent actual trends of prices in the economy. Unofficial reports indicate that consumer prices rose by 13.1 per cent in 1960-1970, and by 20 per cent in 1973-1976. In the housing sector especially, the lower rates are certainly not accurate. Rents of housing which absorbed up to 60 per cent of some workers wages, rose 15 times between 1960 and 1976. They rose by 200 per cent between 1974 and 1975, and by a further 100 per cent by 1976[4].

The widening gap between aggregate demand and aggregate supply caused inflationary upheavals in 1973-1976. A major cause of this inflationary pressure was an injection of government oil revenue into the economy which exceeded the economy's absorptive capacity[5]. Also, some non-government factors such as poor crops, infrastructural bottlenecks which were deterrents to a smooth inflow of imports, and shortages of imported as well as indigenous materials, added to this problem.

(2-3) CONSUMPTION, INVESTMENT EXPENDITURES, AND NATIONAL SAVINGS

Table 2-3 shows real total consumption (CTD) and investment (ITD) expenditures and their ratios to real gross national product (GNPM). It also provides information about total national savings (ST) and its ratio to total gross investment (ITD). Over the 1959-1976 period, aggregate consumption expenditure (CTD, measured in terms of billions of 1959 Rials) increased from 243.7 billion Rials at an average annual rate of 10.1 per cent, to reach 953.2 billion Rials. As the average growth rate of GNPM (10.2 per cent annually) is almost identical to that of CTD, the ratio of consumption expenditure to the gross national product (GNPM, remained fairly stable at around 0.83.

Real aggregate investment expenditure (ITD), with the exceptions of 1961 and 1962, (mainly due to the economical and political uncertainty in the country), grew rapidly in all periods. It increased from 52.7 billion Rials in 1959 to 518.9 billion Rials in 1976, at an average growth rate of 15.36 per cent annually. The average growth rate over the shorter period 1971-1976 was 10.64 percentage points higher, which is due to the rise in both petroleum export prices and quantity which enhanced government revenues. The ratio of total investment (ITD) to the gross

Table 2-3

Total Consumption, Investment and National Savings
(1959 Billion Rials)

	Total Consumption	Total Gross Investment	Total National Savings (ST)	Ratios of Total Savings to Invest.	Ratios of Total Consump. to GNP	Ratios of Total Invest. to GNP
1959	243.71	52.700	40.300	0.76	0.86	0.19
1960	255.55	54.789	41.197	0.75	0.89	0.18
1961	261.82	53.908	42.931	0.79	0.85	0.17
1962	275.84	48.529	44.988	0.92	0.85	0.15
1963	282.06	54.029	56.159	1.04	0.85	0.16
1964	311.80	61.879	54.269	0.88	0.85	0.17
1965	340.32	82.465	68.009	0.82	0.82	0.20
1966	378.10	85.420	69.179	0.81	0.83	0.19
1967	411.38	109.838	87.121	0.79	0.81	0.22
1968	465.18	121.749	87.078	0.71	0.83	0.22
1969	516.39	127.149	87.663	0.69	0.84	0.21
1970	575.03	134.350	92.324	0.69	0.84	0.20
1971	607.09	170.178	167.662	0.99	0.80	0.22
1972	679.44	213.318	228.471	1.07	0.77	0.24
1973	805.73	239.976	430.269	1.79	0.79	0.24
1974	978.27	296.678	691.131	2.33	0.83	0.25
1975	1119.39	466.540	601.555	1.29	0.87	0.36
1976	1234.21	518.937	734.669	1.42	0.85	0.36

Source : Plan and Budget Organization, Economic Trends of Iran, 5th Edition, 1978.

national product (GNPM) increased in all periods but 1961 and 1962. The ratio rose from 0.19 in 1959 to 0.36 in 1976. The government's share of total investment (ITD) is very significant, especially from 1968 and onwards (see below).

Until 1972, both domestic and complementary foreign sources were utilized to finance total domestic investment (ITD). However, a considerable increase in government revenue from oil exports not only dropped the demand for foreign aid and loans to facilitate domestic investment, but it gave the government an opportunity to repay outstanding foreign loans and to invest abroad. The ratio of total savings (ST) to total investment (ITD), with the exception of 1963, is less than unity for the period 1959-1971, averaging 0.81 annually. Since 1972, this ratio has been larger than unity and reached its peak (2.3) in 1974 (see Table 2-3).

Table 2-4 shows components of real total consumption expenditures (CTD), namely consumption expenditures by the private (CPT) and government (CG) sectors. CPT is further divided into private urban and private rural consumption (CUP and CRP respectively). The analysis of these figures may provide some information regarding structural changes in the Iranian economy. Total private consumption increased from 213.4 billion constant Rials in 1959 to 832.4 billion constant Rials in 1976, growing 8.4 per cent annually.

Table 2-4

Distribution of Total Consumption Expenditure
Among Private Rural, Urban and Government Sectors
(Billion 1959 Rials)

	Total Private Consumption	Share of Urban Area in Total Consumption	Per Capita Consumption in Rural Area (1000 constant rials)	Per Capita Consumption in Urban Area (1000 constant rials)	Total Gov't Consumption	Ratio of Gov't to Private Consumption
1959	213.410	0.51	7.012	14.920	30.300	0.14
1960	223.435	0.52	7.164	15.740	32.114	0.14
1961	230.630	0.52	7.400	15.857	31.185	0.13
1962	243.924	0.53	7.637	16.501	31.919	0.13
1963	247.579	0.54	7.443	16.212	34.482	0.13
1964	269.915	0.54	7.993	16.743	41.887	0.15
1965	285.812	0.54	8.375	16.727	54.506	0.19
1966	316.425	0.58	8.313	18.713	61.680	0.19
1967	341.281	0.58	8.648	19.197	70.096	0.20
1968	383.273	0.62	8.590	22.027	81.903	0.21
1969	419.751	0.67	8.134	24.659	96.641	0.23
1970	463.745	0.69	8.243	26.820	111.286	0.23
1971	464.372	0.69	8.036	25.865	142.726	0.30
1972	491.765	0.73	7.422	27.541	187.678	0.38
1973	585.013	0.74	8.351	31.843	220.719	0.37
1974	654.490	0.74	9.182	34.159	323.775	0.49
1975	747.002	0.76	9.328	38.595	372.388	0.49
1976	832.389	0.77	10.706	40.788	401.819	0.48

Source : Plan and Budget Organization, Economic Trends of Iran, 5th Edition, 1978.

Government consumption expenditures (CG) grew much faster than private consumption (CPT), experiencing a growth rate of 17 per cent per annum during the same period. That is, it increased from 30.3 billion Rials in 1959 to 401.8 billion Rials in 1976. Rapid growth in CG gradually narrowed the gap between total government and private consumption expenditures. The ratio of CG to CPT rose from 0.14 in 1959 to 0.48 in 1976.

The two major components of the total private consumption expenditures (CRP and CUP) grew 3.8 and 11.1 per cent annually during the period 1959-1976. Urban private consumption (CUP) increased from 109.1 billion constant Rials to 641.0 billion constant Rials, while private rural consumption (CRP) rose from 104.3 billion constant Rials to 191.4 billion constant Rials. CUP's share of total private consumption increased throughout the period. It reached 77.0 per cent in 1976, up from 51 per cent from 1959. A major reason for this phenomenon was the migration of much of the population from rural to urban areas. Iran's urban population (POPU) increased from 33.0 to 46.8 per cent of total population between 1959 and 1976. At the same time, the per capita consumption expenditures in urban areas jumped from 14.9 to 40.8 thousand constant Rials, while rural areas experienced a mild increase from 7.0 to 10.7 thousand constant Rials. The ratio of per capita consumption in urban

to rural areas rose considerably from 2.13 in 1959 to 3.81 in 1976. Therefore, despite a sizable rural to urban migration, the gap between the urban and rural standard of living, measured by the ratio of per capita consumption in urban to rural areas, widened significantly. This was a direct result of uneven government development strategy which was heavily concentrated in urban areas[6].

The distribution of total real investment expenditures (ITD) between private and government sectors and among the seven sectors of the economy is introduced in Tables 2-5 and 2-6 respectively. Total real government investment (IGT) was smaller than total private investment (IPT) during the period 1959-1967, but this circumstance reversed after 1967 with only two exceptions, 1972 and 1975, when both values were equal. The average growth rate of IPT was 14.8 per cent annually, while that of IGT was 18.2 per cent for the period 1959-1976. Beginning in 1968 the government intensified its investment activities, especially in infrastructural industries. The ratio of total private investment to total government investment (IPT/IGT) which was 1.5 in 1959, fell to 0.77 in 1968 and fluctuated around 0.8 until 1976. A rapid increase in oil revenue allowed the government to play a greater role in economic activities. The Fifth Economic Plan (1973-1978) was revised and the

Table 2-5

Total Government and Private Investment
(Billion 1959 constant Rials)

	Total Private Investment	Total Government Investment	Ratio of Private to Gov't Investment
1959	31.900	20.800	1.534
1960	36.597	18.191	2.012
1961	33.512	20.396	1.643
1962	30.369	18.159	1.672
1963	31.711	22.318	1.421
1964	39.029	22.850	1.708
1965	42.539	39.925	1.066
1966	47.245	38.176	1.238
1967	55.836	54.001	1.034
1968	53.069	68.679	0.773
1969	49.685	77.464	0.641
1970	54.231	80.019	0.678
1971	71.799	98.379	0.729
1972	107.447	105.871	1.014
1973	109.016	130.960	0.832
1974	122.010	174.668	0.696
1975	235.582	230.957	1.020
1976	240.932	278.005	0.867

Source : Plan and Budget Organization, Economic Trends of Iran, 5th Edition, 1978.

projected value of total government investment (IGT) became 46.2 billion current US dollars, in comparison with 23.4 billion current dollars scheduled by private investors[7].

The sectoral distribution of total investment (ITD) is given in Table 2-6. For the period of 1959-1976, average shares of investment in agriculture, (IAT), and water and power, (IWPG), in total investment, (0.07 and 0.06 respectively) were the smallest of the seven economic sectors. However, for the same period, the average share of investment in construction (ICNT), and transportation and communication (ITCT) were 0.28 and 0.23 respectively, the highest of all the sectors. Investment in agriculture (IAT) grew 14.7 per cent annually, as it increased from 3.48 billion Rials in 1959 to 26.55 billion Rials in 1976. However, investment in agriculture (IAT), as well as transportation and communication (ITCT) had slower growth rates than the other sectors. Investments in construction, and manufacturing and mining, had growth rates of 15.4 and 16.3 per cent respectively, and grew moderately during 1959-1976. Investments in oil, and water and power sectors grew considerably (20.4 and 22.1 per cent) in this period. Investment in services grew by 18.6 per cent annually, increasing from 4.4 billion constant Rials in 1959 to 60.57 billion constant Rials in 1976. Considerable funds were also channelled into the construction sector, as its

Table 2-6

Gross Total and Sectoral Investments
(1959 billion rials)

	Agriculture	Construction	Manufacturing & Mining	Transportation & Communication	Services	Oil	Water & Power	Total Investment
1959	3.4800	15.5930	8.8170	12.5850	4.4450	4.8000	2.9800	52.700
1960	3.6188	16.1682	9.1236	13.1264	4.6296	4.9921	3.1298	54.788
1961	3.5506	15.8340	8.8830	12.9169	4.5524	5.0388	3.1317	53.907
1962	3.2387	14.1629	7.9844	11.6073	4.1508	4.5537	2.8306	48.528
1963	3.6015	15.6087	8.8046	12.9748	4.7249	5.1277	3.1869	54.029
1964	4.1314	18.0588	10.1921	14.7656	5.3029	5.8146	3.6135	61.879
1965	5.5692	28.1289	10.0298	18.5065	7.5134	9.1678	3.5488	82.464
1966	5.3780	29.9261	11.4414	19.6356	7.4420	6.9587	4.6391	85.420
1967	7.8600	31.5209	16.2266	27.2416	8.4254	10.6878	7.8752	109.838
1968	7.7902	32.5274	22.2924	28.9683	9.8644	12.1837	8.1225	121.749
1969	8.6061	32.4788	25.4619	30.3990	10.5920	12.0119	7.5993	127.149
1970	8.6871	34.9813	28.7755	34.9229	12.0882	8.4314	6.3634	134.250
1971	11.8101	41.3703	32.3399	42.4360	15.6631	13.5220	13.0362	170.178
1972	18.6614	55.0582	33.2756	48.8245	21.6176	21.3366	14.5443	213.318
1973	18.9079	56.6025	47.1534	42.5458	43.8499	20.6541	10.2625	239.976
1974	22.7312	77.7966	47.4372	55.7390	44.7433	33.1392	15.0916	296.678
1975	34.0396	105.060	86.1920	103.418	57.6743	57.6970	22.4589	466.540
1976	26.5518	146.400	88.4624	92.4091	60.5684	61.3403	43.2049	518.937
Average Growth Rate %	14.7	15.4	16.3	14.4	18.7	20.4	22.1	13.5
Average Shares in Total Investment	0.07	0.38	0.17	0.23	0.1	0.1	0.06	1.00

Source : Plan and Budget Organization, Economic Trends of Iran, 5th Edition, 1978.

investment level increased from 15.59 billion Rials in 1959 to 146.40 billion Rials in 1976. The level of investment in this sector was doubled between 1974 and 1976, when both residential construction and construction for middle and large scale industries sped up. Investment in manufacturing and mining (IMMT) increased more than ten-fold during 1959-1976, as it rose from 8.8 billion to 88.46 billion constant Rials.

(2-4) FOREIGN TRADE AND BALANCE OF PAYMENTS

Foreign trade has played a very important role in the Iranian economy, especially during the 1970s. At this time, a substantial growth in oil exports gave the economy greater access to foreign exchange, a vital requirement for economic development. This section will analyse components of Iran's foreign trade, including imports, exports, the balance of trade, net inflows of financial capital, the balance of payments and Iranian terms of trade.

Table 2-7 describes total imports of goods and services in current Rials (MTA), and its components, namely, imports of consumer goods (MCA), intermediate goods (MINTA), capital goods (MKA), and non-factor services (MNFS). Imports played a dual role in the economy; they assisted industrial development, and secured a balance between

Table 2-7

Total Imports and Shares of its Components
(Billion current rials)

	Consumer Goods	Intermediate Goods	Capital Goods	Non-Factor Services	Total Imports	Ratio of Total Imports to GNP
1959	0.28	0.46	0.19	0.07	48.2	0.17
1960	0.27	0.45	0.22	0.06	49.7	0.16
1961	0.24	0.50	0.20	0.05	47.8	0.15
1962	0.20	0.53	0.20	0.07	43.7	0.13
1963	0.22	0.50	0.19	0.09	41.8	0.12
1964	0.22	0.50	0.20	0.08	59.8	0.15
1965	0.19	0.52	0.22	0.07	69.5	0.15
1966	0.21	0.51	0.24	0.06	81.4	0.16
1967	0.18	0.54	0.23	0.05	101.1	0.18
1968	0.18	0.53	0.23	0.06	120.4	0.19
1969	0.19	0.54	0.21	0.06	139.6	0.20
1970	0.21	0.52	0.19	0.07	158.4	0.20
1971	0.26	0.50	0.18	0.05	199.3	0.21
1972	0.28	0.48	0.19	0.04	251.1	0.20
1973	0.32	0.45	0.17	0.06	345.6	0.19
1974	0.37	0.43	0.13	0.07	673.6	0.22
1975	0.34	0.37	0.21	0.08	1135.9	0.31
1976	0.32	0.37	0.21	0.11	1279.4	0.27
Average Growth Rate	26.2	21.4	27.0	30.0	23.6	2.6
Average Share	0.24	0.49	0.20	0.07	1.0	0.19

aggregate demand and aggregate supply of goods and services thereby decreasing inflationary pressures. Total imports grew at the average rate of 23.6 per cent per annum, increasing from 48.2 billion current Rials in 1959 to 1279.4 billion current Rials in 1976. The ratio of total imports (MTA) to gross national product in current Rials (GNPMA), rose from 0.17 to 0.27 in this period (see Table 2-7).

The major components of the Iranian imports include food and livestock, chemical products, raw non-food materials, fuel and related products, and, finally, beverages and tobacco. Imports of food have risen considerably since the land reform, which started in 1961. The government implemented a food subsidy program in 1974-1975, at a cost of 3 billion current US dollars, and it was expected to reach 4 billion current US dollars annually by the early 1980s. Hence, it was expected that up to a third of Iran's food requirements were to be imported[8].

Imports of consumer goods (MCA) grew at a rate of 26.2 per cent annually, increasing from 13.4 billion current Rials in 1959 to 405.3 billion current Rials in 1976. Its share of total imports (MTA), rose from 28 per cent to 32 per cent at the same time. Increases in aggregate demand, due to the injection of government oil revenues into the economy and the failure of domestic producers to keep their productive capacity in line with rising demand, were the

main factors responsible for the rapid growth rate of MCA between 1971 and 1976[9]. In this period, MCA grew at a rate of 55.4 per cent annually. In order to reduce the high level of consumer good imports, effective long run policy actions are necessary. The policies can include 1) decreasing tariffs in order to lessen the pressure on domestic consumer goods; and 2) encouraging import replacement industries to operate more efficiently and to increase the quality of their products. A significant amount of financial and physical resources should be chanelled to the agricultural sector for the purpose of improving and providing the necessary factors of production.

The largest portion of imports consisted of intermediate goods (MINTA) which averaged a 49 per cent share for the period 1959-1976. It grew at the rate of 21.4 per cent per annum, increasing from 22.137 billion current Rials to 470.52 billion current Rials. A speeding up of the Fifth Development Project from 1973 to 1978 caused MINTA to grow 86 per cent in 1974 and 47 per cent in 1975. The role of imports of intermediate goods (MINTA), along with imports of capital goods (MKA) were very significant in establishing new medium and large scale and import-substituting industries. Imports of capital goods (MKA), which had an average share of 20 per cent of MTA, grew by 27.0 per cent

annually, increasing from 9.3 billion current Rials in 1959 to 262.4 billion current Rials in 1976. This rapid growth was intensified in 1974 (46 per cent) and again in 1975 (163 per cent). In order to speed up the industrialization process, almost all imports of intermediate and capital goods were set free from import taxes in the 1970s. Imports of non-factor services (MNFSA) grew rapidly, especially in the 1970s, with an average growth rate of 23.6 per cent per annum, reaching 141.2 billion current Rials in 1976, up from 3.4 billion in 1959. A high demand for foreign skilled labour to establish and maintain new industries forced MNFSA to grow considerably in 1974-1976. Its average growth rate in this period was 92.7 per cent per annum. In 1976 there were an estimated 50,000 foreigners working in Iran in the upper classes of employment, and this number was expected to rise several times by 1980.

Total exports (XTA) in current Rials grew 28.7 per cent per year, rising from 41.5 billion current Rials in 1959 to 1787.8 billion current Rials in 1976. In this period, the ratio of total exports to gross national product in current Rials (GNPM) increased from 0.15 to 0.38. A quadrupling of oil export prices caused this ratio to reach 0.47 in 1974. A cursory look at Tables 2-8 and 2-9 illustrates that exports of oil (XOA) accounted for more than 80 per cent of Iran's total exports of goods and

Table 2-8

Total Exports of Goods and Services and Shares of its Components
(current rials)

	Consumer Goods	Intermediate Goods	Capital Goods	Non-factor Services	Oil	Total Exports
1959	0.07	0.17	0.0	0.02	0.74	41.50
1960	0.09	0.12	0.0	0.03	0.77	44.10
1961	0.10	0.12	0.0	0.02	0.77	46.10
1962	0.08	0.10	0.0	0.02	0.80	51.60
1963	0.08	0.11	0.0	0.02	0.80	57.30
1964	0.08	0.10	0.0	0.03	0.80	66.90
1965	0.08	0.10	0.0	0.04	0.79	75.90
1966	0.06	0.08	0.0	0.03	0.82	83.90
1967	0.07	0.07	0.0	0.04	0.83	99.10
1968	0.07	0.07	0.0	0.03	0.82	114.30
1969	0.07	0.07	0.0	0.03	0.83	133.20
1970	0.07	0.07	0.001	0.03	0.83	153.70
1971	0.06	0.06	0.002	0.03	0.85	240.60
1972	0.06	0.06	0.001	0.03	0.86	298.60
1973	0.03	0.04	0.002	0.02	0.91	641.90
1974	0.01	0.02	0.002	0.02	0.96	1476.70
1975	0.01	0.02	0.002	0.03	0.95	1440.50
1976	0.01	0.01	0.002	0.03	0.95	1787.80
Average Growth Rate	10.38	7.64		31.26	31.26	28.66
Average Share % Total	6.0	7.0	0.06	3.0	0.8	1.0

services in current Rials (CTA) over the period of 1959-1976. Thus, non-oil exports (NOXA) had only a small role to play in earning foreign exchange for the Iranian economy. During this period, however, a number of incentive policies were devised by the government to boost non-oil exports. These were: 1) a refund of customs levies (including the commericial benefit tax) paid on imports of raw material components used to produce goods exported; 2) the exemption from income tax of all earnings realized from exports; 3) the provision by the central bank (Bank Markazi Iran) of credit for working capital at concessional rates; 4) the establishment and expansion of regular domestic shipping services to selected parts of the world; and 5) special assistance to allow industrial expansion to accomode non-oil exports[10]. Despite inplementation of these policies, the responses of non-oil exports to policy stimuli were not promising.

The expansion of the non-oil exports is very vital to the future of the economy, as oil exports cannot and will not last long. The ratio of total non-oil exports (NOXA) to total imports (MTA) fell, from 0.22 in 1959 to 0.07 in 1976 (see Table 2-9). Narrowing the gap between these two values is not plausible, at least not in the near future, because of constantly rising domestic demand for the exportable commodities. The non-oil exports consist of traditional and

Table 2-9

Ratios of Oil and Non-Oil Exports
To Total Imports and GNP
(current rials)

	Ratio of Non-Oil Exports to Total Exports	Ratio of Non-Oil Exports to Total Imports	Ratio of Non-Oil Exports to GNP	Ratio of Oil Exports to GNP	Ratio of Total Exports to GNP
1959	0.26	0.22	0.04	0.11	0.15
1960	0.23	0.20	0.03	0.11	0.14
1961	0.23	0.23	0.03	0.11	0.14
1962	0.20	0.24	0.03	0.12	0.15
1963	0.20	0.27	0.03	0.13	0.16
1964	0.20	0.22	0.03	0.13	0.16
1965	0.20	0.23	0.03	0.13	0.16
1966	0.18	0.18	0.03	0.14	0.17
1967	0.17	0.17	0.03	0.15	0.18
1968	0.18	0.17	0.03	0.15	0.18
1969	0.17	0.16	0.03	0.16	0.19
1970	0.17	0.16	0.03	0.16	0.19
1971	0.15	0.19	0.04	0.21	0.25
1972	0.14	0.16	0.03	0.21	0.24
1973	0.09	0.17	0.03	0.32	0.35
1974	0.04	0.07	0.02	0.45	0.47
1975	0.05	0.07	0.02	0.38	0.40
1976	0.05	0.07	0.02	0.36	0.38

new products. Traditional goods include items such as carpets, cotton, fresh and dried fruits, animal skins and leather, and mineral and metal ores. Industrial products encompass products such as ready-made clothes, knitwear and textiles, motor vehicles, detergents and soap, glycerine and chemicals, and shoes. Their combined growth amounted to 13.7 per cent per annum, increasing from 10.2 billion current Rials in 1959 to 85.6 billion current Rials in 1976. The share of exports of consumer goods (XCA) of total exports (XTA) fell from 7.0 per cent in 1959 to 1.0 per cent in 1976. Similarly, the share of exports of intermediate goods (XINTA) fell gradually throughout the period, reaching 1.0 per cent in 1976 down from 17 per cent in 1959. Exports of capital goods (XKA), which was almost zero until 1967, grew rapidly from 1968 onwards. Its share of XTA, which was 0.01 per cent (0.016 billion current Rials) in 1968, rose to 0.2 per cent (3.6 billion current Rials) in 1976.

Exports of oil in current Rials (XOA) contributed significantly to total exports of goods and services (XTA). It grew 31.1 per cent annually from 30.71 billion current Rials in 1959 to 1698.41 billion current Rials in 1976. In this period, its share of XTA increased from 74.0 to 95.0 per cent. Petroleum revenue played dominant role not only in Iran's government revenues, trade and economic growth in general, but it also provided most of Iran's foreign

exchange earnings. Before 1971, Iran's balance of payments was in perennial deficit. In February of 1971, the posted oil export price increased from 1.18 US dollars to 2.18 US dollars per barrel (p/b). Later on in 1973, it jumped to 5.12 dollars p/b and finally to 11.65 dollars p/b in 1976 (see Table 2-10). These hikes in the price of export oil caused foreign exchange received from oil export to increase from 1.27 billion current US dollars in 1974 to 18.67 billion current US dollars in 1976. The terms of trade, defined as the ratio of price deflators for total exports and total imports, was below unity until 1971 when it became greater than one (see Table 2-11). These events forced the balance of payments into a surplus position from 1971 through to 1976 (with the exception of only 1975. See Table 2-11).

In 1975, the world demand for oil dropped slightly and this caused the price of Iran's oil to decline from 11.65 to 10.46 US dollars per barrel. This event, along with government foreign investment of 2.94 billion current US dollars, put the balance of payments into deficit. The balance of trade, which was in deficit for many years, recorded a surplus in 1973. The annual external sector deficits were normally financed by foreign borrowing and other sources. However, after the second rise in oil prices in 1974, not only did the current account show a sizable

Table 2-10

Posted Prices of Oil and Government Take, 1960-75
(dollars per barrel)

DATE	POSTED PRICE[a]	GOVERNMENT TAKE
1960-70	$1.80	$0.80-0.85
February 15, 1971	2.18	1.26
1972	2.48	1.44
October 1, 1973	3.01	1.76
October 16, 1973	5.12	3.04
January 1, 1974	11.65	7.00
October 1974	11.65	9.50-10.00
January 1, 1975[b]	10.46	10.11
1976*	11.62	

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a) Light Arabian marker crude of 34 degree API

b) Not a posted price, but a single unified price with 22 cents per barrel allowance for oil company profits and 12 cents per barrel production cost ($10.46-(0.22+0.12) = $10.12)

* Taken from Economic Indicator of Iran (1978)

Source : F. Fesharaki (1976), p. 118

Table 2-11

Terms of Trade and External Balances

	Import Price Deflator (MTPD)	Export Price Deflator (XTPD)	Terms of Trade (XTPP/MTPD)	Balance of Trade	Net Inflow of Capital	Balance of Payment
1959	1.00	1.00	1.00	-6.7	13.53	6.83
1960	1.01	0.99	0.98	-5.6	1.30	-4.30
1961	1.02	0.93	0.91	-1.7	6.30	4.60
1962	1.01	0.94	0.94	7.9	-4.90	3.00
1963	1.02	0.96	0.94	15.5	-12.80	2.70
1964	1.04	1.00	0.96	7.1	0.50	7.60
1965	1.05	0.97	0.92	6.4	-10.80	-4.40
1966	1.08	0.97	0.90	2.5	-5.00	-2.50
1967	1.08	0.99	0.92	-2.0	-0.30	-2.30
1968	1.07	1.00	0.93	-6.1	0.10	-6.00
1969	1.11	1.00	0.89	-6.4	1.30	-5.10
1970	1.17	1.01	0.87	-4.7	-17.00	-21.70
1971	1.24	1.34	1.09	41.3	-5.20	36.10
1972	1.34	1.48	1.10	47.5	-13.60	33.90
1973	1.45	2.85	1.96	296.3	-244.60	51.70
1974	2.06	6.60	3.20	803.1	-451.90	351.20
1975	2.27	6.96	3.06	304.6	-354.30	-49.70
1976	2.42	7.88	3.25	508.4	-403.90	104.50

Source : Plan and Budget Organization, Economic Trends of Iran, 5th Edition, 1978, and Bank Markazi Iran, Annual Reports, Various Issues.

surplus (eliminating any need for the external borrowing), but a portion of Iran's outstanding loans were repaid, prior to their maturity. The sign of both the balance of payment and the balance of trade are therefore heavily dependent upon exports of oil. Unless the price of oil and/or world demand for oil take an upward swing, the balance of trade and hence the balance of payment will again be in deficit.

(2-5) PUBLIC SECTOR AND GOVERNMENT BUDGET

The public sector in Iran is large. It consists of the central government, various provincial and local authorities, some 130 publically owned enterprises and nearly 50 semi-autonomous non-profit agencies which receive a large part of their budget from the national treasury. Moreover, from the standpoint of both domestic resource mobilization and resource allocation, the central government is the dominant influence.

The Government Budget

The primary vehicle of transfer from government revenues to government expenditures is the government budget. On the revenue side, government sources are received from direct and indirect taxes, sales of oil and

other government revenues[11]. Total government revenues increased from 47.94 billion current Rials in 1959 to 1836.40 billion Rials in 1976 (see Table 2-12). Until 1971 when the first round of hikes in OPEC oil prices took place, total government revenue had occasionally had an annual growth rate of over 20 per cent. In 1971, its growth rate reached 51 per cent and and it soared to 195.9 per cent (1394.4 billion current Rials) in 1974 (see Table 2-12). This was due mainly to the rise in government oil revenue which was generated from the jump in the OPEC oil prices, which exceeded 11 US dollars per barrel.

As Table 2-12 indicates, the relative share of oil and gas revenue of the total government revenue was very high. It was 40 per cent in 1959 (19.4 billion current Rials) and reached 86 per cent in 1974 and then 77 per cent in 1976. The contributions of both direct and indirect taxes and other government revenue to the total revenue were small. While the share of direct taxes tended to increase from 7.7 per cent in 1959 (3.7 billion current Rials) to 10.22 per cent (187.8 billion Rials) in 1976, the share of indirect taxes experience a downward trend from 26.9 per cent (12.9 billion current Rials) to 8.45 per cent (155.1 billion current Rials) over the same period.

On the expenditures side, the government's outlays consist of two types: a) current and b) capital. Current

Table 2-12

Total Government Revenues and Shares of its Components
(Billion current rials)

	Share of Direct Tax in Gov't Revenues	Share of Indirect Tax in Total Gov't Revenues	Share of Oil Reserve in Total Gov't Revenues	Share Other Revenues in Total Gov't Revenues	Total Gov't Revenues
1959	7.72	26.91	40.47	24.91	47.940
1960	7.88	25.03	37.46	29.63	57.123
1961	7.37	22.12	35.55	34.95	61.033
1962	7.58	21.09	42.33	28.97	60.680
1963	9.72	25.53	45.63	19.11	60.700
1964	8.10	25.90	53.10	12.88	69.100
1965	11.72	22.12	54.76	11.39	91.300
1966	12.00	26.61	47.40	14.01	99.200
1967	13.00	26.16	50.10	10.76	107.800
1968	13.82	27.50	48.50	10.05	127.300
1969	14.22	25.96	51.24	8.58	149.100
1970	16.78	24.78	49.12	9.29	172.300
1971	11.69	19.51	60.12	8.67	258.300
1972	12.98	19.93	58.99	8.11	302.100
1973	11.58	16.84	66.98	4.80	464.800
1974	5.20	6.12	86.50	2.20	1394.100
1975	9.60	7.51	78.80	4.08	1582.100
1976	10.22	8.46	77.41	3.92	1836.400

Sources : Bank Markazi Iran, Annual Reports, Various Issues.

expenditures run government agencies and meet the financial needs of the public sectors (e.g. defence, justice, health, education, welfare, etc.). Despite an annual growth rate of 22 per cent, its share of total government expenditures fell from 73.27 per cent (34.54 billion current Rials) in 1959 to 55.88 per cent (1047.30 billion current Rials) in 1976 (see Table 2-13). On the other hand, the government capital expenditure, which was used for social and economic development via the "Five Year Plan", grew 28 per cent annually. Its share of total expenditures rose from 26.7 per cent (12.60 billion current Rials) in 1959 to 32.83 per cent (615.288 billion current Rials) in 1976. This, in turn, caused the ratio of current to capital expenditures, which was 2.74 in 1959, to fall to 1.70 in 1976 (see Table 2-13).

Government Investment and its Distribution

Government investment has played a very important role in the economic development of Iran, especially as regards industrialization[12]. Prior to 1968, government investment was lower than the private investment (see Table 2-5). The average ratio of government to private investment was 61 per cent for the period of 1959-1968. However, in the period 1968-1976, the ratio was always above unity except in

Total Government Expenditures and its Components
(billions current rials)

Year	Current Expenditure	Capital Expenditure	Other Expenditures	Total Expenditures	Ratio of Current to Capital Expenditures
1959	34.540	12.600	0.0	47.140	2.74
1960	43.790	14.433	0.0	58.223	3.03
1961	47.370	14.563	0.0	61.933	3.25
1962	44.190	15.290	0.0	59.480	2.89
1963	48.300	18.600	0.0	66.900	2.60
1964	53.500	26.700	0.0	80.200	2.00
1965	61.700	37.800	0.0	98.700	1.67
1966	70.500	37.900	0.0	108.400	1.86
1967	82.100	54.000	0.0	136.100	1.52
1968	98.800	69.900	0.0	168.700	1.41
1969	114.400	82.800	0.0	197.200	1.38
1970	135.200	96.600	0.0	231.800	1.40
1971	168.400	116.000	0.0	284.400	1.45
1972	227.300	131.800	0.0	359.100	1.72
1973	316.800	161.200	0.0	478.000	1.97
1974	727.800	348.200	177.600	1254.100	2.09
1975	929.300	526.800	113.300	1569.400	1.76
1976	1047.300	615.268	211.432	1874.000	1.70

Sources: Bank Markazi Iran, Annual Reports, Various Issues.

1972. The reason for this was the rise in the amount of credit made available to the private sector through the banking system which was mostly owned by the public sector. For the period 1968-1970, the increase in government investment was financed by the heavy government domestic and foreign borrowing (see Table 2-16). However, from 1971 and onwards, oil revenue was the main source which supported government investment expenditures.

Table 2-14 shows the distribution of total government capital expenditures among the seven economic sectors, namely, agriculture, construction, manufacturing and mining, transportation and communication, services, oil, and water and power. Considerable attention was given to three of these sectors, mainly manufacturing and mining, transportation and communication, and water and power by the government. These sectors shared more than one-half of all government investment (61 per cent and 54 per cent in 1959 and 1976 respectively). Government investment in manufacturing and mining which was meager in the early 1960s, increased to 28 per cent of total government investment in 1969 (23.12 billion current Rials). Its average share for the period 1970-1976 was 20 per cent. This, indeed, indicates the government emphasis on industrialization policy in the 1970s. The share of government investment in construction which was below 10 per

Table 2-14

Total Government Investment and Shares of its Components
(billions current rials)

	Agriculture	Construction	Manufacturing & Mining	Transportation & Communication	Services	Oil	Water & Power	Total Gov't Invest.
1959	0.19	0.09	0.01	0.37	0.09	0.008	0.24	12.60
1960	0.11	0.17	0.01	0.37	0.10	0.009	0.23	14.433
1961	0.09	0.20	0.01	0.36	0.11	0.009	0.22	14.563
1962	0.16	0.08	0.02	0.36	0.11	0.010	0.26	15.290
1963	0.15	0.05	0.03	0.36	0.15	0.030	0.23	18.600
1964	0.22	0.08	0.07	0.28	0.17	0.040	0.14	26.700
1965	0.15	0.09	0.09	0.32	0.12	0.080	0.14	37.000
1966	0.12	0.07	0.12	0.29	0.12	0.050	0.21	37.900
1967	0.10	0.06	0.12	0.26	0.09	0.140	0.23	54.000
1968	0.08	0.05	0.08	0.19	0.09	0.200	0.16	69.900
1969	0.06	0.05	0.28	0.21	0.10	0.150	0.16	82.800
1970	0.06	0.07	0.30	0.22	0.09	0.110	0.15	96.600
1971	0.08	0.10	0.21	0.26	0.13	0.070	0.17	116.000
1972	0.09	0.15	0.16	0.19	0.17	0.090	0.16	131.800
1973	0.08	0.28	0.16	0.12	0.14	0.080	0.10	161.200
1974	0.09	0.23	0.23	0.16	0.14	0.030	0.11	348.700
1975	0.07	0.22	0.20	0.16	0.12	0.110	0.12	526.800
1976	0.06	0.24	0.15	0.15	0.12	0.040	0.24	615.268
Average Annual Growth Rate	24.39	45.50	64.52	24.70	30.28	71.44	31.93	27.88

Source : Bank Markazi Iran, Annual Reports, Various Issues.

cent in the 1960s had a significant upturn in the 1970s. It increased from 7 per cent (6.8 billion current Rials) in 1970 to 28 per cent (45.1 billion current Rials) in 1973, and then to 24.0 per cent (147.7 billion current Rials) in 1976. Government investment in services increased throughout the period as well. Its share of total government investment fluctuated between 9 and 17 per cent and it was 12 per cent in 1976 (71.7 billion current Rials). The agriculture sector, which received a relatively high share of total government investment in the first half of the 1960s (averaging 15 per cent), had its share fall gradually to 5 per cent (5.08 billion current Rials) in 1970 and then recovered slightly to 5.5 per cent (34.26 current billion Rials) in 1976.

While the oil and gas sector, which is owned and run by the government, provides financial and non-financial resources to all sectors of the Iranian economy, it uses a very small portion of these resources. This indeed indicates the great forward linkages and the meager backward linkage of this sector with the remaining sectors of the economy. The share of this sector of total government investment was 8 per cent (1.10 billion current Rials) in 1959 and it fell to 6 per cent (39.67 billion current Rials) in 1976. With the exception of a few periods in the 1960s and 1970s in which the share of government investment in oil

exceeded 10 per cent of the total government investment, its share was generally lower than 10 per cent. Significant attention was given to the water and power sector by the government. The encouragement of industrialization and urbanization necessitated a greater investment in water and power which is owned and run by the government. On the average, 18 per cent of total government investment was allocated for water and power during 1959-1976. This sector's share of in total government investment was 24 per cent (3.0 billion current Rials) in 1959, fell to its lowest value, 10 per cent (16.4 billion current Rials) in 1973, and then reached 24 per cent again (14.5 billion current Rials) in 1976.

The Government Budget Deficit and Means of Financing

With the exception of 1959 and 1962, the annual government budget experienced a chronic deficit until 1974 (see Table 2-15). A significant increase in government petroleum revenue in 1974 turned the government budget deficit into a surplus (140.0 billion current Rials). However, this surplus did not last beyond 1975 as rapid increases in the government expenditure outstripped the revenue growth and the budget again went into deficit (37.6 billion current Rials) in 1976. As table 2-16 indicates,

Table 2-15

Government Budget Deficit
(billions current Rials)

YEAR	Total Expenditures (GEXPOA1)	Total Revenues (GRTA1)	Deficit
1959	47.140	47.940	+ 0.800
1960	58.223	57.123	- 1.100
1961	61.933	61.033	- 0.900
1962	59.480	60.680	+ 1.200
1963	66.900	60.700	- 6.200
1964	80.200	69.100	- 11.100
1965	98.700	91.200	- 7.400
1966	108.400	99.200	- 9.200
1967	136.100	107.800	- 28.300
1968	168.700	127.300	- 41.400
1969	197.200	149.100	- 48.100
1970	231.800	172.300	- 59.500
1971	284.400	258.300	- 26.100
1972	359.100	302.100	- 57.000
1973	478.000	464.800	- 13.200
1974	1254.100	1394.100	+ 140.000
1975	1569.400	1582.100	+ 12.700
1976	1874.000	1836.400	- 37.600

Sources : Bank Markazi Iran, Annual Reports, Various Issues.

Table 2-16

Sources of Financing Government Deficit

(billion current rials)

YEAR	Credit from Banking System	Net Bond Sold to Cen. Bank	Net Bond Sold to Oth. Banks	Net Bond Sold to Private Sector	Other Domestic Sources of Financing	Total Domestic Sources of Financing	Total Foreign Sources of Financing	Total Financing of Deficit
1959	0.0	0.0	0.0	0.0	-0.800	-8.000	0.0	-0.800
1960	0.0	0.0	0.0	0.0	-0.600	-0.600	1.700	1.100
1961	0.0	0.0	0.0	0.0	0.0	0.0	0.900	0.900
1962	0.0	0.0	0.0	0.0	-1.200	-1.200	0.0	-1.200
1963	5.100	0.0	0.732	1.060	-1.792	5.100	1.100	6.200
1964	8.100	0.0	0.707	1.065	0.228	10.300	0.800	11.100
1965	6.100	0.600	1.299	1.120	-1.820	7.300	0.100	7.400
1966	5.500	0.042	-0.293	5.616	-4.165	6.700	2.500	9.200
1967	12.300	2.730	1.656	3.014	0.0	19.700	8.600	28.300
1968	11.300	5.866	-0.588	2.422	0.0	19.000	22.400	41.400
1969	18.800	6.300	5.900	-4.200	0.0	26.800	21.300	48.100
1970	29.300	10.400	-3.600	3.900	0.0	40.000	19.500	26.100
1971	2.000	-1.800	9.800	6.100	-5.00	11.100	15.000	26.100
1972	9.400	20.600	10.500	5.800	0.0	46.300	10.700	57.000
1973	-33.400	69.900	15.100	6.900	-42.600	15.900	-2.700	13.200
1974	-5.000	-74.900	70.800	1.900	77.400	70.700	-210.200	-140.000
1975	-108.000	29.100	62.000	6.900	177.700	167.700	-180.400	-12.700
1976	-134.100	16.100	90.800	8.300	144.400	125.500	-87.900	37.600

Sources : Bank Markazi Iran, Annual Reports, Various Issues.

the deficit was financed through two means; domestic and foreign borrowings. The former became more important than the latter after 1969. Substantial access to foreign exchange, through oil export revenues in 1973-1976, enabled the government to pay back its foreign debts. The domestic loans of the government were met via five sources: 1) credit from the banking system; 2) bonds sold to the central bank; 3) bonds sold to other banks; 4) bonds sold to the private sector; and 5) other sources.

(2-6) MONETARY SECTOR

The central bank (Bank Markazi Iran) is the sole body responsible for the formulation and implementation of the country's monetary and credit policies. The aim of monetary and credit policies in Iran is to assist the country's economic development by maintaining monetary and price stability and the appropriate allocation of the supply of credits among different sectors of the economy[13]. However, monetary policy in Iran, like that in most developing countries, is not as effective as it is in western countries due to the limited scope of the market and the small number of financial institutions.

Monetary policy in Iran was operated through two types of policies[14]: 1) selective policy, and 2) demand

management policy. The selective policy was designed for the appropriate allocation of the banking system's credit to different productive sectors of the economy (agriculture, manufacturing and mining, and so forth). This policy was mainly controlled by a) changing the discount rates on notes and negotiable securities[15], and b) controlling interest rates on bank deposits and loans. However, the selective policy was not effective due to the lack of a fully integrated financial market.

The aggregate demand management policy was used to insure monetary equilibrium and to counter cyclical fluctuations of economic activity. This policy was implemented by controlling two measures; a) the minimum reserve requirements, and b) the maximum credit volume. However, in putting this policy into action, the central bank again faced some limitations. Changes in the monetary base and hence the money supply[16] came from two sources; 1) changes in net foreign assets of the central bank due to foreign exchange received from exporting oil, and 2) the expansion of the domestic assets held by the banking system. Changes in net domestic assets originated with the public and/or private sectors. Domestic private assets can be controlled by the central bank through minimum reserve requirements and/or maximum credit ceiling. However, the effective control of the public domestic assets by the

central bank is dependent upon the government's fiscal policy. If the government decides to convert the foreign exchange received through all exports into domestic currency for domestic uses, this action will have two effects; 1) it increases domestic liquidity and 2) it sets the stage for multiple expansion of the money supply. Such an increase in the banking system's liquidity weakens the effectiveness of some of the policy options available to the central bank. Due to this fact, monetary policy was somewhat uneffective in fighting inflaiton in 1971-1974. When the country's net foreign assets began to increase, they were converted into domestic currency to meet government expenditures. The rate of growth of government expenditures which was around 17 per cent in 1970, jumped to 23 per cent in 1971, 26 per cent in 1972, 33 per cent in 1973 and 62 per cent in 1974 (see Table 2-15). With restrictions in place on the aggregate supply of goods and services, the rate of inflation increased considerably. The price deflator of GNP which rose only 1.9 per cent in 1970, increased to 9.3 per cent in 1971, to 9.2 per cent in 1972, 28.7 per cent in 1973 and 49.3 per cent in 1974 (see Table 2-2).

The Iranian money supply[16] grew at around 10 per cent in the 1960s (see Table 2-17), began to grow at 20.1 per cent in 1971, 61.4 per cent in 1974 and finally 36.9 per cent in 1976. This rapid growth in the money supply, which

Monetary Base, Money Supply and Total Banking System - Credit Given to the Private Sector
(billion current rials)

YEAR	Monetary Base[1] billion current Rials	Money Supply[2] billion current Rials	Total Banking System Credit Given to Private Sector billion current Rials
1959	24.90	43.00	35.90
1960	27.70	41.70	42.40
1961	30.80	39.90	50.10
1962	33.00	43.80	60.80
1963	36.80	49.00	72.10
1964	37.30	53.90	87.00
1965	44.00	60.30	101.00
1966	48.00	66.80	119.70
1967	54.80	77.10	140.10
1968	66.30	87.40	165.00
1969	75.10	90.40	195.70
1970	91.60	97.40	228.50
1971	108.70	117.00	274.90
1972	141.40	158.70	359.70
1973	188.30	202.70	486.70
1974	310.90	327.20	692.70
1975	419.60	446.50	1068.60
1976	566.90	611.20	1498.60
Average Growth Rate %	19.0	15.9	23.0

1) Monetary base is defined as currency held by public + currency held by commercial banks + deposit of commercial bank with the central bank.

2) Money supply uses an M1 definition, that is, currency held by public + demand deposits.

Source : Bank Markazi Iran, Annual Reports, Various Issues.

was generated by significant rises in government expenditures, allowed the banking system to expand its credit to the private sector. The total credit to the private sector increased from 35.9 billion current Rials in 1959 to 1498.60 billion current Rials in 1976, growing 23 per cent annually. However, during 1971-1976, it grew 37.21 per cent per year.

The distribution of the total banking system credit to the private sector (CTPA) among five sectors of the economy (namely agriculture, manufacturing and mining, transportation and communication, construction and services) is presented in Table 2-18[17]. Services had the highest share of CTPA (41.2 per cent) during 1959-1976. Credit to services increased from 14.6 billion current Rials to 563.5 billion current Rials, thus growing at an annual rate of 22.5 per cent. Total credit in manufacturing and mining grew 26.2 per cent annually, increasing from 5.6 billion current Rials in 1959 to 369.00 billion current Rials in 1976 and its share of total credit expanded from 15.6 per cent to 24.62 per cent in this period. The share of the construction sector of total credits (CTPA) also increased from 13.37 per cent (4.8 billion current Rials) in 1959 to 16.20 per cent (242.8 billion current Rials) in 1976, growing 24.4 per cent annually. Despite an annual growth rate of around 21 per cent in agriculture and transportation

Table 2-18

Distribution of Total Banking System Credit to Private Sector Among Sectors of the Economy (%)
(billions current rials)

YEAR	Agriculture	Construction	Manufacturing & Mining	Transportation & Communication	Services	Total Credit
1959	10.30	13.37	15.60	20.06	40.67	35.90
1960	10.14	13.44	15.57	20.05	40.80	42.40
1961	10.18	13.37	15.57	20.16	40.72	50.10
1962	10.20	13.32	15.46	20.23	40.79	60.80
1963	10.27	13.45	15.53	19.97	40.78	72.10
1964	10.23	13.45	15.52	20.00	40.80	87.00
1965	10.20	13.37	15.54	20.10	40.79	101.00
1966	10.19	13.37	15.54	20.13	40.77	119.70
1967	10.71	13.42	15.85	17.84	42.18	140.10
1968	11.46	13.88	15.27	18.72	40.67	165.00
1969	10.37	13.44	15.59	19.26	41.34	195.70
1970	8.06	12.69	15.14	25.03	39.08	228.50
1971	6.33	12.51	15.50	25.06	40.60	274.90
1972	8.04	12.73	17.74	18.90	42.59	359.70
1973	7.66	12.68	18.66	15.66	45.34	486.70
1974	9.04	12.33	20.80	13.24	44.59	692.70
1975	8.80	13.83	17.81	17.84	41.72	1068.60
1976	8.75	16.20	24.62	12.83	37.60	1498.60
Average Share %	9.50	13.38	16.74	19.17	41.21	100
Average Growth Rate%	21.9	24.4	26.2	20.0	22.5	23.0

Source : Bank Markazi Iran, Annual Reports, Various Issues.

and communication credits, their shares of the total fell during 1959-1976. Total credit received by the agriculture sector increased from 3.7 billion current Rials to 131.1 billion current Rials during the period 1959-1976, and its share of CTPA fell from 10.3 per cent to 8.8 per cent. Similarly, shares of transportation and communication in CTPA fell from 20.1 per cent (7.2 billion current Rials) in 1959 to 12.9 per cent (152.2 billion current Rials) in 1976.

(2-7) THE REAL GROSS DOMESTIC PRODUCT, GDP

Real gross domestic product, GDP (measured at factor cost) grew from 271.51 billion Rials in 1959 to 1402.96 billion Rials in 1976, at an average growth rate of 10.2 per cent annually (see Table 2-19). Contributions of the seven sectors of the economy to GDP were not homogeneous. Manufacturing and mining, services, and oil sectors, absorbing 42 per cent of labour employment, contributed, on average, over 64 per cent to GDP annually. On the other hand, the contribution of agriculture to GDP, which employed over 46 per cent of the labour force was 21 per cent. This great disparity between the more traditional sector and the more modern sectors, was created by the government through so-called semi-industrialization policy during the 1959-1974 period. At this time, the economy's total output per

Table 2-19

Real Gross Domestic Product and Shares of its Components
(Billion 1959 rials)

	Share of Agriculture	Share of Construction	Share of Manufacturing & Mining	Share of Transportation & Communication	Share of Services
1959	31.45	4.90	11.38	10.13	29.58
1960	30.40	4.70	11.80	9.69	29.87
1961	29.32	4.76	12.19	9.53	28.63
1962	28.04	4.44	13.11	9.46	28.43
1963	26.90	4.86	13.49	9.16	28.40
1964	25.52	4.74	13.12	8.76	30.25
1965	24.25	5.40	13.14	8.07	30.61
1966	23.02	4.79	14.11	7.63	30.92
1967	22.33	5.01	14.59	7.76	30.39
1968	21.53	4.71	14.99	6.67	31.35
1969	20.00	4.31	14.86	6.44	31.83
1970	18.81	3.98	14.81	6.45	32.51
1971	16.56	3.88	15.77	6.14	33.66
1972	15.16	3.69	16.14	6.07	35.48
1973	13.94	3.57	16.53	6.68	36.68
1974	13.14	3.07	17.44	7.41	38.45
1975	12.69	4.01	18.38	8.46	39.54
1976	11.89	5.05	18.57	8.21	39.39
Average Share	0.2138	0.0444	0.1470	0.0793	0.3255
Average Growth Rate	4.06	11.170	13.43	9.136	12.14

continued....

Table 2-19 (continued)

	Share of Oil	Share of Water & Power	Total Gross Domestic Product (GDP)
1959	12.15	0.41	271.510
1960	12.89	0.66	286.236
1961	14.91	0.65	299.368
1962	15.84	0.68	316.453
1963	15.96	1.24	335.350
1964	16.30	1.32	361.002
1965	17.17	1.35	410.180
1966	17.87	1.67	446.757
1967	18.15	1.76	497.090
1968	18.84	1.91	555.636
1969	20.42	2.14	616.121
1970	21.12	2.31	686.057
1971	21.26	2.73	752.543
1972	21.05	2.40	867.519
1973	19.94	2.65	996.218
1974	17.67	2.82	1117.750
1975	14.03	2.90	1234.610
1976	14.07	2.82	1402.960
Average Share	17.20	1.80	100.00
Average Growth Rate	11.10	15.22	10.17

Table 2-20

Share of Total Labour Employment and Sectoral Shares of Employment

	Share of Agriculture	Share of Construction	Share of Transportation & Communication	Share of Manufacturing & Mining	Share of Services	Share of Oil	Share of Water & Power	Total Employment (million)
1959	0.535	0.059	0.033	0.145	0.219	0.005	0.004	6.692
1960	0.536	0.060	0.032	0.145	0.218	0.005	0.004	6.691
1961	0.539	0.061	0.032	0.146	0.213	0.005	0.004	6.682
1962	0.536	0.060	0.032	0.150	0.212	0.005	0.005	6.740
1963	0.535	0.061	0.031	0.152	0.211	0.006	0.004	6.916
1964	0.534	0.061	0.031	0.151	0.218	0.006	0.006	7.107
1965	0.519	0.065	0.030	0.156	0.218	0.006	0.006	7.311
1966	0.500	0.068	0.030	0.169	0.220	0.006	0.007	7.555
1967	0.490	0.069	0.032	0.171	0.225	0.006	0.007	7.954
1968	0.473	0.069	0.031	0.181	0.233	0.006	0.007	8.138
1969	0.457	0.067	0.036	0.190	0.237	0.006	0.007	8.382
1970	0.436	0.070	0.039	0.199	0.242	0.006	0.008	8.647
1971	0.419	0.074	0.039	0.203	0.250	0.006	0.009	8.800
1972	0.401	0.078	0.048	0.207	0.252	0.005	0.009	9.214
1973	0.389	0.082	0.047	0.215	0.253	0.005	0.009	9.462
1974	0.374	0.095	0.050	0.225	0.243	0.005	0.008	9.739
1975	0.360	0.091	0.057	0.221	0.256	0.006	0.009	9.707
1976	0.343	0.092	0.059	0.229	0.261	0.006	0.010	9.979
Average Share %	46.53	7.12	3.83	18.18	23.19	0.56	0.68	100
Average Growth of Output Worker	4.1	4.8	2.5	7.4	7.80	6.3	12.5	7.00

Source : Plan and Budget Organization, Economic Trends of Iran, 5th Edition, 1978.

worker, with an annual growth rate of 7.1 per cent, increased from 40.57 to 140.59 thousand Rials, with most of the improvement occuring in the non-agriculture sectors.

Although agriculture (farming, forestry and fisheries) had been Iran's largest traditional sector, it had the weakest link with other sectors and had been the slowest growing sector in the economy. Value-added in this sector grew 4.1 per cent annually, from 85.4 billion Rials in 1959 to 166.873 billion Rials in 1976 (see Table 2-19). With an average of 46.5 per cent of total employment being employed in the agriculture sector, its average share in GDP over the period of 1959-1976 was only 21.4 per cent. Average output per worker in agriculture had a growth rate of 4.1 per cent in comparison with 7.35 and 7.80 per cent in manufacturing and mining, and services.

The relatively slow growth of Iran's agricultural sector has been due to several factors. First, the scarcity of overall rainfall and the inadequacy of surface and underground water systems to irrigate more than one-third of the cultivated land. Secondly, there is the prelevance of antiquated and inadequate farming techniques in many parts of the country. Thirdly, the supply of agricultural services and farm credits by both private and government sectors is limited. Finally, in comparison with other sectors of the economy, a relatively lower priority of

creating fixed capital formation was given to the agriculture sector by both the private and government sectors. This meager attention towards the agriculture sector by the Iranian economic development planners was, perhaps, based on the unrealistic assumptions that: 1) Iran's national comparative advantage was not in agriculture, and 2) relatively cheap food could always be imported from the world surplus countries and paid for by exports of oil and higher valued industrial products. However, this idea never materialized because of the following reasons: a) world-wide food shortages; b) creation of the physical bottlenecks to the inflow of imports (insufficient capacity of the Iranian harbours), even though foreign exchange was abundant; and c) a more sobering realization that industrialization cannot be self-sustaining without agricultural growth.

Although the oil sector absorbed an average of 0.56 per cent of total employment, it contributed 17.2 per cent annually to the real domestic product during the period 1959-1976. The real value-added in this sector increased from 33.0 billion Rials in 1959 to 197.40 billion Rials in 1976, growing at a rate of 11.10 per cent annually. The oil sector has had a significant role in the Iranian economy. On the aggregate demand side, the oil revenue, accruing to the state treasury, has supported both regular public expenditures, and more importantly, public spending on

infrastructure and productive projects. These expenditures, in turn, have exerted strong multiplier effects on private consumption expenditure, and fixed capital formation. On the aggregate supply side, the steady growth in the value-added of the oil sector has been the linch-pin of the gross domestic and gross national products (GDP and GNP respectively).

The annual growth rate of value-added in manufacturing and mining was 13.4 per cent during the period 1959-1976. Its contribution to the gross domestic product (GDP) increased from 11.4 per cent (30.9 billion Rials) in 1959 to 18.6 per cent (260.5 billion Rials) in 1976 (see Table 2-19). With an average share of 18.1 per cent of total employment, employment in this sector increased from 0.97 to 2.29 million workers during 1959-1976, out of which over two thirds were engaged in the traditional industries. Output per worker grew 7.4 per cent (second only to that of water and power sector) annually, increasing from 31.82 to 114.00 thousand Rials during this period.

Several factors were responsible for the rapid growth of the manufacturing and mining sector. First, government tax and trade policies encouraged private investment in this sector through tax holidays and provided protection against foreign competition via quantitative restrictions and custom levies. Secondly, the state,

through the industrial development banks, provided ample credits to the investors in manufacturing and mining at subsidized interest rates. Thirdly, the government made large investments in the basic industries, namely steel, copper, aluminum, machine tools, petrochemicals. Finally, the availability of foreign exchange increased imports of capital and intermediate goods which in turn facilitated development of the manufacturing and mining sector.

Real value-added in the construction sector (both residential and nonresidential) grew 11.2 per cent annually, increasing from 13.3 billion Rials in 1959 to 70.8 billion Rials in 1976. Its average contribution to the real domestic product was 4.4 per cent. Labour employed in this sector accounted for 7.1 per cent of total labour employment, and the output per worker grew 4.8 per cent annually, from 33.41 thousand Rials in 1959 to 77.4 thousand Rials in 1976. Despite the fact that the average growth rates of both real investment (15.4 per cent) and value-added (11.2 per cent) in the construction sector were above the average growth rates of national real investment (13.6 per cent) and real domestic product (10.2 per cent) during 1959-1976, the number of houses built persistently failed to satisfy the mounting demands of a rising urban population commanding a larger income. Hence, a shortage of housing forced the price of dwellings to escalate

significantly in the 1970s[18]. In 1968, the beginning of the fourth development plan of 1968-1972, there were an estimated 1.87 million residential dwellings for an estimated 2.6 million urban households, indicating a shortage of 0.73 million units. By the end of 1972, this shortage increased to 1.13 million units. Hence, population density per dwelling which was 7.7 in 1968 rose to 8.5 in 1972[19]. Despite the government plan (the Fifth Development Plan, 1973-1978) for construction of an additional 0.81 million units in 1973-1978, the shortage of residential housing persisted in the urban areas[20].

The real value-added in transportation and communication contributed 7.9 per cent annually to GDP. It increased from 27.5 billion Rials in 1959 to 115.2 billion Rials in 1976, growing on an annual rate of 9.1 per cent. This sector absorbed 3.8 per cent of total employment and output per worker in this sector grew 2.5 annually during 1959-1976.

Services was one of the fastest growing sectors in the economy[21]. Value-added in this sector grew 12.1 per cent annually, increasing from 80.3 billion Rials in 1959 to 552.7 billion Rials in 1976, and contributing 32.6 per cent to GDP annually. Despite this large share of GDP, the average share of services of total employment was 23.2 per cent. This discrepancy between shares of GDP and total

employment was created by the introduction of modern services which are "intensive in the use of capital equipment and modern skills; therefore, their labour-absorption capacity will be low, while the skilled pesonnel involved in their provision will be paid monopolistic salaries"[22]. Output per worker in services enjoyed a high annual growth rate of 7.8 per cent (second only to the water and power sector), increasing from 54.8 thousand Rials in 1959 to 212.1 thousand Rials in 1976.

The water and power sector, with its output growing at annual rate of 23.5 per cent, was one of the fastest expanding sectors of the Iranian economy. As Table 2-19 shows, during 1959-1976, the contribution of this sector to the real domestic product (GDP) rose from 1.1 billion Rials (0.4 per cent) to 39.6 billion rials (2.8 per cent). Total gross investment in water and power, which is run and owned by the government, grew 22.1 per cent annually from 2.98 billion Rials in 1959 to 43.20 billion Rials in 1975. The industrialization and urbanization of the country were the two main factors that necessitated a relatively large investment in this sector (see Table 2-6). In 1975, total electric power production in Iran amounted to 15.7 billion kilowatt hours, representing a 12.1 per cent increase over the previous year. Of the total electric consumption, 56

per cent was used by industries, 19 per cent by commercial enterprises, 17 per cent by households and only 3 per cent by farmers[23].

This chapter provided a general description of the Iranian economy during the years 1959 to 1976. Based on this information, the following chapter will present a macroeconomic model of the Iranian economy.

FOOTNOTES

Chapter 2

1. Iran's population figures and their division into urban-rural areas, and employed-unemployed are merely projections which are based on two actual national census taken in 1956 and 1966. Therefore, they may not be reliable. Despite low levels of unemployment reported by the government publications, alarming magnitudes of unemployment among unskilled labourers are spotted in 1959-1976. See, for instance, Bharier (1970), p. 35, and Amuzagar and Fekrat (1971), p. 84.

2. Halliday (1980), p. 189.

3. See Bank Markazi Iran, Annual Reports (1974), for the various government anti-inflationary policies.

4. Halliday (1980), p. 190.

5. Vakil (1975), p. 11.

6. For a detailed analysis of the quesion of income distribution in Iran, see Pesaran (1976), pp. 267-288.

7. See Plan and Budget Organization (1975).

8. Economist (1976), August 28, pp. 40-43.

9. See Looney (1977), p. 56.

10. Mostashari (1978).

11. Other revenues are mainly received from the government owned agencies and industries such as water and power, cement, sugar, tobacco, paper and pulp, textiles , petrochemicals, transportation and communication and so forth.

12. For a summary of industrial development in Iran, see Najmabadi (1976), pp. 105-121.

13. In 1976, there were 75 commercial banks with some 7,400 branches and ten others specializing in regional development operating in the country. Among the commercial banks, some were owned and run by the government. The assets of government banks accounted for about 34 per cent of total commercial banking system assets.

14. See Amuzegar (1978), p. 201.

15. Rediscounting operations were used primarily to influence not so much the aggregate supply of money, as the compositions of the banking credit given to the private sector. However, rediscount facilities were rarely used by the private banks. The majority of the commercial banks seldom asked the central bank for financing because of existence of their excess liquidity assets (excess reserves).

16. Money supply is defined as currency in the hands of the public plus demand deposits, and monetary base (or high powered money) is defined as currency with the public and commercial bank plus the deposits of the commercial banks with the central bank.

17. The two sectors, namely oil and water and power, which are owned by the government are excluded from the above categories.

18. See Katouzian (1981), pp. 334-5.

19. If allowance is made for obsolete and substandard housing, the magnitude of the shortages would obviously be much greater (see Plan and Budget Organization (1975), pp. 597-602).

20. Plan and Budget Organization (1975), pp. 557-602.

21. Service sector consists of banking and non-banking intermediaries, insurance companies, domestic trade, education, health and so forth.

22. Katouzian (1981), pp. 285-6.

23. Bank Markazi Iran, Annual Report (1977).

CHAPTER 3

MACROECONOMIC MODEL - A CASE STUDY FOR IRAN

(3-1) INTRODUCTION

The preceding chapter briefly reviewed some basic economic features of the developing countries in general and petroleum oriented ones in particular. In addition, the major features of the Iranian economy were described. A macroeconomic model is constructed for the Iranian economy, which is chosen as a case study. This section provides an overview of the model and its purposes.

Construction of macroeconomic models for Iran began in the late 1960s. Activities of Iran's central bank and statistical centre, along with the Budget and Plan Organization, in gathering and compiling data, encouraged Iranian researchers to build larger scale macroeconomic models[1]. These models were basically demand oriented, that is, they only explained the components of final demand which were the sole determinants of the level of output. The only exception was a fairly large scale model, built by M.A. Parhizgari (1976) which took both demand and supply sides of the economy under consideration. However, its monetary sector was not well developed, with its components considered to be exogenous. The government budget constraint and the means of financing deficits was ignored.

Government and private investments at the sectoral level were not separated. Prices were determined by a mark-up equation rather than being derived through demand and supply forces. In the following section the model used in this study, which does not have these deficiencies, is described. An overview of the structure of the model is presented in this chapter. A detailed discussion of the regression results is postponed until the following chapter. At the end of this chapter both the identities and definitions, as well as the estimated equations, are presented in tabular form.

(3-2) OVERVIEW OF THE MODEL AND ITS PURPOSE

The purpose of this study is to analyse some aspects of the behaviour of the Iranian economy over the period 1959-1976 with the help of macroeconomic and input-output models.

The model used here is macro sectoral. It is a non-linear, stochastic simultaneous system of 107 equations and identities[2]. The methods of estimation are both ordinary least squares (OLS), and two-stage least squares (TSLS) using principal components of predetermined variables in the first stage. The estimated model is validated and its performance analysed through a series of dynamic simulation experiments. The model is used for historical

simulation of the Iranian economy, and it could be also applied for ex-ante forecasting of the economy.

The effects of many different government monetary and fiscal policies are examined. In particular, government investment policies are studied. These policies are: (i) increases in the total government investment in different sectors, (ii) changes in distribution of government investment across the various sectors, in particular an increase in government investment in agriculture accompanied by a simultaneous decrease of government investment in other sectors, total government investment being held constant. In (i), where total government investment is increased, methods of financing these expenditures which are considered are borrowing from either domestic or foreign sources or a combination of both.

The model is both demand and supply oriented. Supply considerations are taken to be the main constraint in the development of the Iranian economy. The demand side of the model distinguishes between the domestic demand for domestically produced consumer goods, and the domestic demand for domestically produced investment goods. In both cases, demand is considered to be price sensitive while the corresponding supply is perfectly price inelastic. The demand for consumer goods is broken down into three categories, i.e. urban, rural, and government consumptions.

The demand for investment goods arises in seven different sectors of the economy, namely, agriculture, construction, manufacturing and mining, transportation and communications services, oil, and water and power. Apart from the oil, and water and power sectors which are owned and operated by the government, investment in other sectors is further broken down into private and government investment. With the exception of "total government investment", and government investment in water and power, government investment demand in other sectors is considered to be exogenous in nominal terms. All private investment is explained via behavioural relationships. The purpose of this fairly detailed breakdown of the investment demand is to analyse the behaviour of the economy with respect to different government investment policies.

On the supply side, the supply of domestically produced consumption goods (which are consumed domestically) and the supply of investment goods are investigated. The variables involved in the supply side are: (i) value-added, (ii) labour employment, (iii) capital stock, and (iv) wages in the seven sectors.

As there is no direct information about consumption and investment goods produced by each sector, the 1973 Iranian input-output table is utilized to convert sectoral value-added to consumption and investment goods outputs.

Values of investment and consumer goods produced by each sector are calculated and aggregated over seven sectors to arrive at the total supplies of consumer goods and of investment goods (in value terms).

Finally, the interaction of the demand and supply sides determines the equilibrium level of consumption of consumer and investment goods, imports of consumer and investment goods, and their corresponding prices.

A monetary sector is also introduced into the system. This is achieved through the definitional relationships in the government budget constraint and balance of payments. The monetary base, which in turn determines the money supply, is affected by changes in foreign exchange reserves and government bonds sold to the central bank. Being affected by the money supply, total banking credit to the private sector in turn affects the real sector by entering into the private consumption function on one hand, and private sectoral investment functions on the other hand.

Some other aspects of the economy such as (i) the distribution of income between wage earners and profit makers, (ii) the gap between per capita consumptions in urban and rural areas, and (iii) the movement of population between the rural and urban areas are also investigated.

(3-3) STRUCTURE OF THE MODEL

The model is decomposed into 9 blocks. These are: (1) consumption (private rural, private urban and government), (2) investment (six sectors), (3) value-added (six sectors), (4) employment and wages (seven sectors), (5) imports (4 types), (6) monetary block (money supply and banking credits to the private sector), (7) government revenues (3 types), depreciation and population (urban and rural), (8) prices (4 types), and (9) definitions and identities.

Tables 3-1 and 3-2 present notations for the endogenous and exogenous variables, respectively. There are 44 exogenous and 107 endogenous variables. Table 3-3 shows the adjusted proportions of sectoral value-addeds allocated for consumption and investment goods. These proportions are derived from the Input-Output table[3]. Most of the variables are valued in 1959 billion Rials (Iranian currency). Wages are in 1000 current Rials per man year, prices are indexed (1959=1.00),and employment is measured in million persons. All credit variables, monetary base, money supply, foreign exchange, and the government budget constraint are measured in billions current Rials.

A uniform notation is used throughout the study. Variables starting with the letter "C" represent consumption

expenditures, for example, private urban consumption (CUP). Exceptions are credit variables which start with CT. Investment variables begin with the letter "I", for example, IAP and IAG which are private and government investment in the agriculture sector respectively. As mentioned earlier, there are seven sectors in the economy which are identified by the following notation: A = agriculture, CN = construction, MM = manufacturing and mining, TC = transportation and communications, O = oil, WP = water and power, and S = services. Those variables which end with A's are measured in nominal values (except CTAA and NFYAA, i.e. nominal credit in agriculture and net factor income from abroad which are required two As). First - differences in variables are indicated by a Greek letter "delta" (Δ). Astericks (*) and slashes (/) are multiplication and division signs respectively. Purely exogenous variables are indicated by bar above them. The following example may clarify the above description of the notation.

X = real, endogenous variable
XA = nominal, endogenous variable
X = real, exogenous variable
XA = nominal, exogenous variable
X-1 = real, endogenous variable, lagged one period
XA-1= nominal, endogenous variable, lagged one period
XPD = price deflator for variable X

A listing of the variables reported in the Iranian National Income and Product Accounts is presented in Table A3-1 in an appendix at the end of this chapter. The structure of the available data was a major factor in determining the structure of the model. The structure of the model is presented in Figures 3-1 through Figure 3-8.

FIGURE 3-1

Monetary Sector
(Current Rials)

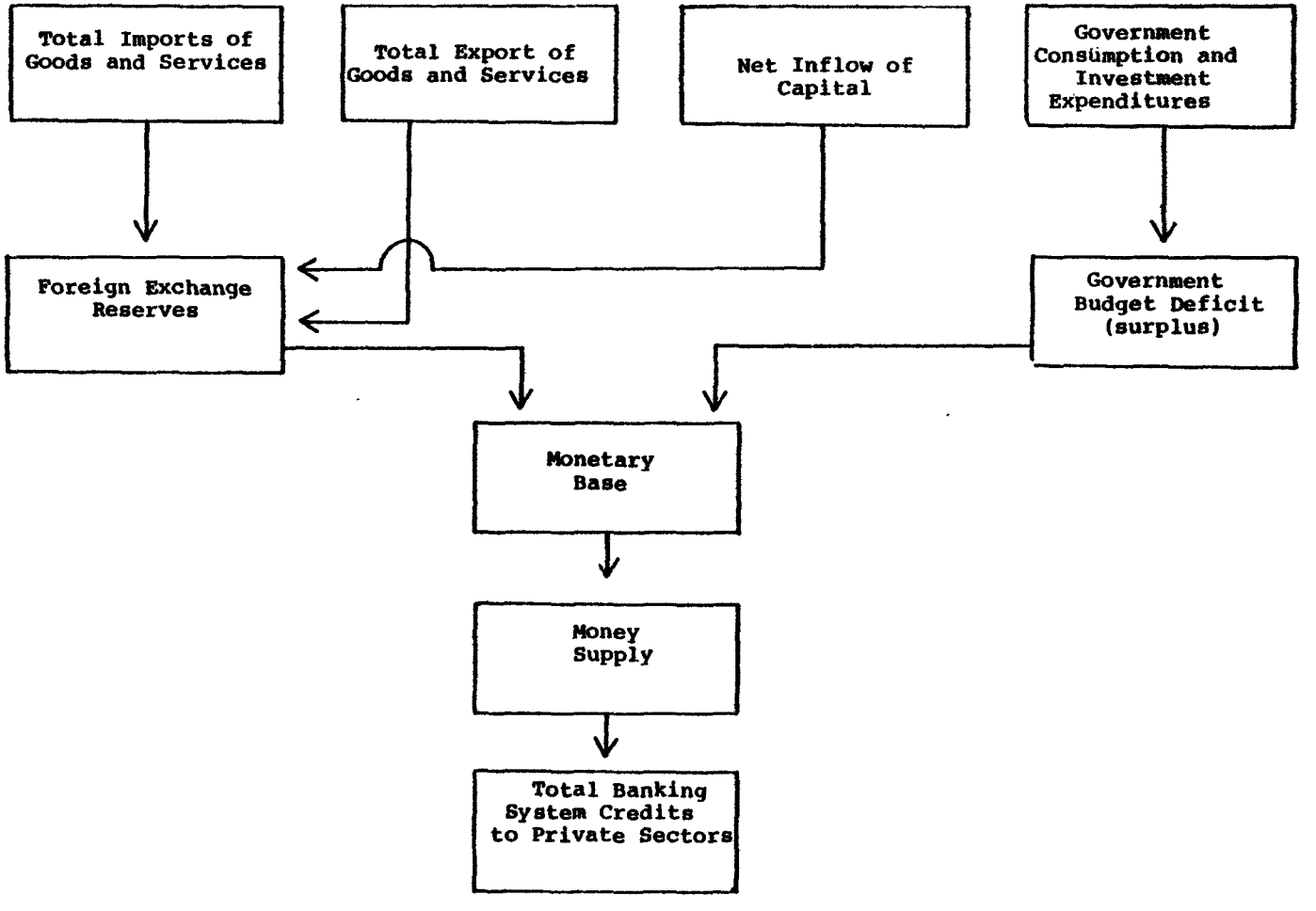

FIGURE 3-2

Labour Market

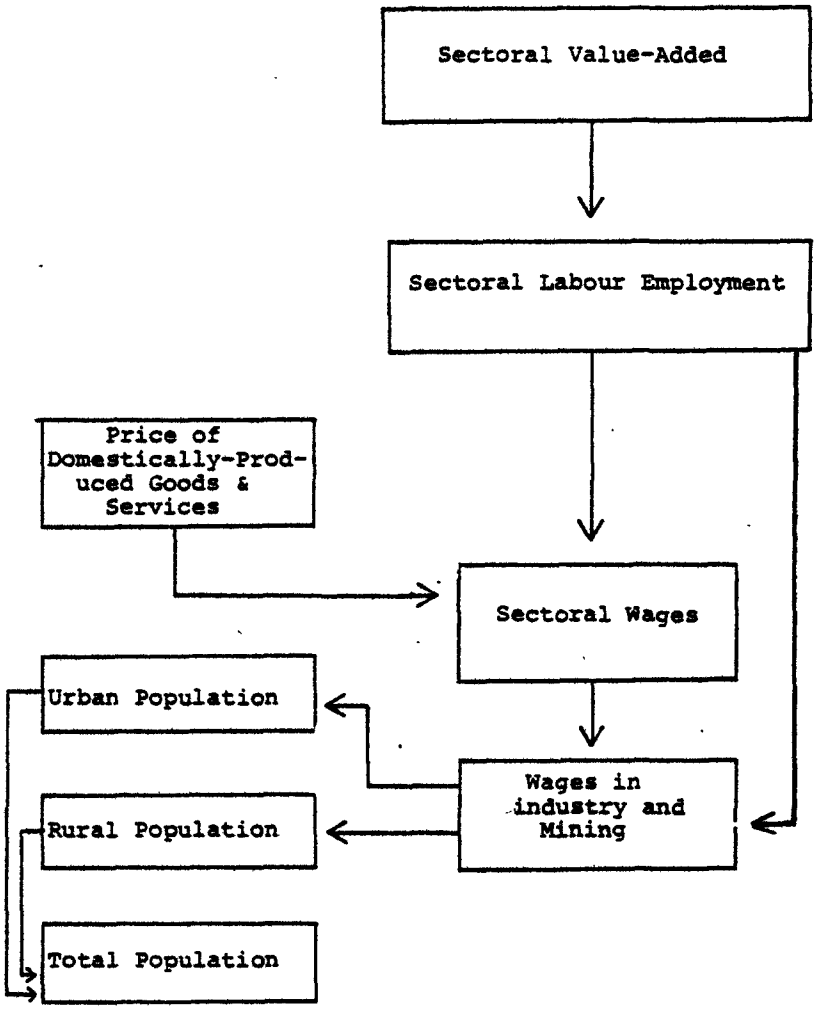

FIGURE 3-3

Demand for Consumer Goods and Services

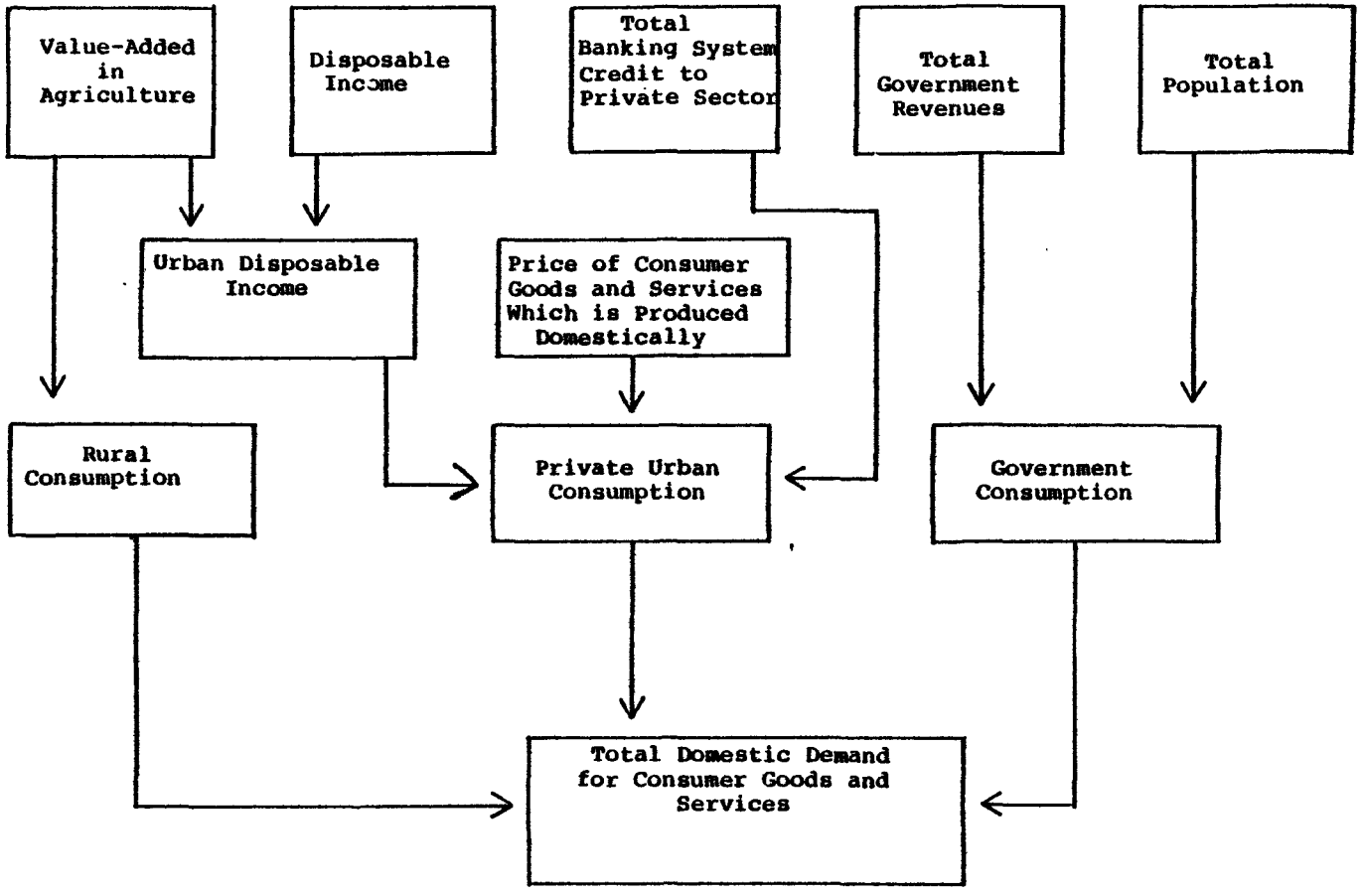

FIGURE 3-4

Supply of Consumer Goods and Services to Domestic Market and Determination of Price of Domestically Produced Consumption Goods and Services

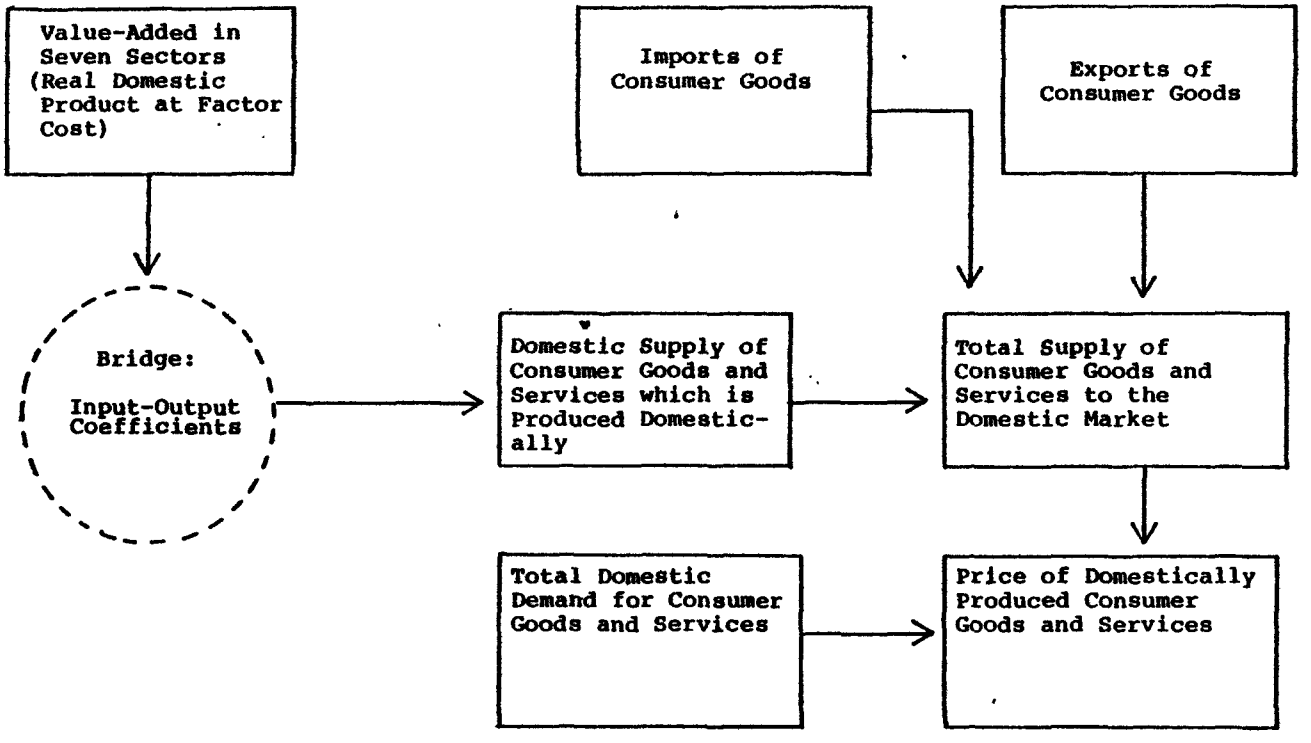

FIGURE 3-5

Gross Domestic Product and Gross National Product

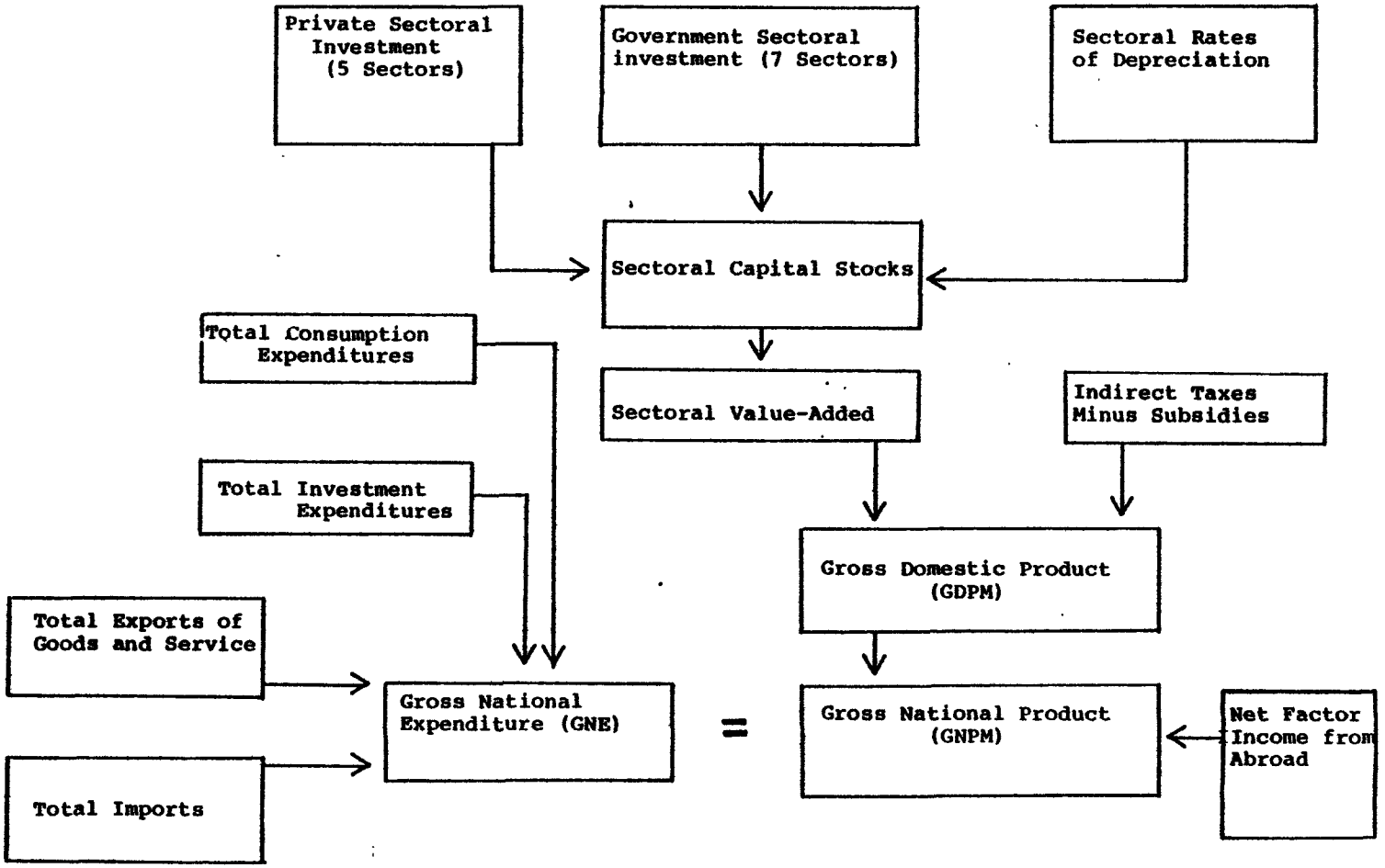

FIGURE 3-6

Domestic Demand for Investment Goods
(Gross Capital Formation)

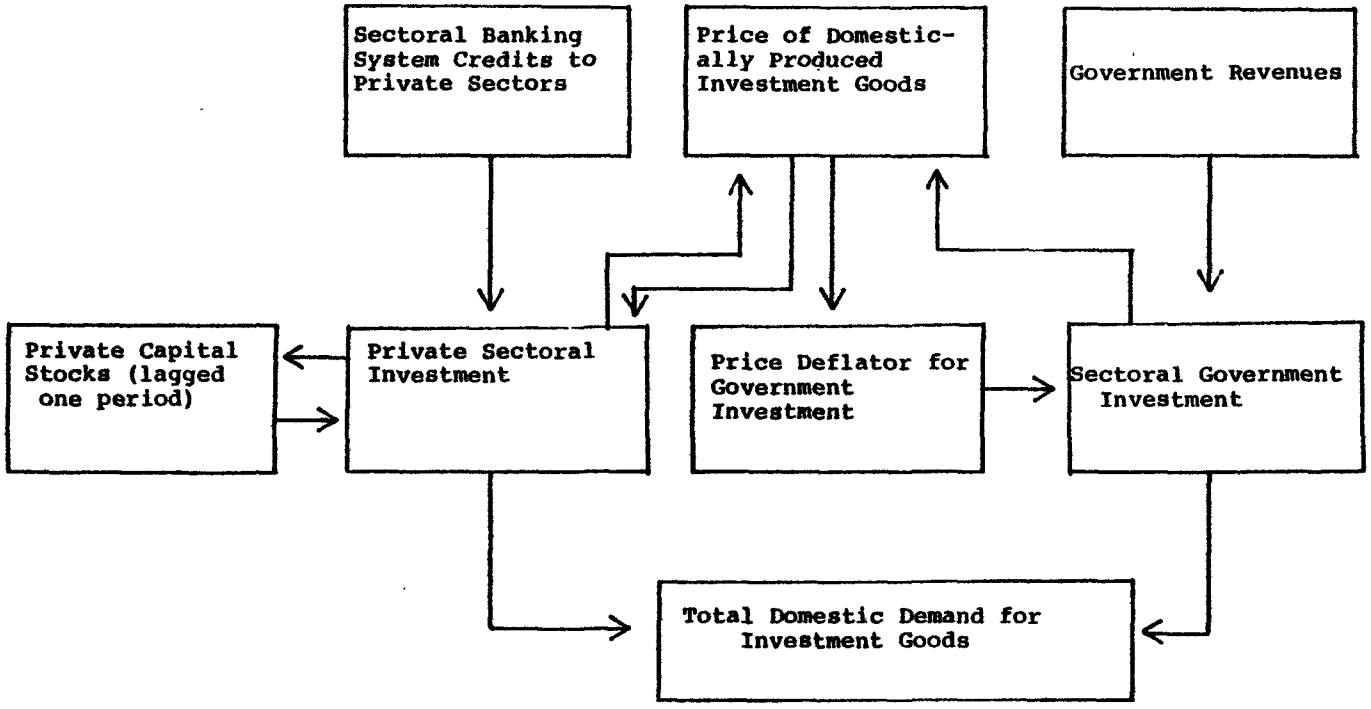

FIGURE 3-7

Total Supply of Investment Goods to Domestic Market and
Price of Domestically Produced Investment Goods

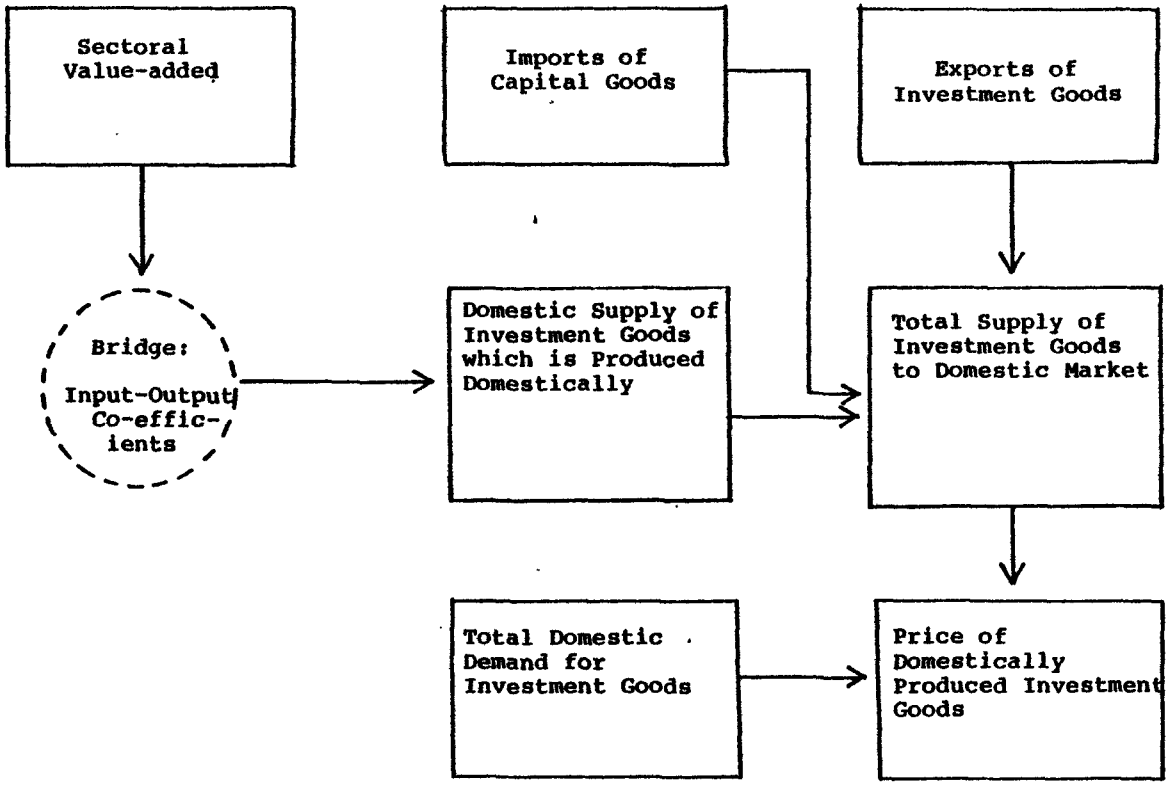

FIGURE 3-8
Imports of Goods and Services

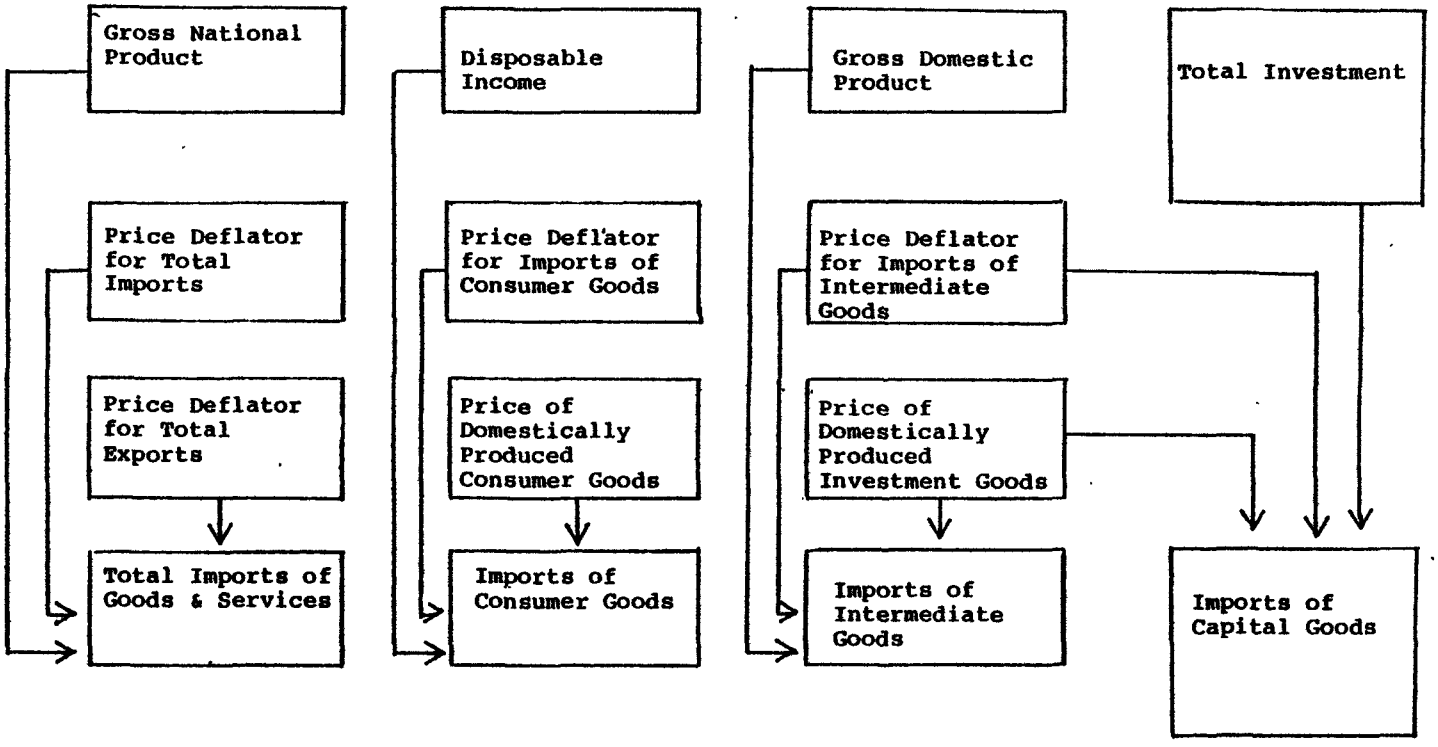

Table 3-1

Endogenous Variables*

ANFA	Net foreign assets of the central bank (current Rials)
ANCLGA	Net claim of the central bank on government (current Rials)
BCBA	Government bonds sold to the central bank (current Rials)
BDFA	Budget deficit financing requirement (total, current Rials)
CG	Government consumption expenditures
CRP	Private rural consumption expenditures
CUP	Private urban consumption expenditures
CT	Total consumption expenditures
CTPD	Price deflator for domestically produced consumer goods (index 1959=1.0)
CTDPD	Price deflator for total consumption expenditure (index 1959=1.0)
CTPA	Total banking credit to private sector (current Rials)
CTSA	Total banking credit to private services sector (current Rials)
CHPA	Domestic currency held by the people (not currently used in the model), current Rials
CHBA	Domestic currency held by the commercial bank (not currently used in the model), current Rials
DWCBA	Deposit of the commercial banks with the central bank (not currently used in the model), current Rials
DEP	Depreciation
DBDFA	Domestic sources of budget deficit financing (current Rials)
DISTOY	Distribution of income
DQC	Demand for domestically produced consumption goods which are used domestically
DQI	Demand for domestically produced investment goods which are used domestically
DSVCN	Slope dummy variable of value-added in construction, 1976 = VCN otherwise zero
DSITPD	Slope dummy variable of price deflator for domestically produced investment goods, 1974-76 = ITPD, otherwise zero
DSLEA	slope dummy of labour employment in agriculture, 1968-1976 = LEA otherwise zero

* All variables are in 1959 Rials unless otherwise mentioned.

Table 3-1 continued

DSRPD	slope dummy of relative prices of imports of consumer goods to domestically produced consumer goods, 1974-1976 = (MCPD/CTPD), otherwise zero
DY	Disposable income
DYU	Disposable income in urban areas
FEXRA	Foreign exchange reserves (in current Rials)
GRDT	Government revenues from direct taxes
GRIDT	Government revenues from indirect taxes
GRP	Government revenues from petroleum
GNPM	Gross National Product in 1959 Rials
GDPM	Gross Domestic Product in 1959 Rials
GQC	Supply of domestically produced consumer goods which is used domestically
GQI	Supply of domestically produced investment goods which is used domestically
GRNP	Government revenues from the non-petroleum sources
IAP	Gross private investment in agriculture
ICNP	Gross private investment in construction
IMMP	Gross private investment in manufacturing & mining
ITCP	Gross private investment in transportation & communications
ISP	Gross private investment in services
IPT	Gross total private investment
IAG	Gross government investment in agriculture
ICNG	Gross government investment in construction
IMMG	Gross government investment in manufacturing & mining
ITCG	Gross government investment in transportation & communications
ISG	Gross government investment in services
IWPG	Gross government investment in water & power
IOG	Gross government investment in oil
IGT	Total gross government investment
IT	Total gross investment
ITPD	Price deflator for domestically produced investment goods (index, 1959=1.0)
IGTPD	Price deflator for total government investment (index, 1959=1.0)
KAP	Private capital stock in agriculture
KCNP	Private capital stock in construction
KMMP	Private capital stock in manufacturing & mining
KTCP	Private capital stock in transportation & communications
KSP	Private capital stock in services
KAG	Government capital stock in agriculture
KCNG	Government capital stock in construction
KMMG	Government capital stock in manufacturing & mining
KTCG	Government capital stock in transportation & communications

Table 3-1 continued

KSG	Government capital stock in services
KOG	Government capital stock in oil
KWPG	Government capital stock in water & power
KAT	Total capital stocks in agriculture
KCNT	Total capital stocks in construction
KMMT	Total capital stocks in manufacturing & mining
KTCT	Total capital stocks in transportation & communications
KST	Total capital stocks in services
KT	Grand total capital stocks
LEA	Labour employment in agriculture (million)
LECN	Labour employment in construction (million)
LEMM	Labour employment in manufacturing & mining (million)
LETC	Labour employment in transportation & communications (million)
LES	Labour employment in services (million)
LEO	Labour employment in oil (million)
LEWP	Labour employment in water & power (million)
LET	Total labour employment (million)
MT	Total imports of goods and services
MC	Imports of consumer goods
MINT	Imports of intermediate goods
MK	Imports of capital goods
MNFS	Imports of non-factor services
MOSA	Money supply (in current Rials)
MBA	Monetary base (in current Rials)
NIOCA	Net inflow of financial capital
PY	Personal Income
POPU	Population in urban areas (in millions)
POPR	Population in rural areas (in millions)
POPT	Total population
PROFIT	Profit
RCONV	Reconciliation variable
ROCRU	Ratio of per capita consumption in rural to urban
VA	Value-added in agriculture
VCN	Value-added in construction
VMM	Value-added in manufacturing & mining
VTC	Value-added in transportation & communications
VS	Value-added in services
VWP	Value-added in water & power
VT	Total value-added
WAA	Wage in agriculture (in 1000 current Rials)
WCNA	Wage in construction (in 1000 current Rials)
WMMA	Wage in manufacturing & mining (in 1000 current Rials)
WTCA	Wage in transportation & communications (in 1000 current Rials)
WSA	Wage in services (in 1000 current Rials per year)

Table 3-1 continued

WOA	Wage in oil (in 1000 current Rials)
WWPA	Wage in water & power (in 1000 current Rials)
WIMA	Wage in industry & mining (in 1000 current Rials)
WBT	Total wage bill (billion 1959 Rials)
XO	Exports of oil
XT	Total exports of goods and services

Table 3-2

Exogenous Variables*

ACLBA	Claim of the central bank on banks (current Rials)
ANCLOA	Net claim of the central bank on others (excluding banks and government) (current Rials)
ANGLGOA	Net claim of the central bank on government-other (total net claim minus changes in government bonds held by the central bank) (current Rials)
ANFOA	Net other foreign asset of the central bank (total net foreign assets net of foreign exchange) (current Rials)
BDFOA	Other sources of budget deficit financing (in current Rials)
BPA	Government bonds held by the private sector
BOBA	Government bonds held by others (excluding central bank, banks and the private sector) (current Rials)
CTAGA	Government credit to agriculture sector (current Rials)
CTAA	Total banking credit to private sector in agriculture (in current Rials)
CTCNA	Total banking credit to private sector in construction (in current Rials)
CTMMA	Total banking credit to private sector in manufacturing & mining (in current Rials)
CTTCA	Total banking credit to private sector in transportation & communications (in current Rials)
CTBSGA	Total banking credit to government for financing deficit (in current Rials)
DISO	Discrepancy in export of oil equation (1959 Rials)
DSCTAGA	Slope dummy of government credit to agriculture sector 1974=CTAGA otherwise zero
DU5	Dummy variable - 1975=1.0 otherwise zero
DU6	Dummy variable - 1976=1.0 otherwise zero
DU24	Dummy variable - 1972-1974=1.0 otherwise zero
DU56	Dummy variable - 1975-1976=1.0 otherwise zero
DU46	Dummy variable - 1974-1976=1.0 otherwise zero
EXR	Exchange rate (Rials/US$)

* All variables are in 1959 Rials unless otherwise mentioned.

Table 3-2 continued

FBDFA	Foreign sources of budget deficit financing (current Rials)
GRO	Government revenues from other sources
GSUBT	Government subsidies (total)
GBDISA	Discrepancy in government budget constraint (in current Rials)
GTRANS	Government transfers (in current rials)
IAGA	Government investment in agriculture (in current Rials)
ICNGA	Government investment in construction (in current Rials)
IMMGA	Government investment in manufacturing & mining (in current Rials)
ITCGA	Government investment in transportation & communications (in current Rials)
IOGA	Government investment in oil (in current Rials)
MTPD	Price deflator for the total imports of goods & services (1959=1.0)
MCPD	Price deflator for the imports of consumer goods (1959=1.0)
MKPD	Price deflator for the imports of capital goods (1959=1.0)
NFYA	Net factor income from abroad
NIOCOH	Net inflow of financial capital (net of FBDFA)
T	Time trend
VO	Value-added in oil
XC	Exports of consumer goods
XINT	Exports of intermediate goods
XK	Exports of capital goods
XNFS	Exports of non-factor services
XOQBB	Quantities of exports of oil in terms of billion barrels per year
XOPD	Price deflator for exports of oil (1959=1.0)
XOP	Oil export price, U.S. dollar per barrel

Table 3-3

Adjusted Coefficients Derived from Input-Output Table

CA	Adjusted proportion of value-added in agriculture allocated to consumption
CCN	Adjusted proportion of value-added in construction allocated to consumption
CMM	Adjusted proportion of value-added in manufacturing & mining allocated to consumption
CTC	Adjusted proportion of value-added in transportation & communications allocated to consumption
CS	Adjusted proportion of value-added in services allocated to consumption
CO	Adjusted proportion of value-added in oil allocated to consumption
CWP	Adjusted proportion of value-added in water & power allocated to consumption
IA	Adjusted proportion of value-added in agriculture allocated to investment
ICN	Adjusted proportion of value-added in construction allocated to investment
IMM	Adjusted proportion of value-added in manufacturing & mining allocated to investment
ITC	Adjusted proportion of value-added in transportation & communications allocated to investment
IS	Adjusted proportion of value-added in services allocated to investment
IO	Adjusted proportion of value-added in oil allocated to investment
IWP	Adjusted proportion of value-added in water & power allocated to investment

The abstract functional forms of the equations, identities and definitions are presented in 9 blocks as follows:

Consumption

Private consumption expenditures in urban areas:

$$CUP = F(DYU, CUP-1, CTPA, CTPD) \qquad 3.3.1$$

Private consumption expenditures in rural areas:

$$CRP = F(VA, CRP-1) \qquad 3.3.2$$

Government consumption expenditures:

$$CG = F(GRP, POPT, CG-1) \qquad 3.3.3$$

Investment[4]

Total government investment:

$$IGT = F(IGT-1, GRP, (GRDT + GRIDT + \overline{GRO})) \qquad 3.3.4$$

Private investment in agriculture:

$$IAP = F(VA, KAP-1, \overline{CTAGA}, \overline{DSCTAGA}) \qquad 3.3.5$$

Private investment in construction

$$ICNP = F(VCN, KCNP-1, ITPD, DSVCN) \qquad 3.3.6$$

Private investment in manufacturing & mining:

$$IMMP = F(VMMP-1, ITPD, \overline{CTMMA}, \overline{DU5}) \qquad 3.3.7$$

Private investment in transportation and communications:

$$ITCP = F(VTC, KTCP-1, ITPD, \overline{CTTCA}) \qquad 3.3.8$$

Private investment in services:

$$ISP = F(VS, KSP-1, ITPD, CTPA, DSITPD) \quad 3.3.9$$

Government investment in water and power:

$$IWPG = F(VWP, KWPG-1, \overline{DU6}) \quad 3.3.10$$

Value-Added

Value-added in agriculture:

$$VA = F(KAT-1, \overline{T}) \quad 3.3.11$$

Value-added in construction:

$$VCN = F(KCNT-1, \overline{DU6}) \quad 3.3.12$$

Value-added in manufacturing and mining:

$$VMM = F(KMMT-1) \quad 3.3.13$$

Value-added in transportation and communications:

$$VTC = F(KTCT-1) \quad 3.3.14$$

Value-added in services:

$$VS = F(KST-1) \quad 3.3.15$$

Value-added in water and power:

$$VWP = F(KWPG-1) \quad 3.3.16$$

Labour Employment and Wages

a) Labour Employment[5]

Labour employment in agriculture:

$$LEA = F(VA, \overline{T}) \quad 3.3.17$$

Labour employment in construction:

$$LECN = F(VCN, DSVCN) \qquad 3.3.18$$

Labour employment in manufacturing and mining:

$$LEMM = F(VMM) \qquad 3.3.19$$

Labour employment in transportation and communications:

$$LETC = F(VTC) \qquad 3.3.20$$

Labour employment in services:

$$LES = F(VS) \qquad 3.3.21$$

Labour employment in oil:

$$LEO = F(VO, \overline{DU24}) \qquad 3.3.22$$

Labour employment in water and power:

$$LEWP = F(VWP) \qquad 3.3.23$$

b) Wages[6]

Wage in agriculture:

$$WAA = F(LEA, CTPD, WCNA, DSLEA) \qquad 3.3.24$$

Wage in construction:

$$WCNA = F(LECN, WCNA-1) \qquad 3.3.25$$

Wage in manufacturing and mining:

$$WMMA = F(LEMM, CTPD, \overline{DU56}) \qquad 3.3.26$$

Wage in transportation and communications:

$$WTCA = F(LETC, CTPD, \overline{DU56}) \qquad 3.3.27$$

Wage in services:

$$WSA = F(LEWP, CTPD, \overline{DU56}) \qquad 3.3.28$$

Wage in water and power:

$$WWPA = F(LEWP, CTPD, \overline{DU56}) \qquad 3.3.29$$

Wage in oil:

$$WOA = F(LEO, CTPD) \qquad 3.3.30$$

Imports Block

Total imports of goods and services:

$$MT = F(GMPM, \overline{MTPD/XTPD}, \overline{DU56}) \qquad 3.3.31$$

Imports of consumer goods:

$$MC = F(DY, MC-1, \overline{MCPD/CTPD}, \overline{DU46}, DSRPD) \qquad 3.3.32$$

Imports of intermediate goods:

$$MINT = F(GDPM, \overline{MKPD/ITPD}, \overline{DU46}) \qquad 3.3.33$$

Imports of capital goods:

$$MK = F(IT, \overline{MKPD/ITPD}, \overline{DU56}) \qquad 3.3.34$$

Monetary Block

Money Supply

$$MOSA = F(MBA) \qquad 3.3.35$$

Total banking credit to the private sector:

$$CTPA = F(MOSA, CTPA-1) \qquad 3.3.36$$

Government Revenues, Depreciation and Population Block

a) Government Revenues

Government revenues from direct taxes:

$$GRDT = F(PY-1, \overline{DU56}) \qquad 3.3.37$$

Government revenues from indirect taxes:

$$GRIDT = F(GRIDT-1, MC) \qquad 3.3.38$$

Government Revenues from petroleum:

$$GRP = F(\overline{XO}, \overline{DU46}) \qquad 3.3.39$$

b) Depreciation

$$DEP = F(KT-1, GNPM-1) \qquad 3.3.40$$

c) Population

Urban population:

$$POPU = F(POPU-1, WIMA, \overline{T}) \qquad 3.3.41$$

Rural population:

$$POPR = F(POPR-1, WIMA, \overline{T}) \qquad 3.3.42$$

Prices

There are no behavioural equations for prices. They are determined by interactions of their corresponding demand and supply which are expressed in supply-demand balances.

Identities and Definitions

a) Supply-Demand Balances

Total consumption:

$$CT = CUP + CRP + CG \qquad 3.3.43$$

Demand for domestically produced consumption goods which are used domestically:

$$DQC = CT - MC \qquad 3.3.44$$

Supply of domestically produced consumptions goods which are used domestically:

$$GQC = (CA*VA) + (CCN*VCN) + (CMM*VMM) + (CTC * VTC) + (CS*VS) + (CO*\overline{VO}) + (CWP*VWP) - \overline{XC} \qquad 3.3.45$$

The price deflator for domestically produced

consumer goods which are used domestically (CTPD) is implicitly defined by the supply-demand balance for consumer goods.

$$DQC(CTPD) = GQC$$

OR

$$CT(CTPD) = MC(CTPD) + GQC \qquad 3.3.46$$

Total private gross investment:

$$IT = IGT + IPT \qquad 3.3.47$$

Demand for domestically produced investment goods which are used domestically:

$$DQI = IT - MK \qquad 3.3.48$$

Supply of domestically produced investment goods which are used domestically:

$$GQI = (IA*VA) + (ICN*VCN) + (ITC*VTC) + (IS*VS) + (IO*\overline{VO}) + (IWP*VWP) - \overline{XK} \qquad 3.3.49$$

Price deflator for domestically produced investment goods which are consumed domestically (ITPD) defined implicitly by the supply-demand balance for investment goods:

$$DQI(ITPD) = GQI$$

OR

$$IT(ITPD) = GQI + MK(ITPD) \qquad 3.3.50$$

b) Other Identities and Definitions

Government investment in services

$$ISG = IGT-(IAG + ICNG + IMMG + ITCG + IOG + IWPG) \qquad 3.3.51$$

Government investment in agriculture:

$$IAG = \overline{IAGA}/IGTPD \qquad 3.3.52$$

Government investment in construction:

$$ICNG = \overline{ICNGA}/IGTPD \qquad 3.3.53$$

Government investment in manufacturing and mines:

$$IMMG = \overline{IMMGA}/IGTPD \qquad 3.3.54$$

Government investment in transportation and communication:

$$ITCG = \overline{ITCGA}/IGTPD \qquad 3.3.55$$

Government investment in oil

$$IOG = \overline{IOGA}/IGTPD \qquad 3.3.56$$

Government revenue from non-petroleum sources:

$$GRNP = GRDT + GRIDT + \overline{GRO} \qquad 3.3.57$$

Banking credit to private sector in services:

$$CTSA = CTPA - \overline{CTAA} - \overline{CTCNA} - \overline{CTMMA} - \overline{CTTCA} \qquad 3.3.58$$

Domestic sources for financing budget deficit:

$$DBDFA = \Delta BCBA + \overline{\Delta BOBA} + \overline{\Delta BPA} + \overline{BDFOA} + \overline{\Delta CTBSGA} \qquad 3.3.59$$

Total budget deficit financing:

$$BDFA = DBDFA + \overline{FBDFA} \qquad 3.3.60$$

Government budget constraint:

$$\begin{aligned}\Delta BCBA = {} & (CG + \overline{GSUBT} + \overline{GTRANS}) * CTDPD + \\ & (ISG + IWPG) * IGTPD + \overline{IAGA} + \\ & \overline{ICNGA} * \overline{IMMGA} + \overline{ITCGA} + \overline{IOGA} - \\ & (GRDT + GRIDT + \overline{GRO} + GRP) * \\ & CTDPD - \Delta BOBA - \overline{\Delta BPA} - \overline{DBDFOA} - \\ & \overline{\Delta CTBSGA} - \overline{FBDFA} - \overline{GBDISA}\end{aligned} \qquad 3.3.61$$

Price deflator for total government investment:

$$IGTPD = (\overline{IAGA} + \overline{ICNCA} + \overline{IMMGA} + \overline{ITCGA} + \overline{IOGA})/(IGT - ISG - IWPG) \qquad 3.3.62$$

Price deflator for total consumer goods:

$$CTDPD = ((CT-MC)*CTPD + MC * \overline{MCPD}) / CT \qquad 3.3.63$$

Net inflow of financial capital:

$$NIOCA = \overline{NIOCOA} + \overline{FBDFA} \qquad 3.3.64$$

Foreign exchange reserves:

$$FEXRA = (XT * \overline{XTPD}) - (MT * \overline{MTPD}) + NIOCA + FEXRA_{-1} \qquad 3.3.65$$

Monetary base (two equivalent definitions):

a) demand for monetary base

$$MBA = CHPA + CHBA + DWCB \qquad 3.3.66$$

or

b) supply of monetary base

$$MBA = ANFA + ANCLGA + \overline{ANCLOA} + \overline{ACLBA}$$

Net foreign assets of the central bank:

$$ANFA = FEXRA + \overline{ANFOA} \qquad 3.3.67$$

Net claims of the central bank on government:

$$ANCLGA = \overline{ANCLGOA} + \Delta BCBA \qquad 3.3.68$$

Total value-added (in constant Rials)

$$VT = VA + VCN + VMM + VTC + VS + \overline{VO} + VWP \qquad 3.3.69$$

Gross domestic product (in constant Rials):

$$GDPM = VT + GRIDT - \overline{GSUBT} \qquad 3.3.70$$

Gross national product (in constant Rials)

= Gross national expenditure (GNE)

$$GNPM = CT + IT + \overline{XT} - MT + \overline{NFYA} + RCONV \quad 3.3.71$$

Reconciliartory variable (or inventory):

$$RCONV = GNPM - (GDPM + \overline{NFYA}) \quad 3.3.72$$

Disposable income:

$$DY = GNPM - DEP - GRIDT - GRDT - GRP - \overline{GRO} + \overline{GBSUBT} + \overline{GTRANS} \quad 3.3.73$$

Personal income:

$$PY = DY + GRDT \quad 3.3.74$$

Urban disposable income:

$$DYU = DY - VA \quad 3.3.75$$

Wage in industry and mining:

$$WIMA = (LECN * WCNA + LEMM * WMMA + LEWP * WWPA)/(LECN + LEMM + LEWP) \quad 3.3.76$$

Total labour employment:

$$LET = LEA + LECN + LEMM + LETC + LES + LEO + LEWP \quad 3.3.77$$

Total Wage Bill:

$$WBT = ((LEA * WAA + LECN * WCNA + LEMM * WMMA + LETC * WTCA + LES * WSA + LEO * WOA + LEWP * WWPA)/CTPD) \quad 3.3.78$$

Profit:

$$PROFIT = PY - WBT \quad 3.3.79$$

Ratio of profit to wage bill (a proxy for distribution of income)

$$DISTOY = \frac{PROFIT}{WBT} \qquad 3.3.80$$

Total population:

$$POPT = POPU + POPR \qquad 3.3.81$$

Ratio of per capita consumption in urban to rural:

$$ROCUR = (CUP/POPU)/(CRP/POPR) \qquad 3.3.82$$

Imports of non-factor services:

$$MNFS = MT - MC - MINT - MK \qquad 3.3.83$$

Exports of petroleum:

$$XO = (\overline{EXR} * \overline{XOQBB} * \overline{XOP})/\overline{XOPD} + \overline{DISO} \qquad 3.3.84$$

Total exports of goods and services:

$$XT = \overline{XC} + \overline{XK} + \overline{XINMT} + \overline{XO} + \overline{XNFS} \qquad 3.3.85$$

Capital stock in agriculture:

a) private

$$KAP = 0.970 * KAP\text{-}1 + IAP \qquad 3.3.86$$

b) government

$$KAG = 0.970 * KAG\text{-}1 + IAG \qquad 3.3.87$$

c) total

$$KAT = KAP + KAG \qquad 3.3.88$$

Capital stock in construction:

a) private

$$KCNP = 0.94 * KCNP\text{-}1 + ICNP \qquad 3.3.89$$

b) government

KCNG = 0.94 * KCNG-1 + IGNG 3.3.90

c) total

KCNT = KCNP + KCNG 3.3.91

Capital stock in manufacturing and mining:

a) private

KMMP = 0.94 * KMMP-1 + IMMP 3.3.92

b) government

KMMG = 0.94 * KMMG-1 + IMMG 3.3.93

c) total

KMMT = KMMP + KMMG 3.3.94

Capital stock in transportation and communications:

a) private

KTCP = 0.94 * KTCP + ITCP 3.3.95

b) government

KTCG = 0.94 * KTCG + ITCG 3.3.96

c) total

KTCT = KTCP + KTCG 3.3.97

Capital stock in services:

a) private

KSP = 0.97 * KSP-1 + ISP 3.3.98

b) government

KSG = 0.97 * KSG-1 + ISG 3.3.99

c) total

KST = KSP + KSG 3.3.100

Capital stock in oil:

KOG = 0.97 * KOG-1 + IOG 3.3.101

Capital stock in water and power:

$$KWPG = 0.935 * KWPG_{-1} + IWPG \quad 3.3.102$$

Total capital stock:

$$KT = KAT + KCNT + KMMT + KTCT + KST + KOG + KWPG \quad 3.3.103$$

Slope dummy of value-added in construction (VCN):

$$DSVCN = VCN * \overline{DU6} \quad 3.3.104$$

Slope dummy of ITPD (price deflator for domestically produced investment goods which is used domestically):

$$DSITPD = ITPD * \overline{DU46} \quad 3.3.105$$

Slope dummy of labour employment in agriculture (LEA):

$$DSLEA = LEA * \overline{DU76} \quad 3.3.106$$

Slope dummy of relative prices of imports of consumer goods to domestically produced consumer goods which is used domestically (MCPD/CTPD):

$$DSRPD = (\overleftarrow{MCPD}/CTPD) * \overline{DU46} \quad 3.3.107$$

(3-4) ESTIMATION OF THE MODEL

The behavioural equations are estimated by the methods of ordinary least squares (OLS) and two-stage least-squares (TSLS) using principal components of the predetermined variables. Equations for endogenous variables such as sectoral value-added, depreciation and direct taxes which are explained only by predetermined variables are estimated by the OLS technique. However, equations with endogenous variables on the right hand side were estimated by both OLS and TSLS methods. The simultaneous nature of these equations makes the OLS technique inappropriate, as it gives rise to biased estimates. Hence, in presenting the results of estimation of these equations, only the two-stage least-squares estimates (TSLS) are reported (see Table 3-4). However, the OLS version of the estimated equations is presented in the appendix to this chapter, Table A3-2.

Application of TSLS in simulataneous equations requires some modification when the number of predetermined variables becomes larger than the sample size, as is the case in this study[7]. Hence, the first stage regression in TSLS, in which all right hand side variables are regressed on the entire set of predetermined variables of the model, cannot be carried out. To overcome this difficulty, one of the following three techniques can be adopted. Each involves running first stage regressions of every endogenous variable on either a) a subset of all predetermined

variables, K (where K is less than number of observations),[8] b) discarding some of these variables which are regarded as unimportant in their contribution to the explanation of other variables, or c) principal components of the predetermined variables[9]. The last approach is adopted in this study. The major role of the principal components is to reduce the number of predetermined variables scientifically and with minimum loss of their contributions. There is no a priori criteria[10] for choosing the number of principal components. However, two factors are taken under consideration: a) restrictions imposed by the sample size, and b) the cumulative contribution of principal components to the total variations of the original predetermined variables. Here, six principal components are selected which accounted for 99% of the variations in all the predetermined variables. Thus, the two stage procedure is carried out by (1) regressing each endogenous variable of the right hand side of each equation on the principal components, and (2) replacing these endogenous variables with their corresponding fitted values for second stage estimations. This approach eliminates the correlation of the right hand side endogenous variables with the error term in each equation and gives consistent estimates. The Cochrane-Orcutt iterative method is used to correct for autocorrelation for those equations for which correction is required. Other problems such as multi-collinearity, errors in variables, lagged dependent variables, etc. undoubtedly

affect the estimation results. However, correction for these problems is not easy due to computational difficulties and lack of easily applied methods. Thus, the estimates do not satisfy all desired properties and the reader may find that the adopted estimation procedures are lacking[11].

Table 3-4 shows TSLS versions of the estimated equations.[12] The t-statistic values are reported in parentheses under the estimated coefficients. Other necessary statistical measures, i.e. the coefficient of multiple determination adjusted for degress of freedom (R^2); the Durbin-Watson Statistic (DW); (RO), the first-order auto-regressive parameter of the residuals; and the standard error of the regression(SE), are also reported for each equation. These equations are selected after experimenting with many different variables and functional relationships in the process of estimation, and after dynamic simulations within the sample period.

The discussion of the estimated equations and their theoretical background is presented in the next chapter. The level of significance used to classify the estimated coefficients is 5% unless otherwise stated.

Endogenous Variable	Estimated Equation	R^2	DW	SE	RO*	NO
1. CUP =	482.670 + 0.480855 DYU + 0.452197 CUP-1 + .198633 CTPA - (2.774) (3.221) (2.077) (2.371) - 481.319 CTPD (-2.780)	0.9939	2.0446	12.8825	0.0	17
2. CRP =	29.7991 + 0.875933 VA + 0.0450288 CRP-1 (1.235) (2.892) (0.130)	0.8995	1.7957	7.15854	0.512356	16
3. CG =	-259.825 + 0.475575 CG-1 + 0.174870 GRP + 11.0433 POPT (-3.955) (9.324) (13.393) (4.557)	0.9984	1.5468	5.09802	0.766927	17
4. CTPA =	-37.6105 + 1.30976 MOSA + 0.697358 CTPA-1 (-6.811) (5.805) (5.262)	0.9984	2.3168	15.9298	0.0	17
5. DEP =	1.83848 + 0.008158 KT-1 + 0.055027 GNPM-1 (1.571) (2.369) (10.264)	0.9993	2.0385	05386	0.0	17
6. GRDT =	-8.37691 + 0.050750 PY-1 + 19.0447 $\overline{DU56}$ (-5.429) (17.458) (5.973)	0.9891	1.8972	2.50357	0.0	17
7. GRIDT=	2.4091 + 0.926890 GRIDT-1 + 0.089818 MC (0.972) (8.650) (2.774)	0.9850	1.9505	2.41721	-.153525	17
8. GRP =	-35.5721 + 1.07168 $\overline{XO}$ + 465.935 $\overline{DU46}$ (-2.049) (7.451) (27.796)	0.9946	2.2408	16.8405	0.46429	17
9. IGT =	-8.42287 + 0.751943 IGT-1 + 0.0459279 GRP + 0.431519 GRNP (-1.419) (4.790) (2.600) (2.583)	0.9934	1.9583	6.31452	-.147032	16
10. IAP =	-34.4287 + 0.370807 VA - 0.393568 KAP-1 + 1.79862 $\overline{CTAGA}$ - (-2.332) (2.701) (-3.691) (5.300) 0.950772 $\overline{DSCTAGA}$ (-5.853)	0.9393	1.4911	1.74154	0.735356	16

* Note: If RO equals zero, no correction for autocorrelation was required.

Table 3-4 continued

Endogenous Variable	Estimated Equation	R^2	DW	SE	RO	NO
11. ICNP	=-10.0159 + 2.61090 VCN - 0.108151 KCNP-1 - 11.331 ITPD - (-1.329) (2.901) (-1.519) (1.573) - 0.814099 DSUCN (-1.400)	0.8782	2.2825	6.38451	0.0	17
12. IMMP	= 89.5690 + 0.322221 VMM - 0.254837 KMMP-1 - 92.9270 ITPD + (3.123) (3.835) (-2.672) (-2.846) + 0.492984 $\overline{\text{CTNMA}}$ + 40.4941 $\overline{\text{DU5}}$ (4.041) (4.781)	0.9590	2.1127	3.12642	0.0	17
13. ITCP	= 13.9670 + 0.675881 VTC - 0.213439 KTCP-1 - 27.9876 ITPD + (2.098) (3.115) (-2.928) (-2.647) + 0.386421 $\overline{\text{CTTCA}}$ (6.186)	0.9736	2.2036	2.91175	0.0	17
14. ISP	= 86.0534 + 0.086289 VS - 1.23765 KSP-1 - 93.7488 ITPD + (2.405) (5.415) (-4.749) (-2.337) + 0.171477 CTPA + 10.8458 DSITPD (4.892) (4.928)	0.9736	2.1534	1.78640	0.0	17
15. IWPG	= 2.67803 + 1.51945 VWP - 0.452342 KWPG-1 + 24.7783 $\overline{\text{DU6}}$ (2.934) (2.891) (-1.962) (9.541)	0.9680	2.2465	1.81379	0.0	17
16. LEA	= 5.47083 + 0.000078 VA - 0.0921146 $\overline{\text{T}}$ (7.742) (0.218) (-2.753)	0.8012	1.8447	0.0578624	0.097078	17
17. LECN	= 0.123554 + 0.0182437 VCM - 0.00807089 DSUCN (4.227) (16.192) (-6.387)	.894	1.8447	0.0578624	-0.516886	17
18. LEMM	= 2.71627 + 0.00239659 VMM (3.452) (2.053)	.9832	1.7115	0.05886	0.970728	17
19. LETC	= 0.308577 + 0.00294121 VTC (1.770) (3.538)	0.9031	2.2952	0.0241571	0.952362	17
20. LES	= 2.87796 + 0.0013763 VS (3.760) (2.211)	0.982	1.0006	0.054333	0.972618	17

Table 3-4 continued

Endogenous Variable	Estimated Equation	R^2	DW	SE	RO	NO
21. LEO =	0.0298655 + 0.000154808 $\overline{VO}$ - 0.00934900 $\overline{DU24}$ (15.614) (10.129) (-5.336)	0.939	2.2566	0.00199178	0.395283	17
22. LEWP=	0.114686 + 0.000549439 VWP (4.247) (1.420)	0.977	2.0099	0.00322001	0.950334	17
23. MOSA=	11.2409 + 1.04400 MBA (5.011) (95.593)	0.998	1.8309	6.48912	0.062686	17
24. MT =	35.9211 + 0.2510006 GNPM - 66.6430 ($\overline{MTPD}/\overline{XTPD}$) + 151.997 $\overline{DU56}$ (1.047) (11.493) (-2.849) (12.838)	0.995	1.8689	10.0961	0.259636	17
25. MC =	-0.680910 + 0.0549835 DY + 0.631628 MC-1 - 15.3808 ($\overline{MCPD}$/CTPD) (-0.016) (7.538) (10.100) (1.343) - 598.375 $\overline{DU46}$ + 542.163 DSRPD (-8.151) (8.046)	0.9976	2.4203	2.74461	0.183716	17
26. MINT=	108.368 + 0.104846 GDPM - 117.312 ($\overline{MKPD}$/ITPD) + 46.7965 $\overline{DU46}$ (4.365) (22.187) (-5.032) (10.577)	0.991	1.8208	4.87455	0.676243	17
27. MK =	34.1131 + 0.152586 IT - 31.0543 ($\overline{MKPD}$/ITPD) + 26.0248 $\overline{DU56}$ (2.291) (15.492) (-2.096) (6.007)	0.990	1.5732	2.90353	0.0	18
28. VA =	70.9028 + 0.216651 KAT-1 + 3.49043 $\overline{T}$ (12.652) (2.675) (4.111)	0.9883	1.8017	2.89772	0.488285	16
29. VCN =	12.3355 + 0.0809533 KCNT-1 + 22.9875 $\overline{DU6}$ (15.455) (19.347) (7.776)	0.9735	1.8668	2.35399	-0.416673	16
30. VMM =	21.7032 + 0.762513 KMMT-1 (7.805) (41.426)	0.9943	1.5906	5.30654	0.219999	16
31. VTC =	10.6492 + 0.38035 KTCT-1 (1.259) (7.525)	0.9549	1.4535	5.77996	0.694770	16
32. VS =	75.7036 + 2.21709 KST-1 (8.548) (23.602)	0.9720	0.5710	25.0664	0.0	16

Table 3-4 continued

Endogenous Variable	Estimated Equation	R^2	DW	SE	RO	NO
33. VWP	= 0.679685 + 0.425649 KWPG-1 (-1.373) (39.397)	0.9898	2.1453	1.24729	0.0	16
34. POPR	= 6.586 + 0.528182 POPR-1 - 0.0169607 WIMA + 0.172511 $\overline{T}$ (3.459) (3.768) (-6.786) (4.346)	0.9900	2.0430	0.126204	-0.371222	16
35. POPU	= 1.87261 + 0.708926 POPU-1 + 0.00565 WIMA + 0.150210 $\overline{T}$ (6.941) (15.057) (4.625) (7.389)	0.9997	1.9029	0.0384265	0.0	17
36. WAA	= -19.9008 + 3.57855 LEA + 8.53657 CTPD + 0.147586 WCNA + 0.271801 DSLEA (-1.983) (1.380) (4.847) (7.405 (2.308) + 0.271801 DSLEA (2.308)	0.995	1.8243	0.517661	0.0	18
37. WCNA	= -26.4914 + 17.1830 CTPD + 1.285062 WCNA-1 (-4.091) (1.932) (8.593)	.9928	1.9174	3.01660	-0.024880	16
38. WMMA	= -11.4060 + 2.75601 LEMM + 14.8469 CTPD + 6.18663 $\overline{DU56}$ (-8.797) (2.936) (8.026) (5.131)	0.9898	1.5474	0.782463	0.0	18
39. WTCA	= -32.3569 + 40.6388 LET + 43.8442 CTPD + 16.6137 $\overline{DU56}$ (-6.028) (2.274) (5.452) (4.452)	0.988	1.4759	2.64153	0.0	18
40. WSA	= -65.39690 + 14.1342 LES + 74.7145 CTPD + 27.96795 $\overline{DU56}$ (-12.068) (3.292) (10.018) (5.375)	0.9913	1.6016	3.62352	0.0	18
41. WWPA	= -147.216 + 309.340 LEWP + 178.477 CTPD + 80.9007 $\overline{DU56}$ (-7.350) (1.392) (7.557) (4.503)	0.98	1.9982	13.2442	-0.342905	17
42. WOA	= -649.292 + 6480.85 LEO + 393.275 CTPD (-5.920) (2.749) (8.076)	0.975	1.5758	24.0104	0.788569	17

APPENDIX TO CHAPTER 3

Table A3-1

IRAN'S NATIONAL INCOME AND PRODUCT ACCOUNT

(Expenditure Side)

Private Consumption Expenditures
- Rural
- Urban

Government Consumption Expenditures

Gross Investment
- Agriculture
- Industries and Mining
  - Construction
    - Residential
    - Non-Residential
  - Manufacturing and Mining
  - Water and Power
- Oil
- Services
- Transportation and Communication
  - Communication
  - Transportation

Exports of Goods and Services
- Goods
  - Consumer
  - Intermediate
  - Capital
  - Oil
- Non-Factor Services

Imports of Goods and Services
- Goods
  - Consumer
  - Intermediate
  - Capital
- Non-Factor Services

Table A3-1 continued

GROSS DOMESTIC PRODUCT AT MARKET PRICES

Plus: Net Factor Income Payment from Abroad

GROSS NATIONAL PRODUCT AT MARKET PRICES

Less: Depreciation
Net Indirect Taxes

NATIONAL INCOME

Value-Added in Agriculture
Farming
Fishing and Hunting
Forestry
Livestock

Value-Added in Industries and Mining
Construction
Manufacturing and Mining
Water and Power

Value-Added in Oil
Share of Foreign Oil Companies
Share of Iranian Government
Depreciation of Fixed Capital
Rentals
Interest
Revenue (Income) of Iran
Wages and Salaries, etc.

Value-Added in Total Services
Services
Banking, Insurance and Real Estate
Wholesale and Retail Trade
Ownership of Dwellings
Government Services
Private Services
Transportation and Communication
Communication
Transportation
Aviation
Buses, Rental Cars and Taxis
Other
Ports and Navigations
Railways
Trucks

GROSS DOMESTIC PRODUCT AT FACTOR COST

Plus: Net Indirect Taxes

Table A3-1 continued

GROSS DOMESTIC PRODUCT AT MARKET PRICES

Plus: Net Factor Income Payment from Abroad

GROSS NATIONAL PRODUCT AT MARKET PRICES

Less: Depreciaton
Net Indirect Taxes

NATIONAL INCOME

Source: Pahizgari (1976) and Plan and Budget Organization (1978).

Endogenous Variable	Estimated Equation	R^2	DW	SE	RO*	NO
1. CUP	= 312.983 + 0.334652 DYU + 0.636445 CUP-1 − 311.244 CTPD + 0.13025 CTPA (3.970) (5.176) (6.229) (−4.009) (3.005)	0.9961	2.2940	10.2692	−0.560893	16
2. CRP	= 28.0948 + 0.789346 VA + 0.136781 CRP-1 (1.287) (3.127) (0.456)	0.9190	1.8703	6.90519	0.493607	16
3. CG	= −199.562 + 0.507343 CG-1 + 0.180251 GRP + 8.87082 POPT (−3.448) (7.854) (9.621) (3.942)	0.9975	1.8183	6.99084	0.0	16
4. CTPA	= −38.6079 + 1.32211 MOSA + 0.694961 CTPA-1 (−14.237) (9.634) (8.429)	0.9990	1.9949	12.3539	−0.651837	16
5. DEP	= 1.83848 + 0.008158 KT-1 + 0.055027 GNPM-1 (1.571) (2.369) (10.264)	0.9993	2.0385	0.56386	0.283211	16
6. GRDT	= −8.37691 + 0.050750 PY-1 + 19.0447 $\overline{DU56}$ (−5.429) (17.458) (5.973)	0.9891	1.8972	2.50357	0.0	17
7. GRIDT	= 3.09559 + 0.893847 GRIDT-1 + 0.0992604 MC (1.270) (8.310) (2.995)	0.9873	2.1477	2.29006	0.0	17
8. GRP	= −35.5721 + 1.07168 $\overline{XO}$ + 465.935) $\overline{DU46}$ (−2.049) (7.451) (27.796)	0.9946	2.2408	16.8405	0.464429	17
9. IGT	= −7.6441 + 0.758682 IGT-1 + 0.0514539 GRP + 0.400485 GRNP (−1.305) (4.562) (2.891) (1.807)	0.9928	2.1673	6.52359	0.0	17
10. IAP	= −21.3875 + 0.249756 VA −0.326880 KAP-1 + 1.93311 $\overline{CTAGA}$ (−1.901) (2.329) (−3.173) (5.850) − 0.9884504 $\overline{DSCTAGA}$ (−5.568)	0.9293	1.5770	1.87930	0.691717	16

*Note: If RO equals zero, no correction for autocorrelation was required.

Endogenous Variable	Estimated Equation	R^2	DW	SE	RO	NO
11. ICNP	= -6.67118 + 2.46657 VCN - 0.105799 KCNP-1 - 12.2917 ITPD (-1.198) (4.016) (-2.093) (-1.602) - 0.255589 DSVCN (-1.065)	0.9142	2.3060	5.35804	0.600287	16
12. IMMP	= 58.0699 + 0.268920 VMM - 0.313303 KMMP-1 - 56.1661 ITPD + (3.980) (4.433) (-3.619) (3.456) 0.364423 $\overline{\text{CTMMA}}$ + 31.5656 $\overline{\text{DU56}}$ (5.581) (6.324)	0.9659	2.1484	2.85223	0.0	16
13. ITCP	= 8.67452 + 0.484635 VTC - 0.223822 KTCP-1 - 16.3677 ITPD + (0.509) (3.137) (-2.682) (-1.568) 0.380856 $\overline{\text{CTTCA}}$ (5.352)	0.9637	2.2440	3.41479	0.0	16
14. ISP	= 8.84448 + 0.0612575 VS - 1.42696 KSP-1 = 7.86693 ITPD + (0.509) (3.137) (-4.007) (-0.415) 0.0911263 CTPA + 7.87827 DSITPD (3.109) (2.478)	0.9239	2.2361	3.03437	0.0	16
15. IWPG	= 2.04471 + 0.838371 VWP - 0.155316 KWPG-1 + 23.2811 $\overline{\text{DU6}}$ (2.044) (1.730) (-0.728) (8.007)	0.9572	2.3009	2.09617	0.0	16
16. LEA	= 5.62868 + 0.000298745 VA - 0.100469 $\overline{\text{T}}$ (7.837) (0.067) (-1.834)	0.81062	1.9327	0.0563347	0.915851	17
17. LECN	= 0.136822 + 0.0176948 VCN - 0.00738768 DSVCN (4.164) (14.077) (-5.579)	0.891	1.8928	0.0605459	0.381851	17
18. LEMM	= 2.56534 + 0.00256748 VMM (3.470) (2.248)	0.9845	1.6710	0.0579254	0.969284	17
19. LETC	= 0.413073 + 0.00273543 VTC (1.695) (3.223)	0.9653	2.2363	0.0242799	0.967462	17

Endogenous Variable	Estimated Equation	R2	DW	SE	RO	NO
20. LES	= 2.92288 + 0.00112667 VS (3.727) (2.176)	0.9829	1.0642	0.0544100	1.0642	17
21. LEO	= 0.0301488 + 0.000153252 $\overline{VO}$ - 0.00938876 $\overline{DU24}$ (14.411) (9.421) (-5.580)	0.9481	2.2082	.00189669	0.471287	17
22. LEWP	= 0.100609 + 0.000663785 VWP (4.636) (1.974)	0.9811	2.0205	0.00312592	0.942890	17
23. MOSA	= 8.17852 + 1.06073 MBA (1.910) (74.734)	0.9991	1.2967	4.82421	0.645957	17
24. MT	= 41.0705 + 0.2478 GNPM - 69.9257 ($\overline{MTPD}$/$\overline{XTPD}$) + 152.994 $\overline{DU56}$ (1.377) (13.20) (-3.403) (14.135)	0.9962	1.8599	9.37542	0.196136	17
25. MC	= -1.00509 - 0.0559852 DY + 0.627175 MC-1 - 15.6102 ($\overline{MCPD}$/CTPD) (-0.026) (7.743) (11.378) (-0.370) - 592.487 DU46 + 536.674 DSRPD (-9.534) (9.231)	0.9980	2.2748	2.45909	0.415295	17
26. MINT	= 70.3765 + 0.109894 GDPM - 81.6565 (MKPD/ITPD) + 42.0496 $\overline{DU46}$ (4.241) (28.250) (-5.251) (11.392)	0.9948	2.2733	4.42243	0.636482	17
27. MK	= 31.9042 + 0.153636 IT - 28.9550 ($\overline{MKPD}$/ITPD) + 25.6948 $\overline{DU56}$ (3.479) (20.753) (-3.186) (7.950)	0.9956	1.8397	2.18079	0.0	18
28. VA	= 70.9028 + 0.216651 KAT-1 + 3.49043 $\overline{T}$ (12.652) (2.675) (4.111)	0.9883	1.8017	2.89772	0.488285	16
29. VCN	= 12.3355 + 0.0809533 KCNT-1 + 22.9875 $\overline{DU6}$ (15.455) (19.347) (7.776)	0.9735	1.8668	2.35399	-0.416673	16
30. VMM	= 21.7032 + 0.762513 KMMT-1 (7.805) (41.426)	0.9943	1.5906	5.30654	0.219999	16
31. VTC	= 10.6492 + 0.38035 KTCT-1 (1.259) (7.525)	0.9549	1.4535	5.77996	0.694770	16

Table A3-2 continued

Endogenous Variable	Estimated Equation	R^2	DW	SE	RO	NO
32. VS	= 75.7036 + 2.21109 KST-1 (8.548) (23.602)	0.9720	0.5710	25.0664	0.0	17
33. VWP	= -0.679685 + 0.425649 KWPG-1 (-1.373) (39.397)	0.9898	2.1453	1.24729	0.0	17
34. POPR	= 4.55073 + 0.679469 POPR-1 - 0.0183942 WIMA + 0.172511 $\overline{T}$ (4.734) (-5.921) (-5.921) (0.132207)	0.9905	2.0448	0.130589	0.0	17
35. POPU	= 1.96820 + 0.692125 POPU-1 + 0.00599261 WIMA + 0.163583 $\overline{T}$ (14.964) (5.035) (7.909)	0.9997	1.9554	0.0363882	0.0	17
36. WAA	= -13.7106 + 1.79997 LEA + 9.17002 CTPD + 0.134501 WCNA + (-2.331) (1.157) (6.321) (7.920) 0.328759 DSLEA (3.626)	0.9961	1.9617	0.460831	0.0	18
37. WCNA	= -26.7610 + 17.4822 CTPD + 1.28167 WCNA-1 (-4.225) (2.002) (8.834)	0.9919	1.9345	2.98528	-0.021994	16
38. WMMA	= -11.0910 + 3.07467 LEMM + 14.2105 CTPD + 6.47365 $\overline{DU56}$ (-7.921) (3.079) (7.188) (4.965)	0.9880	1.4665	0.848441	0.0	18
39. WTCA	= -31.3847 + 44.5080 LETC + 42.1118 CTPD + 16.9081 $\overline{DU56}$ (-5.810) (2.593) (5.401) (4.342)	0.98865	1.5335	2.80662	0.0	18
40. WSA	= -65.0999 + 15.7706 LES + 71.9969 CTPD + 29.0505 $\overline{DU56}$ (-11.105) (3.454) (9.041) (5.174)	0.9892	1.5308	61.2941	0.0	18
41. WWPA	= -153.491 + 287.542 LEWP + 184.746 CTPD + 76.9446 $\overline{DU56}$ (-6.460) (1.058) (6.686) (3.711)	0.9737	1.9049	14.7240	-0.140315	17
42. WOA	= -739.443 + 7703.43 LEO + 398.168 CTPD (-5.551) (3.229) (8.223)	0.9769	1.8448	23.1889	0.854765	17

FOOTNOTES

Chapter 3

1. For a survey of the Iranian Macro Models see Mostashari (1978).

2. The 107 endogenous variables are derived from 42 stochastic equations and 65 non-behavioural relationships and identities.

3. See Appendix one to Chapter 4 for the derivation of this proportion.

4. The government sectoral investments in all sectors but services and water and power are considered to be exogenous in nominal terms. Their corresponding real terms are derived simply by dividing each by the price deflator for total government investment, IGTPD (endogenous). This treatment assumes that the government investment budget and its allocation are determined in nominal terms. This assumption is consistent with the presentation of this budget in planning documents.

5. In million employees.

6. In 1000 current Rials per man year.

7. There are 18 observations and 72 predetermined variables (of which 44 are purely exogenous and 28 are lagged endogenous variables).

8. Klein (1974), pp. 184.

9. See Evans and Klein (1968), Choudhry et. al. (1972), and Kloek and Mennes (1960), pp. 45-61.

10. Koutsoyiannis (1977), pp. 424-436.

11. Dar (1981), pp. 97.

12. The OLS version of the estimated equations is presented in the Appendix to Chapter 3, Table A3-2.

CHAPTER 4

DISCUSSION OF THE ESTIMATED MODEL

(4-1) INTRODUCTION

A discussion of the estimated model is presented in this chapter. There are nine interrelated blocks as outlined in the preceding chapter. Each block consists of different equations which are discussed briefly. Results of the estimations are presented in Tables 3-4 and A3-2 (for TSLS and OLS) at the end of the preceding chapter[1]. Thus, the results will not be repeated in this section and the reader is encouraged to refer to the cited tables[2].

(4-2) CONSUMPTION BLOCK

This block is comprised of three behavioural equations. Conventionally, total consumption is categorized as consumption of durables and non-durables. However, Iran's national accounts make no such distinction[3]. Instead, these expenditures are broken into 3 categories; a) private rural, CRP, b) private urban, CUP, and c) government, CG, consumption. This breakdown is necessary because the consumption patterns and the variables influencing each component are not the same.

Functional forms used for CRP and CUP closely follow standard consumption function estimates in which an income variable, a monetary variable, and lagged consumption are included[4,5].

As the urban sector is more monetized and generally is the principal user of durable consumer goods, total banking credit given to the private sector (CTPA) is introduced in the private urban consumption (CUP) function. Private urban consumption (CUP) is a function of urban disposable income (DYU)[6], one period lagged private urban consumption (CUP-1), total banking credit to the private sector (CTPA) and the price index of domestically produced consumer goods (CTPD). In the original functional form, the ratio of (CTPA/CTPD) was used, leading to the following estimated equation for CUP:

CUP =

$$\underset{(0.624)}{9.066} + \underset{(1.776)}{0.0735}\ DYU + \underset{(5.602)}{0.894834}\ CUP\text{-}1 + \underset{(1.778)}{0.0488}(CTPA/CTPD)$$

$R^2 = 0.9913$ DW = 2.2268 SE = 15.4693

However, when this equation was used in the simulation process, the model did not converge. Thus, CTPA and CTPD are entered separately in the function used in the model.

All estimated coefficients in the CUP equation have the expected signs and are statistically significant. The elasticity of CUP with respect to CTPD, calculated at the sample means, is fairly high (2.2). Inclusion of durable

consumer goods, which can generally be considered as luxuries in the Iranian economy, is perhaps a main reason for the high value of this elasticity. On the other hand, credit (CTPA) seems to have a relatively small effect on CUP. The elasticity of CUP with regard to CTPA is 0.17, computed at sample means. The private urban consumption equation gives a short-run marginal propensity to consume out of urban disposable income equal to 0.48, and the long-run marginal propensity to consume is 0.88.

Private rural consumption (CRP) is a function of value-added in agriculture (VA) and one year lagged private rural consumption (CRP-1). As there are no figures available for rural and urban disposable income in the Iranian national accounts, VA is used as a proxy for the rural disposable income. Other proxies, such as the wage bill in agriculture, were also considered; however, the statistical results were not satisfactory. The short-run marginal propensity to consume in the private rural sector is 0.88 which is, as expected, higher than that of the private urban sector (0.48). Similarly, the long-run marginal propensity to consume of the private rural sector (0.92) is slightly larger than that of the private urban sector (0.88).

Government consumption expenditure (CG) is made a function of government revenues from petroleum, (GRP), the one period lagged CG (CG-1) and the total population (POPT). As government decisions to consume reflect social, political

and economic considerations, POPT is used as a proxy for these elements. Petroleum revenues are significant in explaining government current consumption (CG). A one billion Rials increase in GRP increases CG by 0.18 billion Rials (18%). Total population is also an important explanatory variable in this equation. A one million increase in POPT requires a 11.0 billion Rials increase in CG. All coefficients are statistically significant. By making CG endogenous, government behaviour is modelled. The lagged value of CG provides a dynamic structure for the government decision with regard to its consumption expenditure. Moreover, treating CG as endogenous is useful for ex-ante simulation, as it helps government to forecast CG into the future.

(4-3) INVESTMENT BLOCK

This block consists of seven behavioural equations (equations 9 through 15, Table 3-4). They are, (1) total government investment (IGT) and sectoral private investments in (2) agriculture (IAP), (3) construction (ICNP), (4) manufacturing and mining (IMMP), (5) transportation and communication (ITCP), (6) services (ISP); and (7) government investment in water and power (IWPG)[8]. There are no data for sectoral private invstments in the Iranian national accounts. The figures are calculated as residuals after deriving government sectoral investment data from the

government annual budgets and subtracting them from the corresponding total investments in each sector. The total investments in each sector are presented in the national accounts of Iran (see Data Appendix).

The basic theories underlying the private investment equations in the above six sectors are the "flexible accelerator" and the "liquidity" or "cash flow" hypotheses[9]. The former is based on factors determining the marginal efficiency of investment; that is, output and capital stock. The latter deals with major variables which determine the marginal fund schedule, such as the rate of interest, cash flow and other financial variables. The level of investment is determined by interaction of these two theories. In other words, output, capital stock, the interest rate and liquidity are the main variables in explaining the level of investment.

Many other theories are also available to investigate the behaviour of investment[10]. They introduce variables such as profit, sales, stock prices, unfilled orders, user costs of capital, etc. Lack of data of these variables prevents their being considered in the investment equations. However, the price deflator for domestically produced investment goods (ITPD) is introduced in the investment equations. This variable, ITPD, may be a good proxy for some of the variables mentioned above, i.e., profit and the user cost of capital. In addition, ITPD is used to link the demand for domestically produced investment

goods (DQT) to its corresponding supply (GQI). As proxy for infrastructure variables, government capital stocks in each sector were introduced in the corresponding private investment equations. However, they did not provide significant results, hence they were dropped from the equations.

Gross private investment in agriculture (IAP) is expressed in terms of value-added in agriculture (VA), lagged private capital in this sector (KAP-1), total government credit given to agriculture (CTAGA) and a slope dummy for government credit in 1974 (DSCTAGA). This dummy is introduced because of a drastic change in CTAGA in 1974. All coefficients have appropriate signs and are significant (with respect to t-statistics). The coefficient of CTAGA is fairly large (1.7986). This indicates that a rise in government credit to this sector encourages the private sector to investment more. The elasticity of IAP with respect to VA is very high (6.3). This may be a result of very low private investment in this sector (i.e. the ratio of IAP to VA at the sample mean is low).

Gross private investment in construction (ICNP) is expressed as a function of value-added in construction (VCN), lagged private capital stock (KCNP-1), the price deflator for domestically produced investment goods (ITPD) and a slope dummy with respect to VCN (DSVCN) for the year 1976[11]. The coefficient of VCN is significant at the 1% level. However, the remaining coefficients in the equation

have t-ratios significant only at the 10% level. Other variables, credit given to this sector and the interest rate, were also introduced in the process of estimation; however, they were not statistically significant. This may indicate that personal retained earnings and personal savings are the main sources of finance for this sector[12]. The elasticity of ICNP with respect to VCN is high, 2.4. The adjusted R^2 is not very high relative to other equations, but there is little auto-correlation (DW=2.28).

Gross private investment in manufacturing and mining (IMMP) is a function of value-added and the one-period laged private capital stock in this sector (VMM, and KMMP-1 respectively), the domestic investment goods price deflator, (ITPD), private credit paid to this sector, (CTMMA), and a dummy variable for 1975 (DU5). All coefficients have correct signs and are significant at the 1% level and the remaining statistical measures are acceptable. Elasticity of private investment in manufacturing and mining with respect to value-added in this sector is 1.42. This indicates that increasing value-added in manufacturing and mining (VMM), by means such as government credit, government investment and so forth, encourages private investment in this sector (IMMP). The elasticity with respect to private credit paid by the banks to this sector (CTMMA) is 2.0; hence, increasing CTMMA can promote private investment in this sector. Private investment in manufacturing and mining (IMMP) is very price elastic. Its elasticity with respect

to the price of domestically produced investment goods (ITPD) is -7.9. The dummy variable DU5 is introduced for 1975 during which IMMP increases drastically. This may be due to drastic increases in foreign and government investments in this year.

Gross private investment in transportation and communication (ITCP) is expressed in terms of value-added (VTC), lagged private capital stock (KTCP-1), private credit (CTTCA) in this sector, and the price deflator for domestically produced investment goods (ITPD). The coefficients have the proper signs and are significant. Similar to the manufacturing and mining sector, private investment in transportation and communication (ITCP) is elastic (1.72) with respect to the value-added in this sector (VTC). Hence, by increasing VTC through means such as government investment in this sector (ITCG), ITCP can be promoted. Although the elasticity of ITCP with respect to ITPD is fairly high (-1.97), it is lower than that of private investment in manufacturing and mining (-7.4). This can be expected, as industrialization is being intensified, needs for means of transportation and communication increases. Thus, investment demand in this sector becomes less price sensitive.

Gross private investment in services (ISP) is made a function of value-added in services (VS), the one year lagged private capital stock (KSP-1), total credit paid to the private sector (CTPA), the price deflator for

domestically produced investment goods (ITPD) and a slope dummy for ITPD for 1974-1976 (DSITPD). This dummy is introduced due to an alteration in the changes in ITPD. The positive sign of the coefficient of DSITPD may be rationalized as follows. Private investors in services foresee higher prices in the future and hence they tend to invest now. All coefficients have appropriate signs and are significant. Durbin-Watson statistics (DW) and R^2 values are also acceptable. Total credit paid to the private sector (CTPA) and ITPD play important roles in this equation. Elasticities of ISP with respect to these two variables are respectively 6.83 and -15.15. The elasticity of ISP with respect to VS is 1.55. Government investment in services (ISG) can increase value-added in this sector (VS) which, in turn, enhances ISP.

The final equation explains investment in the government-owned water and power sector (IWPG). Credit and the investment goods price do not enter this equation because of the non-private nature of the water and power sector. Investment in water and power is a function of the value-added and lagged capital stock in this sector (VWP and KWPG-1 respectively). A dummy variable for 1976 (DU6) is also introduced in this equation due to a sharp increase in IWPG, on the basis of an ad-hoc decision by government. All the coefficients have correct signs and are statistically significant. The elasticity of IWPG with respect to value-added in water and power (VWP) is high, 2.25.

To recapitulate, "flexible acceleration" and "cash flow" theories are utilized to form the gross investment equations in six sectors. The price deflator for domestically produced investment goods (ITPD) is introduced in all gross investment equations, except for IWPG and IAP. This price is considered as a proxy for variables such as the user cost of capital. The presence of this variable links the demand for the domestically produced investment goods to its respective supply. Credit does not play an important role in the IWPG and ICNP equations, but it is important in explaining investment in other sectors (IAP, IMMP, ITCP, and ISP). Coefficients of all the investment equations have correct signs and are statistically significant. All the investments are elastic with respect to their corresponding value-added (the values of these elasticities are larger than unity). The elasticities with respect to credit are larger than unity in all equations in which this variable appears.

(4-4) VALUE-ADDED BLOCK

There are six equations in this block, as value-added in the oil sector is considered to be exogenous. Decisions of the government, foreign oil companies and the world demand for oil are major determinants of output in the Iranian oil sector. Despite many attempts to explain the behaviour of value-added in this sector (VO), the results

were unsatisfactory. Hence, VO was finally treated as exogenous. Value-addeds in all other sectors, agriculture (VA), construction (VCN), manufacturing and mining (VMM), transportation and communications (VTC), services (VS) and water and power (VWP) are treated as endogenous.

Value-added in each sector is regressed on the corresponding one-period lagged total capital stock. Capital stocks are the only binding factors of production in these sectors. Abundance of labour, except skilled labour, may be the main reason that labour input tends to be insignificant in the value-added equations[13]. Although skilled labour, or so called human capital, is very scarce, there is not sectoral data available for this variable. When import variables are introduced in these equations, they also tend to become insignificant in explaining variations of the value-added. Capital stocks were discovered to be the only significant determinants of value-addeds in all sectors except agriculture. In agriculture, as well as its total capital stock (KAT), a time trend (T) is a significant explanatory variable in the value-added (VA) equation.

Several functional forms were used to estimate the value-added equations (i.e. logarithmic semi-logarithmic and linear forms). Linear formulations of these equations provided better results in estimation and simulation. Thus, all sectoral value-added are expressed as linear functions of their total sectoral capital stocks (and a time trend, T,

in the case of value-added in agriculture). Before analysing the results of the estimated equations in this block, a note on the capital stock data is appropriate. As indicated in the Data Appendix, data for sectoral capital stocks are derived by assuming zero values for all stocks in 1958[14]. Hence, any results such as elasticities of value-addeds with respect to capital stocks and marginal capital output (value-added) ratios should be accepted cautiously. These results may tend to change when different capital stock data are used.

Value-added in agriculture (VA) is a function of lagged capital stock in this sector (KAT-1) and a time trend (T). Coefficients of KAT-1 and T are highly significant. The time trend (T) is used as a proxy for technological change in this sector. A unit increase in T can raise VA by 3.5 billion Rials. Hence, educational programs for labour, more effective use of the traditional agriculture system, methods which increase the quality of labour, land and seeds and so forth may improve output in this sector. Physical capital (KAT-1) is not very important in this equation. The elasticity of VA with respect to KAT-1 is very low, 0.1. This is perhaps because of long gestation periods of investment and inefficient use of new machinery and seeds in this sector. After a project for building of a dam is initiated, it may take six or seven years to affect agricultural output[15]. Therefore, the low magnitude of elasticity (0.1) of VA with respect to KAT-1 and the high

marginal capital output ratio ($\Delta KAT-1/\Delta VA=4.2$) may not be surprising.

Value-added in construction (VCN) is a function of the one year lagged period capital stock in construction (KCNT-1) and a dummy variable for 1976 (DU6). The latter is introduced to capture a sudden rise in VCN in 1976. The statistical measures indicate that all coefficients are significant and the values of R^2 and DW are also acceptable. The response of value-added in construction (VCN) to KCNT-1 is low. A unit increase in KCNT-1 raises VCN only by 0.09 billion Rials. The elasticity of VCN with respect to KCNT-1 is 0.5, and the marginal capital output ratio in this sector (Δ KCNT-1/Δ VCN) is very high, 12.35. Construction of steel mills, petrochemical complexes, large and medium sizes of private and government industries, along with the recent developments in high-rise buildings are examples of construction which are more capital-intensive than traditional construction.

Value-added in manufacturing and mining (VMM) is explained by the prior years capital stock in this sector (KMMT-1). The parameters have very high t-ratios and other statistical measures, i.e. R^2 and DW, are also acceptable. The elasticity of VCN with respect to KMMT-1 is 0.80, which is higher than that of the construction sector (0.50), and the marginal capital output ratio ($\Delta KMMT-1/\Delta VMM$) is 1.3. These results suggest that the response of output to change in investment, and hence capital stock, is more rapid than

in other sectors (except services). The majority of industries are medium or small scale where investment gestation periods are fairly short (one or two years). Food, textiles, carpets, and auto assembling are some examples.

Three remaining equations in the value-added blocks, namely value-addeds in transportation and communication (VTC), services (VS) and water and power (VWP) are expressed in terms of their corresponding one year lagged capital stocks. With the exception of the intercepts in the VTC and VWP equations, all coefficients are significant. Apart from the VS equation where the Durbin-Watson (DW) measure is very low (0.5710), R^2 and DW are acceptable for these equations. Despite attempts which were made to correct the problem of auto-correlation for the equation of VS, the value of DW did not improve. Hence, the OLS[16] version of the equation with no correction for auto-correlation was chosen[17]. In the transportation and communication sector (TC), the elasticity of VTC with respect to the lagged capital stock in this sector (KTCT-1) is 0.87. This value is high relative to all other sectors (except water and power). The magnitude of the marginal capital output ratio in TC, (ΔKTCT-1/ΔVTC), is 2.6 which is considered to be reasonable. In the services sector, the elasticity of VS with respect to KST-1 (the one year lagged capital stock in services) is 0.71. The marginal capital output ratio, (ΔKST-1/ ΔVS) is, as expected, the lowest amongst all sectors (0.45). This sector is very

important in most developing countries. The high rate of return on capital and less capital-intensive nature attract investors to this sector. Suppliers of credits, bank and non-bank intermediaries are willing to provide more funds to this sector than any other sector. This is mainly because the services sector asks for fairly short-term credit (3 to 6 months). The elasticity of value-added in the water and power sector (VWP) with rspect to the one period lagged capital stock in this sector (KWPG-1) is highest amongst all sectors (1.05). The marginal capital output ratio in the water and power sector (ΔKWPG-1/ΔVWP) is 2.3 which is higher than that in services or manufacturing and mining.

In summary, the formulation of the value-added equations seems to be appropriate. One period lagged capital stocks explain almost all the variation of the corresponding value-addeds. The marginal capital output ratio and the elasticity of value-added with respect to its respective lagged capital stocks tend to be consistent with the nature of each sector.

(4-5) EMPLOYMENT AND WAGES BLOCK

The employment equations represent the demand for labour and the wage equations reflect the corresponding supply. Interactions of these two sets of equations determine the levels of wage and employment in each sector. Employment is measured in terms of the number of individuals

employed by each sector annually. Man-hours worked is a better measure of the level of employment compared to the number of labourers employed. This is because in the case of the former, the level of output can be increased by increasing the number of hours worked without raising the level of employment (e.g. working overtime and reducing disguised unemployment). However, lack of data on man-hours leaves no alternative but using the available data on annual levels of employment (measured in millions of workers). Similarly, wages (measured in 1000 current Rials), represent average annual wage income per worker in each sector rather than wages per hour.

In general, the demand for labour (the labour employment equations), in each sector is determined by value-added in that sector. That is:

$$LEi = f(Vi,...)$$

where LEi and Vi are labour employment and value-added in sector i respectively. The supply of labour (wage equations) in each sector is influenced by the sectoral wages and the price deflator for domestically produced consumer goods (CTPD). Equating the demand and supply of labour implies that the wage depends on employment and the consumer goods price deflator[18]. That is:

$$WAi = f(CTPD, LEi...)$$

where WAi and LEi are the nominal wage and labour employment in sector i, and CTPD is the price deflator for domestically produced consumer goods. A linear formulation of these equations is used instead of other functional forms because the former has better performance in estimations. The results are investigated in the following two sub-sections.

(a) Labour Employment

Labour employment in agriculture (LEA) is a function of value-added in this sector (VA) and a time trend T. The coefficient of VA is very low and is not significantly different from zero. The elasticity of LEA with respect to VA is the lowest amongst all sectors (0.0025). Vulnerability of agriculture output to weather, other natural phenomenons and disguised unemployment are major factors that may account for the poor responses of LEA to VA. The time trend (T) is negatively related to LEA and its coefficient is significant. This is a result of the fall in the employed labour force in the agriculture sector (which started in 1968) and a movement of the labour force towards other sectors, especially construction. The statistical performance of this equation is poorer than that of other employment equations as indicated by the value of adjusted R^2 (0.80).

In addition to value-added in construction (VCN), labour employment in the construction sector (LECN) is

explained by a slope dummy variable for 1976 (DSVCN). This dummy variable is introduced to capture the effect of a sudden rise in VCN, in 1976, which seems to be due to the adoption of more capital-intensive and labour displacing production techniques in the construction sector. The elasticity of LECN with respect to VCN is 0.824 which is the highest amongst all sectors. This reflects the high capability of this sector to absorb the labour force. All coefficients of the LECN equations are highly significant and values of adjusted R^2 and DW are within acceptable ranges.

Labour employment in manufacturing and mining (LEMM), transportation and communication (LETC), and services (LES) are functions of their corresponding value-added (VMM, VTC, and VS respectively). Their value-added coefficients are significant and the other statistics (i.e. R^2 and DW) are also acceptable. The elasticity of LEMM with respect to value-added in manufacturing and mining is 0.16. Unlike the construction, and transportation and communication sectors, manufacturing and mining has less tendency to absorb the labour force. Modern capital-intensive industries and disguised unemployment in the traditional manufacturing sector are the main reasons behind this phenomenon. The following observation by Katouzian[19], in this respect, is consistent with the above interpretation:

> "The total number of industrial work-force (employed in construction as well as manufacturing and mining) has been around 2.5 million average since 1971. Modern manufacturers (claiming 5.7 per cent of total manufacturing and mining output) employed an average of only 150,000 or 6 per cent of the whole industrial labour force. This observation shows that a) modern, and especially new industries, were significantly capital-intensive; b) traditional and semi-traditional (urban and rural) industries - contributing 35 per cent of manufacturing and mining output - must have employed about 65 per cent of the total industrial work-force (the rest being employed in construction); and c) therefore there must have been a certain amount of disguised unemployment (what in polite circles they now call "overmanning") in the traditional and semi-traditional manufacturing sector."

The labour absorption capacity in the transportation and communication sector is second only to construction. The elasticity of labour (LETC) with respect to value-added in transportation and communication (VTC) is 0.44. The services sector has less tendency to absorb the work force. The elasticity of labour employment (LES) with respect to value-added in this sector (VS) is 0.16, which is very low. In most developing countries, contribution of services both in GNP and in employment are high[20]. However, similar conditions do not hold in oil exporting developing countries such as Iran. In these countries "...the service sector has a large share of both total and non-oil GNP, though not necessarily of the labour force: modern services are intensive in use of capital equipment and modern skills; therefore, their labour absorption capacity will be low,

while the skilled personnel involved in their provision will be paid monopolistic salaries"[21]. This may be the reason for the low elasticity of LES with respect to VS in the Iranian economy.

The oil sector, which contributes substantially to GNP and to the total government revenues, absorbs only a small part of the Iranian labour force. A one billion Rial increase in the value-added in the oil sector (VO) increases labour employment in this sector (LEO) by only 155 workers. The average value-added labour ratio, 2.5 million Rials per worker, is very high in comparison with that of the agriculture sector, 0.033 million Rials per worker. A dummy variable, DU24, is introduced in the LEO equation for the period 1972-1974. Labour employment in the oil sector declines in those years in spite of a sharp increase in oil production.

Value-added in the water and power sector (VWP) is not significant in explaining the variation of the labour employment in this sector (LEWP). This sector is owned and run by the government, therefore, many other autonomous factors such as government decisions, urbanization and so forth can influence LEWP. The elasticity of LEWP with respect to VWP is only 0.13. Given that the sector is capital-intensive, the low magnitude of the elasticity is not surprising.

b) Sectoral Wages

The equations for nominal wages (wages hereafter)[22], as mentioned earlier, are derived from supply-demand equalities in the seven sectors. In general form, the wage[23] in each sector is explained by labour emplyment in that sector[24] and the price deflator for the domestically produced consumer goods (CTPD). These equations generally perform well both in estimation and simulation.

The wage in agriculture (WAA) is a function of labour employment in this sector (LEA), CTPD, wages in construction and a slope dummy variable (DSLEA) for 1968-1976. The coefficient of DSLEA is significant and positive indicating that the fall in LEA in this period tended to depress wages. However, the large impact of the other variables in the equation accounts for the increase in WAA at the same time that LEA was falling. The elasticity of WAA with respect to LEA is 1.17. A relatively high level of unemployment and under-employment in this sector allows the labour supply curve in agriculture to be inelastic. This may give an indication of a low mobility of labour from other sectors of the economy to agriculture. The elasticity of WAA with respect to the consumer good price (CTPD) is almost unitary (0.98).[25] The wage level in construction (WCNA) is a dominant force in determining the level of WAA. A higher WCNA attracts labour from the agriculture sector (the main supplier of labour to construction) to

construction, shifts supply curve of LEA to the left and hence WAA increases.

The wage level in construction (WCNA) is a function of CTPD and the previous year's wage in this sector (WCNA-1). Labour employment in construction (LECN) was found to be statistically insignificant, and therefore was dropped from the equation. Hence, WCNA is perfectly inelastic with respect to LECN, that is, the labour supply curve is horizontal (when LECN is measured on the horizontal axis). This reflects the idea that labour mobility into the construction sector from other sectors, especially agriculture, is very high. Rapid development of transportation and communication along with high wages for an unskilled work force, significantly increased the mobility of labour from agriculture to the construction sector. The lagged wage in construction (WCNA-1) has an important role in determining the level of WCNA. Finally, the short-run elasticity of WCNA with respect to CTPD is 0.50.

The wages in manufacturing and mining (WMMA), transportation and communication (WTCA), services (WSA), and water and power (WWPA) sectors are expressed in terms of their respective labour employment (LEMM, LETC, LES and LEWP respectively) and the price deflator for domestically produced consumer goods, CTPD, and a dummy variable, DU56. The equations have significant coefficients and their adjusted R^2 and DW values are acceptable. The dummy

variable DU56 is used in all 4 sectors and is introduced to capture sudden increases in nominal wages in these sectors in 1975 and 1976[26]. The elasticity of wages in manufacturing and mining, WMMA, with respect to labour employment (LEMM) is 0.32. In other words, this implies a wage elasticity of labour supply equal to 3. This may suggest a high mobility of labour from other sectors (presumably agriculture) to manufacturing and mining. The elasticity of wage levels in transportation and communication (WTCA) with respect to labour employment in this sector (LETC) is 0.33, which is similar to that of manufacturing and mining. The comparable elasticity for the services sector is 0.44. In the water and power sector, which is owned and run by the government, relatively higher wages are offered to labour. This may be a reason for very elastic supply of labour in this sector (5.56). The oil sector is a less labour-intensive industry and it also absorbs skilled labour. Hence, supply of labour is inelastic in this sector (0.37). The equation for wages in the oil sector performs well and the relevant statistics measures are acceptable. Finally, the price deflator for domestically produced consumer goods (CTPD) is statistically significant in explaining the variation of wages in manufacturing and mining (WMMA), transportation and communication (WTCA), services (WSA), water and power (WWPA) and oil (WOA).

(4-6) IMPORTS BLOCK

In this section the behaviour of the principal import groups are explained. Total imports (MT) are broken down into four categories. They are imports of 1) consumer goods (MC), 2) intermediate goods (MINT), 3) capital goods (MK), and 4) non-factor services (MNFS). The last variable is obtained as a residual, and the remaining import variables, including the total imports (MT), are explained by behavioural equations. Provision of the above categories are considered to be necessary for at least two reasons: 1) some import variables are used as explanatory variables in other stochastic equations, such as MC in the equation of government revenues from indirect taxes, and some are used in supply-demand balances, such as MC and MK in domestically produced consumer (GQC) and investment (GQI) goods respectively; and 2) they provide a ground for a possible investigation of import substitution. All import prices are exogenous, that is, it is assumed that for a relatively small economy such as Iran, supply schedules for all imports are perfectly price elastic.

In the original formulation of the import equation, four types of variables were considered[27]; 1) income or activity variables, such as GNP, GDP, and total gross investment (IT); 2) ratios of import prices to their respective domestic prices such as ratios of price of imported consumer goods to domestic consumer goods

(MCPD/CTPD); 3) one year lagged import variables such as lagged import of consumer goods (MC-1). These variables reflect what is known about habits in consumer behaviour and purchasing patterns of businessmen[28]; and finally 4) foreign exchange reserves (FEXRA). With the exception of lagged imports of consumer goods, lagged variables of the other imports turned out to be insignificant and hence, were dropped. Similarly, effects of foreign exchange reserves (FEXRA) were not statistically significant and this variable was deleted from import equations. This may suggest that FEXRA, especially after 1971, is not a significant binding factor in the imports.

Total imports of goods and services (MT) is a function of the gross national product (GNPM), the relative price deflators of total import to total exports (MTPD/XTPD) and a dummy variable (DU46). The dummy variable (DU46), which is highly significant, is introduced to reflect sudden rises in MT in 1975 and 1976. Increases in the government demand for imported capital and consumer goods, due to substantial rises of its petroleum income, are the major explanation of these increases. Both GNPM and (MTPD/XTPD) explain the variation of MT significantly and R^2 and DW measures are acceptable. Elasticities of MT (calculated at the mean values) with respect to GNPM and the relative prices (MTPD/XTPD) are respectively 0.85 and -0.29. The corresponding elasticities were calculated by Parhizgari[29] who obtrained larger values (1.64 and -0.97 respectively).

Since his period of study covers only 1950 to 1972, the main reasons for these differences is a significant increase in the oil exports and hence the government revenues from this source after 1972. This caused GNPM to increase sharply but, due to the limited imports-absorption capacity, MT was not able to increase proportionally to GNPM. The validity of this reasoning can be clearly seen by comparing the coefficients of GNPM (marginal propensity to imports out of GNPM) and of (MTPD/XTPD). The value of the former is 0.2511 (that of Parhizgaris' 0.287) and of the latter is 66.64 (that of Parhizgaris' 138.081).

Imports of consumer goods (MC) are explained by disposable income, the one year lagged imports of consumer goods (MC-1), the relative prices of imported consumer goods to domestically produced consumer goods (MCPD/CTPD) and two dummy variables, DU46 and DSRPD. Imports of consumer goods (MC) includes both private and government demand. However, lack of accurate data on both private and government imports of consumer goods prevents disaggregation of MC. To partially overcome this problem, the variable total government revenues (with and without revenues from petroleum) was introduced in MC equation. However, its effect was statistically insignificant and it was dropped from the equation. Thus, disposable income (DY) is used as the only income variable in MC equation. Short-run marginal propensity to import consumer goods out of disposable income is 0.05. The same elasticity calculated by Parhizari[30] for

the period 1958-1972 is 0.011, which is smaller than that in this study. Apart from a possible discrepency in data, the reason for this discrepency is a sudden rise in the exports of oil which directly and indirectly increase both disposable income which leads to rises in demand for imported consumer goods. The long-run marginal propensity of MC with respect to DY is 0.15. The short-run disposable income elasticity of MC is 0.72 and that in the long-run is 1.96. The effect of relative prices (MCPD/CTPD) is significant only at the 10% level. This is, perhaps, due to fairly constant relative prices (MCPD/CTPD) until 1973. Short-run and long-run elasticities of MC with respect to the relative prices are 0.31 and 0.86 respectively. The low values of these elasticities may indicate that a significant portion of imports of consumer goods are made up of necessities such as food where imports tend to increase considerably in 1973 and onwards. A slope dummy variable DSRPD is introduced to capture the effect of the sudden rise in the relative prices (MCPD/CTPD). This increase does not lead to decreased MC; on the contrary, MC tends to increase over the same period (i.e. the coefficient of DSRPD is significantly positive, giving a positive slope during the sub-period). This result may be explained by monetary behaviour. Higher import prices (MCPD) encourage importers of consumer goods to anticipate further increases in MCPD and hence lead to higher import demand now. An intercept dummy

variable DU46 is also introduced for the period 1974-1976. The negative sign of the coefficient of DU46 is perhaps due to the fall in the ratio of MC to disposable income in these periods. The one year lagged import of consumer goods (MC-1) significantly explains some of the variation of MC. This may reflect habit persistence of consumers and behaviour of importers of consumer goods in adjusting their inventories.

Imports of intermediate goods (MINT) are a function of gross domestic product (GDPM), the relative price of imported capital goods to the price of domestically produced investment goods (MKPD/ITPD), and the dummy variable DU46. Since MINT is used in the process of production, GDPM is used as an income indicator in this equation. Also, the ratio of (MKPD/ITPD) is chosen because MINT is mainly utilized in the process of producing investment goods. The dummy variable, DU46, is introduced to capture the effect of a sudden increase in MINT in the period of 1974-1976. All the coefficients have correct signs and are highly significant. Elasticities of MINT with respect to GDPM and the relative prices (MKPD/ITPD) are 0.96 and -1.59 respectively. The former indicates that the demand for MINT varies at the same proportion as the gross domestic product. An elastic relative price elasticity of MINT (-1.59) suggests that users of intermediate goods may switch to domestically produced intermediate goods or decrease their demand for MINT as MKPD increases. The marginal propensity of MINT out of GDPM is 0.105.

Imports of capital goods (MK) are made a function of total gross investment, the relative price of imported capital goods to the price of domestically produced investment goods (MKPD/ITPD) and the dummy variable DU45. The latter explains sudden increases in MK in the years 1974 and 1975. Total gross investment (IT) is used as an aggregate economic indicator in the MK equation. Since different categories of investments (i.e. investment in agriculture, construction, manufacturing and mining and so forth) can have very different import content, it seems reasonable to introduce each category as a separate explanatory variable in the MK function. However, because of the existence of multicollinearity among these various categories of investments, total gross investment (IT) is used instead. All the coefficients in this equation are significant and have appropriate signs. The marginal propensity of MK out of IT is 0.15 and the elasticity of MK with respect to IT is 0.80. The relative price (MKPD/ITPD) elasticity of MK is 1.0. These relatively low values of elasticities may not be surprising once the components of the total gross investment (IT) are studied. A breakdown of IT into investment in machinery and equipment and non-machinery and equipment may clarify the point. On average the former, which is primarily made up of imports, comprises 37 per cent of the total gross investment (IT).[32] A larger share of the non-machinery and equipment investment in IT is, perhaps, the main reason for the low elasticity of MK with respect to IT.

In summary, the behaviour of all categories of imports (excluding imports of non-factor services, MNFS, more of which appears later) are explained well and affected significantly by their corresponding economic activity indicators and relative prices. Dummy variables, which are introduced to account for structural changes which are caused by high oil revenues in 1974-1976, become very significant. Total imports (MT) is considered as a stochastic equation and hence the imports of non-factor services (MNFS) is obtained as a residual. Thus, estimated and especially predicted values of MNFS are subject to error. It contains not only all statistical discrepancies between total imports and their different components, but also the estimation errors in all import equations.

(4-7) THE MONETARY BLOCK

This block consists of two behavioural equations for total banking credit to the private sector (CTPA) and the money supply (MOSA). Being directly affected by the money supply (MOSA), CTPA and its components (which are cited below) link the monetary part of the model to the other components. The linkage is accomplished by introducing CTPA and its components (i.e. banking credits given to the private sector in agriculture, CTAA, construction, CTCNA, transportation and communications, CTTCA, and services, CTSA) in the equations for private urban consumption, CUP,

and the private sectoral investments. The money supply has frequently been considered to be exogenous in both theoretical and empirical studies. However, by putting more emphasis on the sources of money supply, i.e. the monetary base, the money supply gradually came to be considered as endogenous.[33] Adopting the latter approach, the money supply (MOSA)[34] depends solely on the monetary base, MBA (whose definition and components are investigated, in detail, in the definitions and identities block below). This formulation implicitly suggests that the monetary multiplier, linking changes in the monetary base to changes in the stock of money, is constant. Obviously, in examining the behaviour of the monetary multiplier, one should consider the behaviour of its components: currency, time deposits, government deposits and reserve ratios. These are, in turn, influenced by income and interest rates, and, in the long-run, by such institutional factors as the degree of monetization, the growth of the banking sector, and income distribution.[35] However, given that the monetary multipliers in Iran have been fairly stable (over the period of this study, 1959-1976), the assumption of the constant monetary multiplier may not be too restrictive and unrealistic. All coefficients of the money supply (MOSA) equation are statistically significant. The marginal monetary multiplier ($\Delta MOSA/\Delta MOB$) is 1.04, which is smaller than the average monetary multiplier that is reported by the Central bank (Bank MARKAZI IRAN).[36] This is because a

broader definition of MOSA is used by the Central bank; that is, time deposits are also included (M2).

Total banking credit to the private sector (CTPA) is expressed in terms of the money supply (MOSA) and the one period lagged total banking credit to the private sector (CTPA-1). This equation basically represents the supply of the total credit given to the private sector. The supply is the main factor that determines the level of CTPA in each period. In Iran, the situation is one where demand side considerations are less relevant. As mentioned earlier, domestic interest rates are stable and are kept below the equilibrium level, thus giving rise to a situation of excess demand and non-price rationing.[37] In these conditions, the actual private demand for credit is constrained not by the cost of credit, but the unavailability of[38] credit (i.e. the supply).

The formulation of the supply of credit functions as noted by Mostashari[39] is hypothesized to be proportional to some weighted aveage of present and previous money supplies extending over many periods. The rationale behind this is that movements in the money supply (MOSA) over a long period of time best represent the monetary authority's overall objective with respect to the state of monetary affairs in general, and its entire policy package to achieve these objectives. However, in reality, the dependence of net banking credit on money supply terminates after a finite number of years. Using the familiar Koyck transformation

for such an expression, the final result suggests that banking credit to the private sector is a function of the money supply (MOSA) and the lagged credit (CTPA-1). All coefficients of the equation are statistically significant and its two explanatory variables explain total banking credit to the private sector well.

(4-8) GOVERNMENT REVENUE, DEPRECIATION AND POPULATION BLOCK

This block describes the governments' main sources of income, depreciation and population.

The governments' revenues are broken down into three categories: government revenues from (1) direct taxes (GRDT), indirect taxes (GRIDT) and petroleum (GRP). Each category is explained by the most relevant variable(s) on which they are based. There are no explanatory variables to represent the government policies and regulations in these equations. This is mainly because of the erratic nature of these explanatory variables. Dummy variables may be introduced to reflect regulation changes wherever it is required.

The government revenues from direct taxes (GRDT) are explained by one year lagged personal income (PY-1) and dummy variable DU56. The former is the main source of GRDT and it is lagged one period because the direct taxes are mostly collected one year after PY is received. The dummy

variable DU56 is introduced for 1975-1976 and it reflects the government's administrative regulations in collecting the direct taxes (GRDT) in this period. The government revenue from indirect taxes (GRIDT) is made a function of the one year lagged government revenues from indirect taxes (GRIDT-1) and the imports of consumer goods. The latter is one of the most important sources of the government revenues. The former (GRIDT-1) is introduced because the government decision about indirect taxes is, to some extent, made on the basis of the past year income from this source. Government revenue from petroleum (GRP) is a function of oil exports (XO) and DU46, a dummy variable for the hike in price of exports of oil in 1974-1976. All explanatory variables of the above three equations significantly explain variations of their corresponding endogenous variables and their R^2 and DW values are also acceptable.

Total depreciation (DEP) is a function of the total capital stock at the beginning of the period (KT-1) and the one year lagged gross national product (GNPM-1).[40] Summations of coefficients of these explanatory variables in 0.063 which is very close to the annual depreciaton rate used by the government in the national accounting data (0.061). Finally, total population (POPT) is broken into two parts: (1) urban population (POPU), and (2) rural population (POPR). Each variable is expressed in terms of its own one year lagged values, wages in industry and mining, WIMA, (which is a weighted average of wages in construction, WCNA,

manufacturing and mining, WMMA, and water and power, WWPA, and time trend (T). The coefficients of the time trend (T) are positive in both equations which means that they reflect rises of population in both urban and rural areas during the sample period. The coefficient of WIMA is positive in the POPU equations and negative in the rural population equation. Higher wages in industry and mining are an important factor in migration from the rural to urban areas. All the explanatory variables in each equation explain variations of their respective endogenous variables well (R^2 is very high), and their coefficients are highly significant.

(4-9) DEFINITIONS AND IDENTITIES BLOCK

All identities and definitions are presented in Chapter 3. These relationships become very important once the entire system is to be solved simultaneously. For instance, they are required in estimation processes once three stage least squares (TSLS) and full information maximum likelihood methods (FIML) are adopted and/or in simulation of the model. Some identities and definitions are self explanatory and they may not need further investigation. However, some may require more explanation and justification. Those in the former group are: total consumption (CT), total private gross investment (IPT), total gross investment (IT), total value-added (VT), gross

domestic product (GDPM), personal income (PY), disposable income (DY),[41], urban disposable income (DYU), wage in industry and mining (WIMA), total labour employment (LET), total wage bill (WBT), total population (POPT), and total exports of goods and services (XT). Definition and identities of total sectoral and the grand total capital stocks (KT) are also straightforward. The latter (KT) is simply the summation of total capital stock in each sector. In general, the identities are explained in two subsections: (a) those which are used to solve for the main prices; these are presented in the prices or supply-demand balances block; and (b) the remaining identities which are given in the other identities and definitions block.

(4-9-1) Prices Blocks (Supply-Demand Balances)

There are basically two types of prices which are determined by interactions of their corresponding demand and supply. These are: the price deflators for domestically produced consumer goods (CTPD) and investment goods (ITPD). The remaining prices are obtained through identity relations by using ITPD, CTPD and some other relevant variables wherever needed.[42] These prices play important roles in the model. They link the supply side of the model to that of demand[43] on the one hand, and the nominal section to that of real in the model on the other hand. The latter is basically the transmission of the government policies to the

real sector. Prices transform exogenous nominal sectoral government investments into real investments. In addition, prices influence nominal government borrowing through the government budget constraint.

The relations of demand and supply for domestically produced consumption goods which is used domestically (DQC and GQC respectively) is basically introduced to solve for the price deflator for domestically produced consumer goods (CTPD). In this approach, the price, CTPD, which enters only in the demand side, DQC (Chapter 3, relation 3.3.44) is determined via the equilibrium conditions (relation 3.3.46) in which DQC is equal to GQC.[44] The demand, DQC, is obtained simply by subtracting the imports of consumer goods (MC) from total consumption (CT). The supply of domestically produced consumer goods which is used domestically, GQC, (relation 3.3.45), is derived by the help of the Iranian input-output table of the year 1973[45]. The coefficients[46] attached to value-added of each sector of the economy are derived from the input-output table. They indicate the proportions of value-added which is allocated for producing consumer goods in that sector. These proportions are denoted for agriculture, CA, construction, CCN, manufacturing and mining, CMM, transportation and communication, CTC, services, CS, oil, CO, and water and power, CWP. The supply of domestically produced consumer goods which is used domestically (GQC) is derived directly by subtracting exports of consumer goods, XK, from the

summation of consumer goods produced by all seven sectors (see relation 3.3.44).

A similar approach is adopted to derive the demand for and supply of domestically produced investment goods which are used domestically (i.e. DQI and GQI respectively). Relations 3.3.48 and 3.3.49 show the definitions of DQI and GQI. The coefficients[47] which are derived from the input-output table and attached to sectoral value-added in the GQI relation, are proportions of value-added which are allocated for investment uses. These proportions are IA for agriculture, ICN for construction, IMM for manufacturing and mining, ITC for transportation and communication, IS for services, IO for oil, and IWP for water and power sectors. The interaction of DQI and GQI, which is shown by relation 3.3.50, determines the price deflator for domestically produced investment goods which are used domestically (ITPD).

Two other price deflators are also derived in order to connect the government budget constraint, which is defined in nominal terms, to other parts of the model. These prices are price deflators for: total government investment, IGTPD, and total consumer goods, CTDPD. Relations 3.3.62 and 3.3.63 in Chapter 3 present these definitions.

(4-9-2) Other Definitions and Indentity Block

Derivation of the government investments in services (ISG) is shown in relation 3.3.51. This variable is treated as a residual because total government investment (IGT) is explained by a behavioural relation rather than a definition. Similarly, since total banking credit to the private sector (CTPA) is explained through a behavioural equation, banking credit to the private sector in services (CTSA) is also derived residually (relation 3.3.58).

Relations 3.3.59-3.3.61 are related to the government budget constraint[48] and means of financing budget deficits. Government can finance its deficit by borrowing from either domestic or foreign sources or a combination of both. The variable which represents the foreign source of financing (FBDFA) is considered to be exogenous. However, the domestic source of financing the deficit (DBDFA) is assumed to be endogenous. The latter method of financing is comprised of five different sources. In relying on domestic borrowing sources, government can sell bonds either to: (1) the central bank, ΔBCBA,[49], or (2) other banks (intermediary and non-intermediary financial insitutions), ΔBOBA, or (3) the private sector, ΔBPA, or (4) other domestic institutions, BDFOA, or (5) government can also obtain credit from the banking system (CTBSGA), or any combination of the above. With the exception of ΔBCBA, all the domestic sources of financing the budget deficit are exogenous. Selling bonds

to the central bank (ΔBCBA), is the only means of financing a deficit at each period of time, unless otherwise specified. Hence, the government budget constraint is solved for ΔBCBA which is given in relation 3.3.61 in Chapter 3. Since, by definition, ΔBCBA is part of the monetary base, MBA (relation 3.3.66), the government budget constraint, is connected to the rest of the model via MBA, money supply (MOSA), and total banking credits to the private sector (CTPA).

Relation 3.3.64 breaks down net inflow of financial capital (NIOCA) into two parts: (9) government borrowing from abroad for financing its budget deficit (FBDFA), and other inflows of financial capital. The reason for this breakdown is to connect the government budget constraint via foreign exchange reserves (FEXRA) to the monetary base, MBA. Relation 3.3.65 defines the level of foreign exchange reserves (FEXRA). Relation 3.3.66 defines the monetary base (MBA) in two different ways with identical results. The conventional definition of the monetary base (MBA) consists of: (1) currency held by the public (CHPA), (2) currency held by commerical banks (CHBA), and (3) commerical banks' deposits with the central bank (DWCB). From the central bank balance sheet[50] an equivalent definition of the monetary base (MBA) is derived as a summation of: (1) net foreign assets of the central bank, ANFA, (foreign assets - foreign liability), (2) net claim of the central bank on the government, ANCLGA, (3) net claim of the central bank on

others, ANCLOA, and (4) total claim of the central bank on the commerical banks, ACLBA. The latter definition of MBA is used here because it enables us to link the government budget constraint (relation 3.3.61) on one hand and the balance of payment relation (foreign exchange reserve, FEXRA, relation 3.3.65), on the other hand, to the monetary base (MBA). Relation 3.3.67 defines the net foreign assets of the central bank (ANFA) as a summation of foreign exchange reserves (FEXRA) and net other foreign assets of the central bank (ANFOA). Relation 3.3.68 breaks net claims of the central bank on government (ANCLGA) into two parts: (1) net claim of the central bank on government net of changes of the government bonds held by the central bank (ANCLGOA) and (2) changes of the government bonds held by the central bank (ΔBCBA).

Relation 3.3.73 is introduced in order to reconcile two different definitions of the gross national product (GNPM), with identical results. Relation 3.3.71 defines GNPM as equivalent to the gross national expenditure (GNE). However, GNPM can also be derived by adding the net factor income from abroad (NFYA) to the gross domestic product (GDPM). Over the sample period (1959-1976), both calculated values of GNPM are identical and hence the reconciliatory variable (RCOV) becomes zero. However, in the process of simulation, forces determining GDPM and GNE may or may not be equivalent, and hence RCOV may become greater or less than zero. Therefore, by introducing RCOV in the GNPM

relation (relation 3.3.71), the above two approaches are reconciled with each other.

Relation 3.3.79 defines profit (PROFIT). Since there is no data available for profit, it is derived by subtracting the total wage bill from personal income (PY). This variable is introduced in order to provide a proxy for measuring the distribution of income between wage earners and profit makers. The measurement which is presented in relation 3.3.80 is the ratio of profit to the wage bill (PROFIT/WBT) which is denoted as distribution of income (DISTOY). The historical data shows that DISTOY tends to increase from 2.05 in 1961 to 2.5 in 1965. It is stable during 1966 through 1972, and it sharply rises in 1973 to 3.24. It reaches its peak point, 3.94, in 1974 and it falls to 3.03 at the end of the period (1976). In addition to DISTOY, the ratio of per capita consumption in urban to rural areas (ROCUR) is calculated in order to compare the living conditions in these two areas. This index is presented by relation 3.3.82. The gaps between these two areas becomes wider during the sample period. The value of ROCUR increases from 2.38 in 1961 to 4.45 in 1976.

Relation 3.3.84 defines exports of oil (OX) as a product of foreign exchange rates (EXR),[51] quantity of oil exported in billion barrels (XOQBB), price of oil export (XOP),[52] and a discrepancy variable DISO[53] which are deflated by price deflators of oil exports (XOPD). Relation 3.3.85 is total exports (XT) which is comprised of exports

of consumer goods (XC), capital goods (XK), intermediate goods (XINT), oil (XO), and non-factor services (XNFS). All exports are considered to be exogenous.

Finally, relations 3.3.86 through 3.3.103 are related to the calculations of the private, government, total sectoral, and grand total capital stocks. Private and government capital stocks in each sector are calculated at the end of each year. They are expressed as the sum of depreciated[54] capital stock at the beginning of each period and sectoral gross investment during the period. Apart from the oil and water and power sectors which are owned by the government, each sectors' capital stocks is classified as private, government and total. Capital stocks in oil (KOG) and water and power (KWPG) are presented by relations 3.3.101 and 3.3.102. Last of all, the grand total capital stock (KT) which is a summation of total capital stocks in all sectors, is shown by relation 3.3.103.

Presentation of structure of the model, estimation of its stochastic equations and explanation of its identities and definitions are now complete. The next step is to test the performances of the model in (a) simulation experiments and (b) implementation of policy experiments. The following chapter discusses dynamic properties of the model and presents historical simulations. In Chapter 6, simulations of alternative government policies are presented.

APPENDIX TO CHAPTER 4

Derivation of supplies of consumer and investment goods and their linkages to their corresponding demands.

To derive the supply of consumer and investment goods, Iran's input-output table for 1973 is used. The proportions of value-added in each sector which are allocated for consumer and investment goods are collected from the table. These proportions,* then, are applied on value-added in each sector (variables from Iran's national accounts data), in order to calculate consumer and investment goods produced by each sector. Derivation of the proportions for consumer goods and hence total supply of consumption goods are explained in detail below, while the procedure for investment goods, which is similar to the procedure for consumption, is mentioned briefly.

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* It is assumed that relative prices remained unchanged in the period of study (1959-1976). This assumption is necessary because figures in the input-output table are in current Rials (the Iranian currency), while variables in this study are in real terms. With this assumption, then, the proportions are applied on the value-added figures in order to arrive at consumer and investment goods supplies.

a) Total Supply of Consumption Goods

Total supply of consumption goods (including exports) provided by all sectors is:

1) $SCT = \sum_{i=1}^{7} SC_i \qquad i = 1,....7$

where SCT is total supply of consumer goods at period t=(1973) which is available for domestic uses and SC_i is that of sector i. The aim is now to calculate SC_i from the input-output table (Table A-1, columns 10, 11, and 17) SC_i is defined as:

2) $SC_i = \beta_i (GQ_i + M_i - X_i)$

where GQ_i is total gross output of sector i; M_i and X_i are respectively imports and exports of this sector, and β_i is the proportion of total gross output of sector i available for domestic uses which is allocated to consumer goods. Solving for β_i:

3) $\beta_i = SC_i/(GQ_i + M_i - X_i)$

In addition, SC_i is equal to total consumption of private (CP_i) and government (CG_i) which is provided by sector i, that is:

4) $SC_i = CG_i + CP_i$

substituting relation 4 into 3, β_i, the proportion of gross domestic output of sector i allocated to consumption uses, can be easily calculated from:

5) $$\beta_i = (CG_i + CP_i)/(GQ_i + M_i - X_i)$$

whose values for seven sectors are presented in Table A-2. Returning to relation 2, as there is no time series data on GQ_i, M_i, and X_i, SC_i cannot be calculated for the periods other than 1973 (the period for which the input-output table is constructed). The input-output table provides total value-added (which is cited as total factor payments in row 12) of each sector (V_i) whose time series data is available from the Iranian national accounts. As V_i is some proportion of GQ_i, by having annual data on value-added in each sector, time series data for its respective GQ_i can easily be generated, that is:

6) $$\alpha_i = V_i/GQ_i$$

(All values of for seven sectors are presented in Table A-2.)

In relation 6 solving for GQ_i:

7) $$GQ_i = V_i/\alpha_i$$

and substituting it into 2 and summing it up over seven sectors, total supply of consumer goods for domestic uses can be obtained, that is:

$$8) \quad SCT = \sum_{i=1}^{7} SC_i = \sum_{i=1}^{7} (\beta_i/\alpha_i) * V_i + \sum_{i=1}^{7} \beta_i M_i - \sum_{i=1}^{7} \beta_i X_i$$

The last two terms in the right-hand side of relation 8 are total imports and exports of consumer goods (MC and XC respectively) whose time series data are available. That is:

$$9) \quad MC = \sum_{i=1}^{7} \beta_i M_i$$

and

$$10) \quad XC = \sum_{i=1}^{7} \beta_i X_i$$

Substituting relations 9 and 10 into 8 and defining (β_i/α_i) as UC_i, SCT can be written as:

$$11) \quad SCT = \sum_{i=1}^{7} (UC_i * V_i) + MC - XC$$

where
UC_i can be defined as proportions of value-added in each sector allocated to consumption. The calculated values of UC_i are presented in Table A-2.

The total supply of consumer goods available for domestic uses (SCT) which is derived by the help of the

input-output table, is not necessarily identical to its corresponding demand (DCT)* whose time series data is gien in the national accounts data. As it is required that the ex-post demand must be equal to that of supply, the supply figure is adjusted in such a way as to be equal to the corresponding demand. To make such an adjustment, two methods are adopted here.

(i) First Method

The first method is to find the difference between the demand and the calculated supply from the input-output table. Equality conditions require that total consumption (CT) which consists of private urban and private rural and government consumption (CUP, CRP, and CG respectively) to be equal to the total supply (SCT), that is:

12) $CT = SCT$

Substituting for SCT from 11 and re-arrangement, we get:

13) $CT - MC = \sum_{i=1}^{7} (UC_i * V_i) - XC$

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* Total demand for consumer goods (DCT) consists of consumptions of private rural (CRP), private urban (CUP), and government (CG).

Although the above equilibrium condition is theoretically met, empirical data does not satisfy the condition. This is because of a) the coefficients derived from the input-output tables (UCi's) are constant for all the periods (that is to assume that technology and taste remain unchanged over time); and b) there are data discrepancies between sources used in calculating the input-output table and the national account data. The difference between the demand and supply is:

$$14) \quad EC = CT - MC - \sum_{i=1}^{7} (UC_i * V_i) + XC$$

where EC is the discrepancy between the demand for and supply of consumer goods. Then, the term EC can be regressed on some explanatory variables that are able to take into account the changes in technology and tastes over the period of study. The grand total capital stock (KT) or total capital stock in each sector can be used as proxies for technological changes. Since the government revenue from petroleum (GRP) is an important factor in the Iranian economic behaviour, GRP can be used as a proxy for capturing changes in consumer tastes. Hence, EC can have the following functional form:

$$15) \quad EC = F(KT, GRP)$$

Re-arranging 14 and substituting 15 in it, we get:

$$16) \quad CT - MC = \sum_{i=1}^{7}(UC_i * V_i) - XC + F(KT, GRP)$$

OR

$$DEQ = GQC$$

where the left-hand side of relation 16 is the demand for domestically produced consumer goods which is used domestically (DCQ) and its right-hand side is that of supply (GQC).

ii) Second Method

The second method approach is to adjust the unadjusted input-output coefficients (UC_i's) directly. Bringing the exports of consumer goods (XC) to the left-hand side of relation 13 (above) we get:

$$17) \quad CT - MC - XC = \sum_{i=1}^{7}(UC_i * V_i)$$

Thus, multiplying the right-hand side of 17 by factor k, where k is defined as:

$$18) \quad k = ((CT - MC - XC)/\sum(UC_i * V_i))$$

Relation 17, then can be rewritten as:

19) $CT - MC + XC = k * \sum_{i=1}^{7} (UC_i * V_i)$

or

20) $CT - MC = \sum_{i=1}^{7} (C_i * V_i) - XC$

where

21) $Ci = k * UC_i$

which is called the adjusted proportion of value-added in sector i allocated for consumption purposes. Values of C_i for seven sectors are collected and presented in Table A-3. The left-hand side of relation 20 is the demand for domestically produced and used consumer goods (DQC) and the right-hand side is that of supply (GQC). Both of the above methods were used in the initial simulations of the model. However, the final results reported use the second method.

b) Total Supply of Investment Goods

The above two methods can be similarly applied to adjust the supply of investment goods to its corresponding demand. To avoid repetition, derivation of the supply of investment goods is explained only briefly below.

Method 1: The discrepancy between the demand for and supply of investment goods is

22) $EI = IT - MK - \sum_{i=1}^{7} (UI_i * V_i) - XK$

where IT is total gross investment (which consists of total gross government and private investment), MK is imports of capital goods, UI_i is unadjusted proportion of value-added in sector i allocated for investment purposes (its values for seven sectors are given rise in Table A-2), and EI is the disrepancy error between the investment demand and supply. Similar to EC, EI can be explained in terms of KT, grand total capital stock and GRP, government revenue from petroleum.

23) $EI = F(KT, GRP)$

Re-arranging relation 22 in terms of the demand for and supply of domestically produced and used investment goods and substituting for EI we get:

24) $IT - MK = \Sigma(UI_i * V_i) - XK + F(KT, GRP)$

where the left-hand side is the demand for domestically produced and used consumer goods (DQI) and the right-hand side is that of supply (GQI).

Second method: rewriting relation 22 for investment goods we get:

25) $IT - MK = \Sigma(I_i * V_i) - XK$

where I_i is adjusted proportion of value-added in sector i allocated for investment purposes, which is equal to:

26) $I_i = r * UI_i$

where UI_i is unadjusted proportion of value-added allocated for investment purposes (derived from the input-output table) and r is the adjustment factor which is equal to:

27) $r = (IT - MK - XK) / \Sigma(UI_i * V_i)$

Values of I_i for seven sectors are given in Table A4-4. The left-hand side of relation 25 is demand for domestically produced and used investment goods (DQI) and the right-hand side is that of supply (GQI). The dynamic simulation of the model is implemented by using the second method.

Table A4-1

Aggregated Input-Output Table of Iran for 1973 (million current Rials)**

		(1) Agriculture	(2) Crude Oil & Natural Gas Products	(3) Manufacturing & Mines	(4) Water & Power	(5) Construction	(6) Transportation & Communication	(7) Services	(8) Unallocated Output
1	Agriculture	50602		74854		123	1039	490	66220
2	Crude Oil & Natural Gas Products			278				20	154724
3	Manufacturing & Mining	25149	2352	126378	6945	113209	30337	15484	
4	Water & Power	7088		3363	920		616	3505	5417
5	Construction			463	82		262	7340	-14
6	Transportation & Communication	5426	138	14557	537	10890	3075	3177	32573
7	Services	4029	2891	23176	791	13416	6540	17701	29099
8	Unallocated Inputs	-56945	117570	28726	3090	33222	11753	4269	
9	Total Intermediate Inputs	35465	122980	286387	12783	170859	54644	51239	
10	Compensation		12400	33981	12592	41498	23253	19690	
11	Other Value-added	234400	575100	197919	9008	37402	54647	357710	
12	Total Factor Payments	234400	587500	231900	21600	78900	77900	551400	
13	Net Indirect Taxes	-2947		70637	-290		-1128	-1977	
14	Value-added at Market Prices (12+13)	231453	587500	302537	21310	78900	76772	549423	
15	Total Inputs at Factor Cost (9+12)	269865	710480	518287	34383	249759	132544	602639	
16	Total Inputs at Market Prices (15+13)	266918	710480	588924	34093	249759	131416	600662	

continued...

Table A4-1 (continued)

		(9) Total Intermediate Output	(10) Private Consumption Expenditures	(11) Public (gov't) Consumption Expenditures	(12) Fixed Capital Formation	(13) Net Inventory Changes	(14) Foreign Exports	(15) Foreign Imports	(16) Total Final Demand	(17) Total Output (Mkt Price)
1	Agriculture	204097	60637	1529		-3130	11673	-12888	62821	266918
2	Crude Oil & Natural Gas Products	155022				3333	572342	-20217	555458	710480
3	Manufacturing & Mines	222841	364522	88949	113511	-8640	45137	-237396	366083	588924
4	Water & Power	20939	11349	3363		-1582	41	-17	13154	34093
5	Construction	8133		6559	232079	2988			241626	249759
6	Transportation & Communication	70463	38909	16808	7469	-6421	4188		60953	131416
7	Services	98398	354947	208192	10241	-70580	3519	-4055	502264	600662
8	Unallocated Inputs	-45536	45536					-71027	45536	
9	Total Intermediate Inputs									734357
10	Compensation									31747
11	Other Value-added									1466186
12	Total Factor Payments							-50300		1733300
13	Net Indirect Taxes									64295
14	Value-added at Market Prices (12+13)									1847895
15	Total Inputs at Factor Cost (9+12)									2517957
16	Total Inputs at Market Prices (15+13)	734357	875900	325400	363300	-84032	641900	395900	1847895	2582252

** In order to make the category of the Iranian national account data consistent with that of the input-output table of 1973, the original table is aggregated to cover seven sectors of the economy.

Source: Statistical Centre of Iran (1973), Iran's Input-Output Table for 1352(1973), Methodology and Tentative Estimates.

Table A4-2

Unadjusted Proportions of Value-Added in Seven Sectors Allocated to Consumer (UC_i) and investment (UI_i) Goods for 1973

	Consumer Goods			Investment Goods		
Sectors	α_i	β_i	$UC_i = \frac{\beta_i}{\alpha_i}$	α_i	γ_i	$UI_i = \frac{\gamma_i}{\alpha_i}$
Agriculture	0.87	0.24	0.28	0.87	0.0	0.0
Construction	0.32	0.03	0.09	0.32	0.93	2.91
Manufacturing & Mines	0.45	0.58	1.29	0.45	0.15	0.33
Transportation & Comm.	0.59	0.44	0.75	0.59	0.06	0.10
Services	0.92	0.94	1.02	0.92	0.02	0.02
Oil	0.83	0.0	0.0	0.83	0.0	0.0
Water & Power	0.63	0.43	0.68	0.63	0.0	0.0

α_i = ratio of value-added in sector i (V_i) to the total gross output in sector i (GQ_i)

β_i = proportion of total gross output of sector i which is available for domestic uses ($GQ_i+M_i-X_i$) allocated for consumption purposes

γ_i = proportion of total gross output of sector i which is available for domestic uses ($GQ_i+M_i-X_i$) allocated for investment purposes

UC_i = unadjusted proportion of value-added allocated to consumer goods

UI_i = unadjusted proportion of value-added allocated to investment goods

Sources : Table A4-1

Table A4-3

Adjusted Proportion of Sectoral Value-Added Allocated for Consumption Purposes

YEARS	CA	CCN	CMM	CTC	CS	CO	CWP
1959	.523609	.793346E-01	1.61843	.936149	1.38042	0.	.856814
1960	.522101	.791062E-01	1.61377	.933453	1.37645	0.	.854347
1961	.527848	.799769E-01	1.63153	.943727	1.39160	0.	.863750
1962	.528238	.800361E-01	1.63274	.944426	1.39263	0.	.864390
1963	.507880	.769516E-01	1.56981	.908029	1.33896	0.	.831077
1964	.511757	.775390E-01	1.58180	.914960	1.34918	0.	.837421
1965	.497318	.753513E-01	1.53717	.889145	1.31111	0.	.813794
1966	.499574	.756931E-01	1.54414	.893178	1.31706	0.	.817485
1967	.488348	.739921E-01	1.50944	.873107	1.28746	0.	.799115
1968	.489038	.740967E-01	1.51157	.874341	1.28928	0.	.800245
1969	.490465	.743129E-01	1.51598	.876892	1.29304	0.	.802579
1970	.485688	.735891E-01	1.50122	.868351	1.28045	0.	.794762
1971	.448800	.680000E-01	1.38720	.802400	1.18320	0.	.734400
1972	.421829	.639135E-01	1.30383	.754179	1.11209	0.	.690265
1973	.415069	.628892E-01	1.28294	.742093	1.09427	0.	.679203
1974	.414087	.627405E-01	1.27991	.740338	1.09168	0.	.677597
1975	.398793	.604233E-01	1.23263	.712994	1.05136	0.	.652571
1976	.395147	.598707E-01	1.22136	.706474	1.04175	0.	.646603

CA = Proportion of value-added in agriculture allocated to consumption

CCN = Proportion of value-added in construction allocated to consumption

CMM = Proportion of value-added in manufacturing and mines allocated to consumption

CTC = Proportion of value-added in transportation and communication allocated to consumption

CS = Proportion of value-added in services allocated to consumption

CO = Proportion of value-added in oil allocated to consumption

CWP = Proportion of value-added in water and power allocated to consumption

Sources: Table A4-2

Table A4-4

Adjusted Proportion of Sectoral Value-Added Allocated for Investment Purposes

YEARS	IA	ICN	IMM	ITC	IS	IO	IWP
1959	0.	2.49968	.172597	.107129	.238065E-01	0.	0.
1960	0.	2.47033	.170570	.105871	.235269E-01	0.	0.
1961	0.	2.37183	.163769	.101659	.225889E-01	0.	0.
1962	0.	2.10191	.145132	.900819E-01	.200182E-01	0.	0.
1963	0.	2.14346	.148001	.918627E-01	.204139E-01	0.	0.
1964	0.	2.20837	.152483	.946446E-01	.210321E-01	0.	0.
1965	0.	2.38113	.164412	.102049	.226775E-01	0.	0.
1966	0.	2.36402	.163230	.101315	.225145E-01	0.	0.
1967	0.	2.67144	.184457	.114490	.254423E-01	0.	0.
1968	0.	2.71650	.187568	.116422	.258715E-01	0.	0.
1969	0.	2.76356	.190817	.118438	.263196E-01	0.	0.
1970	0.	2.83003	.195407	.121287	.269527E-01	0.	0.
1971	0.	3.37222	.232844	.144524	.321164E-01	0.	0.
1972	0.	3.77711	.260800	.161876	.359724E-01	0.	0.
1973	0.	3.71744	.256681	.159319	.354042E-01	0.	0.
1974	0.	4.57939	.316196	.196260	.436132E-01	0.	0.
1975	0.	4.88780	.337491	.209477	.465505E-01	0.	0.
1976	0.	4.15916	.287180	.178250	.396111E-01	0.	0.

IA = Proportion of value-added in agriculture allocated to investment

ICN = Proportion of value-added in construction allocated to investment

IMM = Proportion of value-added in manufacturing and mines allocated to investment

ITC = Proportion of value-added in transportation and communication allocated to investment

IS = Proportion of value-added in services allocated to investment

IO = Proportion of value-added in oil allocated to investment

IWP = Proportion of value-added in water and power allocated to investment

Sources: Table A4-2

FOOTNOTES

Chapter 4

1. Definitions of variables are presented in the previous chapter.

2. As mentioned earlier, all variables are measured in billion of 1959 Rials, except the following: all credits are in current billion Rials; wages are in current thousand Rials; employment is in million people; prices are indices with base "one" for the year 1959.

3. For the methodology of national accounting in Iran, see a series of publications by BANK MARKAZI IRAN (1968, 1969, 1975), and the Appendix of Chapter 3, Table A3-1.

4. Evans (1969), Chapter 2, 3 and 6.

5. Two different theories, leading to a similar conclusion, can be used to explain the existence of lagged variables in these equations. One theory considers that current consumption decisions are often based on past commitments (partial adjustment or habit resistence model). The other suggests that consumer purchases at the present time depend not so much on current income, but rather on permanent or normal income; and it can be estimated via an adaptive expectation model. For econometric work, the above two methods are observationally equivalent (see, for instance, Kementa, 1971, pp. 474-477).

6. Urban disposable income (DYU) is simply derived by subtracting the value-added in agriculture (VA) from the total disposable income (DY). Value-added in agriculture is used as a proxy for disposable income in the rural area. See the data appendix for the derivation of DY.

7. For derivation of the private and government investment data, see the data appendix.

8. Government investment in the oil sector (IOG), which is entirely monopolized by the state, is considered to be exogenous. This is basically due to the erratic nature of this variable. Many different functional forms were used in attempts to explain this variable. However, none of these estimated equations gave satisfactory results.

9. Evans (1960), pp. 80-95.

10. See, for example, Evans and Green (1966), Sachs and Hart (1967), Jorgenson (1965), Jorgenson (1971), Hall and Jorgenson (1967), and Bischoff (1971).

11. DSVCN is introduced due to a sharp increase in VCN in 1975 which is mainly due to government investment in this sector.

12. The interest rate has been kept fixed over relatively long periods of time with extremely slow changes over the whole sample period (1959-1976).

13. A shortage of labour was felt somewhat in 1975 and 1976. However, disguised unemployment was still high, especially in the agriculture and government service sectors.

14. Data for sectoral capital stock is not provided by the Iranian national accounts. Some preliminary attempts have been made to calculate total capital stock and capital stock in some sectors by Iran's Plan and Budget Organization (1975). However, their methods and results are not satisfactory.

15. Introduction of many period lags in the capital stock in agriculture may seem more desirable, on a priori consideration. However, their use is avoided on the grounds that it makes the simulation process more complex.

16. OLS and TSLS versions are similar, because the explanatory variable is predetermined.

17. This unsatisfactory result may be attributed to misspecification of this equation. In the services sector, unlike other sectors, demand considerations may be more important than supply constraints in determining value-added.

18. Alternative models of the labour market were also examined. The model presented here provided the best explanation of the labour-employment and wage variables.

19. Katouzian (1981), p. 283.

20. Katouzian (1970) and (1978).

21. Katouzian (1981), pp. 285-286.

22. Wages are in terms of current thousands Rials.

23. There are no official data for sectoral wages in Iran (see data appendix). Nominal wages for seven sectors for 1973 are taken from Iran's input-output table. Then, after collecting information about rates of change in wages in all sectors for the entire period (1959-1976), these rates are applied to the 1973 wages in order to arrive at sectoral wages for the period of study. This approximate nature of wage data does not have serious effects on the validity of the model. This is mainly because wages do not enter into any other equations, with the exception of population equations.

24. Sectoral unemployment rates may be theoretically better variables to use in the wage equations. However, due to a lack of data on sectoral unemployment, the corresponding labour employment figures are used.

25. This result should be considered cautiously due to the lack of reliable data on wages (see footnote 23). However, as a fairly large number of wage earners in this sector are tenants and/or proprietors, they are perhaps able to sell their products in the market and therefore adjust their earnings to the current prices (i.e. CTPD).

26. The government substantially increased nominal wages and salaries of its employees in 1975 due to the significant increases in government's revenues from the oil sector. This ad-hoc policy affected the nominal wages in the private sector as well.

27. See Adams, Eguehi, and Meyer-Zu-Scholochtern (1969), pp. 15-18 and also Evans (1969), pp. 223-224; Adelman and Je (1969), pp. 86-87; Adelman and Chenery (1966), pp. 1-19; Dusenberry et. al. (1965), pp. 375-406; Evans and Klein (1968); and Hirsch et. al. (1973), pp. 40-42.

28. Evans, Ibid, P. 225, and Vernardakis (1978).

29. Parhizgari (1976), p. 94.

30. Ibid., p. 95.

31. Vernardakis (1978), pp. 83-85.

32. This average turns out to be 46 per cent for the later periods of this study (i.e. 1972-1976).

33. Tobin and Brainard (1963), Gurley and Shaw (1960), Anderson (1967), pp. 13, and Anderson and Jordon (1968), pp. 7-14, Jordan (1969), pp. 10-19.

34. The money supply is defined as currency in the hands of public and demand deposits (M1).

35. Mostashari (1978), pp. 132-133 and Park (1973) P. 398.

36. Bank MARKAZI IRAN (1970), p. 49. This figure, as it is reported, is 2.8.

37. The rationing is basically applied arbitrarily by each individual bank and hence there are no regulations suggested by the monetary authorities for this purpose.

38. Park (1973), p. 404.

39. Mostashari (1978), p. 134.

40. A reason for explaining the scrappage by GNPM is that increases in oil products, while having a significant effect on the economy, has encouraged imports of new machinery and equipment which, in turn, may hasten depreciation of old equipment.

41. See the data appendix for a detailed explanation and derivation of DY.

42. See Chapter 3, identities and definitions block.

43. See appendix of this chapter and Chapter 3, identities and definitions block.

44. In other words, CTPD is solved via the structural form rather than the reduced form of the model.

45. See appendix of this chapter for the derivation of the supply of consumer and investment goods.

46. The coefficients are adjusted ones. The original coefficient calculated from the input-output table is constant for all the periods (1959-1976). They must be adjusted in order to make the ex-post demand for consumer goods equal to the ex-post supply of consumer goods. The method of adjustment is presented in the appendix at the end of this chapter.

47. These coefficients are adjusted (see footnote 46 and the appendix of this chapter).

48. See, Brunner (1976), Blinder and Solow (1973, 1974), Branson (1976), Christ (1968, 1975), Infante and Slein (1976), Katz (1977), Scarth (1977).

49. All sources of financing which are changes in stocks are denoted by "delta". Thus changes of government bonds held by the bank and non-bank institutions and changes in credit given to the government by the banking system indicate the amount of the domestic financing of the government at each period of time.

50. See, for instance, Bank MARKAZI IRAN, Annual Report and Balance Sheet 1356 (1977), pp. 124, 125.

51. The exchange rate (EXR) is considered to be fixed in this study.

52. This is the price for Iran's light oil with gravity (AIP) 32. (See Table 2.10.)

53. This discrepancy is developed due to the uses of different price of oil exports, and differences in information provided by International Financial Statistics (1981) and those by the Iranian official and non-official sources about the exchange rate and quantity of oil exported (XOQBB).

54. Further information is provided in Data Appendix for derivation of capital stocks and the selection of the rate of depreciation in different sectors.

CHAPTER 5

DYNAMIC PROPERTIES AND SIMULATION OF THE MODEL

(5-1) INTRODUCTION

In the previous chapter, the performance of the single equations was examined. A set of statistical tests (R^2, F test, t test, Durbin-Watson, standard errors, etc.) were used to judge the significance (in a statistical sense) of the model and its individual coefficients. The outcome suggests that most of the equations performed well. However, these results do not guarantee that the model as a whole, when simulated, does reproduce these data series closely; and it is also possible that in a historical simulation (which is the main purpose of this study), simulated values of some endogenous variables will "track" the original series closely while others will not. Therefore, it is likely that the behaviour of the model as a dynamic system may have little relation to the way individual equations fit the historical data.[1] This chapter explores and tests the dynamic behaviour of the model on the basis of some conventional methods.

The model is simulated historically (ex-post) for sixteen periods (1961-1976).[2] The model can easily be extended for ex-ante simulation (forecasting beyond the sample period), but this application is not within the scope of this study. The dynamic simulation method is adopted here. That is, apart from their initial values, the lagged endogenous variables are generated within the system. Thus, errors of all equations in the system in one period are transmitted to the next and thus the entire simulation period. These errors can be compounded and hence decrease the accuracy of the model's performance; or they may cancel each other out throughout the period and hence improve its performance.

The prediction accuracy of the model is tested by comparing the actual (Y^a) and simulated (Y^s)[3] values of the endogenous variables. If the prediction errors ($Y^a - Y^s$) for all variables and periods are within reasonable limits, then it may be concluded that the predictive capabilities of the model are good. There are a number of methods that may be used to evaluate the accuracy of the predictions. Five methods are used here, namely the mean absolute error, (MAE), the mean absolute percentage error (MAPE), the root mean squared error (RMSE), the root mean squared percentage error (RMSPE), and Theils' inequality coefficient (TIC). They are defined as:

1) Mean Absolute Error (MAE)

$$MAE_i = 1/T * \sum_{t=1960}^{1976} ABS(Y^a_{it} - Y^s_{it})$$

where ABS(.) is absolute value of (.) and subscript i refers to the ith variable.

2) Mean Absolute Percentage Error (MAPE)

$$MAPE_i = (1/T * \sum_{t=1960}^{1976} (ABS(Y^a_{it} - Y^s_{it})/Y^a_{it})) * 100$$

3) Root Mean Squared Error (RMSE)

$$RMSE_i = (1/T * \sum (Y^a_{it} - Y^s_{it})^2)^{\frac{1}{2}}$$

4) Root Mean Squared Percentage Error (RMSPE)

$$RMSPE_i = ((1/T) * \Sigma(Y^a_{it} - Y^s_{it})^2/Y^a_{it})^{\frac{1}{2}} * 100$$

5) Theil's Inequality Coefficient (or Theil's U coefficient)[4]

$$TIC_i = U^2 = \Sigma(\Delta Y^a_{it} - \Delta Y^s_{it})^2/\Sigma(\Delta Y^a_{it})^2$$

where Y^a_{it} is the actual value of the ith variable for period t

Y^s_{it} is the simulated value of the ith variable for period t

and T is the number of periods in the simulation (=16)

The mean absolute error (MAE) and the mean squared error (RMSE) are frequently used. They indicate the average deviation of the actual values from their corresponding simulated values. However, these values are expressed in terms of different units of measurement. Hence, comparisons of MAE and RMSE for two variables which are measured in two different units, are irrelevant. Nevertheless, these methods are very useful in comparing the predictive capabilities of different models of an economy[5].

The mean absolute percentage error (MAPE) and the root mean squared percentage error (RMSPE) provide the average of the relative differences between the actual and the simulated values. They are expressed in percentage terms, and hence they become independent of units of measurement of variables. Theil's inequality coefficient (TIC)[6] is another approach for evaluating the forecasting power of the model. The value of TIC is between zero and infinity

$$0 \leq TIC \leq \infty$$

The smaller the value of the inequality coefficient the better is the forecasting performance of the model.

However, there is not a general rule for acceptance levels of these measures. Some variables such as price indexes and GNP should have very small MAPE, less than 5 per cent. Others such as the foreign exchange reserve (FEXR), the government budget deficit and so forth, may have very large MAPE (even over 30%), even though their performances are acceptable[7]. Small values of MAE, MAPE, RMSE, RMSPE and

TIC are not the only desirable measures of simulation fit. Another important criteria is how the model will simulate turning points in the historical data[8].

To simulate the model it is required that the entire system of equations be solved simultaneously. Given that the system is non-linear in variables, it is not easily amenable to conventional solutions. There are different solution methods for solving non-linear equation systems. However, an iterative technique along the line of the Gauss-Seidel method, is implemented here[9].

(5-2) THE 1961-1976 DYNAMIC SIMULATIONS

The results of the dynamic simulation for 1961-1976 appear in Table 5-3 at the end of this chapter. The results are acceptable for the majority of the variables, as their measures of error (such as MAE, MAPE, RMSE, RMSPE, and TIC) are within acceptable ranges. However, for some variables this is not so. Variables such as foreign exchange reserves (FEXRA) and the government budget deficit (= changes in government bonds sold to the central bank, Δ BCBA) produce very large percentage residual errors. Hence, they introduce some distortions in simulation of the model. As mentioned in the earlier chapters, total credit to private sectors (CTPA) is affected by money supply (MOSA) which itself is influenced by FEXRA and ΔBCBA. There exist wide deviations between the simulated and actual values of ΔBCBA for earlier years

(1961-1966)[10]. Consequently, the monetary base (MBA), and hence, money supply (MOSA) and total credit (CTPA), show relatively large percentage residual errors for those years especially, and the rest of the period generally. Being affected by CTPA, private urban consumption (CUP) has relatively large values for MAPE (18.79%) and RMSPE (26.25%). Bearing this in mind, results of various error measures which are reported in Table 5-3 will be analysed.

Tables 5-1 and 5-2 show distributions of 93[11] variables in terms of five different categories of MAPE and RMSPE respectively. The mean absolute percentage errors (MAPE) for 60 per cent of the variables (56 variables) are below 10 per cent; and those of 80 per cent of the variables (74 of them) are under 15 per cent. Only 9.7 per cent of the total variables (9 variables) have MAPE greater than 30%. Similar distributions in terms of RMSPE indicate that 57 per cent of the total variables (53 variables) have RMSPE less than 10 per cent; and RMSPE's of 79.6 per cent of them (74 variables) are under 15 per cent. Those variables with RMSPE's larger than 30% represent 10.8 per cent of the total. These error measures for most of the major variables, such as Gross National and Domestic product in constant price (GNPM and GDPM respectively), prices of domestically produced and total consumer goods (CTPD and CTDPD respectively), the price of domestically produced investment goods (ITPD), total labour employment (LET), total population (POPT) and total capital stock (KT) are less than 5 per cent.

Table 5-1

Distribution of Variables in Terms of MAPE

MAPE	0-4.9%	5-9.9%	10-14.9%	15-19.9%	20-29.9%	30%-over
Distribution of variables % (total 93)	31 (33.3)	25 (26.9)	16 (17.2)	6 (6.5)	6 (6.5)	9 (9.7)

Table 5-2

Distribution of Variables in Terms of RMSPE

RMSPE	0-4.9%	5-9.9%	10-14.9%	15-19.9%	20-29.9%	30%-over
Distribution of variables % (total 93)	22 (23.7)	31 (33.3)	11 (11.8)	10 (10.8)	9 (9.7)	10 (10.8)

Source: Table 5-3.

A detailed discussion of the results of the dynamic simulation over sixteen periods (1961-1976) for 93 endogenous variables is very lengthy. Thus, the results of some major variables are to be investigated, while briefly referring to others whenever it is required.

Total consumption (CT) performs very well. Its values of MAE, MAPE, RMSE, RMSPE and TIC are very small. Percentage deviations of the simulated values from their actual's are also very small throughout the period. The MAPE and RMSPE are respectively 0.24 and 0.33 per cent. Components of total consumption (CT), namely private rural, private urban and government consumption (CRP, CUP and CG respectively) are not forecast as well as CT. Private consumption in rural areas (CRP) has small MAPE and RMSPE (4.46 and 6.10 respectively). However, the simulated values are not able to capture four turning points in 1962, 1969, 1971 and 1972. In these years, actual values of CRP fall while the corresponding predicted values increase. Existence of the lagged CRP is, perhaps, one reason for this drawback. The performance of CUP in terms of tracking the observed data is not perfect. Predicted CUP falls in 1963, 1965 and 1971, while their corresponding actual values increase in these years. Error measures of MAPE and RMSPE are also relatively high, 31.07 and 14.99 per cent. As CUP's RMSE is 5.40, its performance may be considered to be within an acceptable range. With the exception of 1962, simulated values of government consumption (CG) follow its

corresponding actual values reasonably well. Although the MAPE and RMSPE of CG are somewhat over 10 per cent (11.79 and 14.18 per cent respectively), errors for the last five years (1972-1976) become very small. Existence of two period lags[12] in the CG equation does not worsen its predictive performance in the last period. This suggests that errors are cancelling each other rather than compounding annually. Good performance of predicted CT (total consumption) may indicate a similar reasoning, that is, errors in CRP, CUP and CG cancel each other substantially over time.

Total investment (IT) meets closely the validity tests. Insofar as predictions of the turning points is concerned, it does well. The mean absolute error (MAE) and RMSE are 6.98 and 8.31 respectively, and the value of MAPE is 8.20. The aggregated components of IT, namely total private and total government investments (IPT and IGT respectively) show larger error measures. Total private investment (IPT), due to its erratic nature, has relatively larger MAPE (13.37%) and RMSPE (13.37%). In terms of forecasting turning points, IPT is able to capture one out of three downturns of the historical observations. Total private investment (IPT) falls in 1962, 1968 and 1969. However, the model can reproduce only the downturn in 1962. A general remark about the nature of the present model in regard to its ability to mirror the turning points of the observed data, may help the reader. The model is generally

able to imitate downturns or upturns of the actual data fairly well, if the magnitude of these turns are relatively large (i.e. more than 10% changes in either direction). In addition, those equations with one and/or two year lags are able to reproduce turning points to a lesser degree. Some equations of components of IPT have this nature.

Components of IPT, namely private investments in agriculture (IAP), construction (ICNP), manufacturing and mining (IMMP), transportation and communication (ITCP), and services (ISP) have fairly small RMSE with values less than 8.5 (in the case of IAP, RMSE is 1.5). However, their MAPE and RMSPE's are large, mostly over 20 per cent. With regard to reflecting turning points, IAP and ITCP do well. However, the other variables do not provide good results. These results, perhaps, may not be surprising when the nature of private and government investment are taken into consideration. As mentioned earlier, the sectoral private investment data are derived as residuals once their corresponding sectoral government investments are calculated from the government annual budget and subtracted from the total sectoral investment[13]. Therefore, this decreases the accuracy of the data and hence the ability to predict the values. The total government investment (IGT) predicts the actual data well in later periods of the study (1970-1976). It produces relatively larger errors in the first six years and then the errors tend to become relatively smaller thereafter. The RMSE is 10.09 and MAPE and RMSPE are 20.73

and 31.4 per cent. Apart from IGT, there is only one sectoral government investment which has a behavioural equation (other nominal sectoral government investments are exogenous)[14]. This sector is water and power which is a government owned and monopolized sector. Investment in water and power (IWPG) has a fairly small RMSE (2.11 units). However, MAPE and RMSPE are larger; 20.58 and 25.05 per cent, respectively. The prediction of turning points is poor.

There are two major prices, price deflators for the domestically produced consumer and investment goods (CTPD and ITPD respectively) which are derived via interactions of the corresponding demand and supply equations. The remaining prices are obtained through definitional relationships (see Chapter 3, definitions and identities block). The predictive values of CTPD and ITPD track the respective observed data quite well. The root mean squared error (RMSE) for CTPD and ITPD are 0.06 and 0.08 units, respectively. The MAPE and RMSPE are also small, respectively 3.40 units and 3.99 per cent for CTPD and 4.57 and 5.39 per cent for ITPD. With regards to turning points, the forecast values of CTPD do not reflect a small downturn in 1967, and the forecast values of ITPD also miss the downturns in the first 3 periods (1961-1963). However, as these variables are based on almost all the variables in the system, which themselves are subject to prediction errors, the predictive values of CTPD and ITPD may be considered good.

The predictive values of the grand total capital stock (KT) track well. The MAPE and RMSPE are 4.30 units and 5.12 per cent respectively. Total sectoral capital stocks, except those for manufacturing and mining, and services, track the observed data well. Total capital stocks in manufacturing and mining (KMMT), and services (KST) are subject to larger error measures, primarily because their corresponding private investments have poor tracking power.

In the case of total value-added (VT), the results of error statistics are encouraging. The MAPE and RMSPE are very small, 0.69 units and 0.82 per cent respectively. Insofar as components of VT go, value-added in agriculture (VA) performs very well in terms of error statistics. However, it is not able to capture a downturn in 1971 in which VA falls 4.5 billion Rials from its' preceding year. Value-added in construction (VCN), transportation and communication (VTC), and water and power (VWP), with RMSE of 2.28, 7.22 and 1.69 units respectively, track the historical data reasonably well. However, value-added in manufacturing and mining (VMA) and services (VS) both show relatively higher error measures. This is mainly due to the poor performances of the respective capital stocks which are the sole explanatory variables in VMM and VS equations.

By-products of VT are gross domestic product, GDPM and gross outputs of domestically produced consumer and investment goods (GQC and GQI respectively). Similar to VT,

simulated values of GDPM closely track the historical data. The RMSE is 1.22 units and the respective MAPE and RMSPE are also very low, 0.17 and 0.21 per cent. The performance of GQC is also very good, but that of GQI has relatively larger statistical errors.

Total labour employment (LET) and its components track the historical paths well. The root mean squared error (RMSE) of LET is 0.32 units, and its MAPE and RMSPE are 3.45 and 3.77 per cent respectively. Labour employment in manufacturing and mining (LEMM), transportation and communication (LETC) and water and power (LEWP) have RMSPE's somewhat larger (between 8-11 per cent). However, the other labour employment variables perform well and are able to predict turning points (see for instance, labour employment in agriculture, LEA and oil, LEO).

Like most aggregate variables, GNPM performs reasonably well in terms of MAPE and RMSPE (4.84 units and 5.30 per cent respectively). The predicted GNPM values overestimate the actual values frequently over the 16 periods (13 times). That is, the distribution of percentage deviation of the actual from predicted values is skewed to the right rather than being distributed around the mean evenly. The nature of this distribution is very similar to that of one component, namely, private urban consumption (CUP). However, the direction of causation between these variables is not clear, as GNPM and CUP are inter-related.

In the case of the import variables, the statistical errors are within reasonable ranges. However, the performances in reflecting turning points are relatively weak. This is mainly due to the small magnitudes of changes in the observed data at turning points. Imports of consumer goods (MC), intermediate goods (MINT) and capital goods (MK) have MAPE's and RMSPE's which lie within a range of 12 to 23 per cent. In the case of total imports (MT), the MAPE and RMSPE are 8.20% and 10.27%.

Total population (POPT) and its components, urban and rural population (POPU and POPR respectively) perform extremely well in capturing turning points and tracking the observed paths. Predicted values of nominal wages also perform well (except for those of oil, WOA, and water and power, WWPA). Existence of two period lagged variables in the WOA and WWPA equations (both are corrected for autocorrelation) may be the cause of the problem. Real wages have lower statistical errors than their corresponding nominal wages. The total wage bill (WBT) which is a by-product of both labour employment and real wages, tends to replicate the observed data. The MAPE and RMSPE are 5.94 and 7.52 per cent, respectively.

In summary, the above analysis, though not fully exhaustive supports the following conclusions:

a) The model reflects the time paths of most of the endogenous variables reasonably well, and its overall performance in the sample period seems acceptable.

b) Performance of the model in replicating turning points is good for cases where the magnitude of changes in downturns or upturns are reasonably large (more than 10 per cent).

c) The ability of the model to predict major variables which are at the aggregated level, such as GNPM, GDPM, VT, GQC, GQI, CT, IT, is good.

The simultaneous nature of the model and its ability in historical forecasting were examined in this section. Now the model can be used to examine various government policy changes. The next chapter deals with this matter.

TABLE 5-3

DYNAMIC SIMULATION OF THE MODEL 1961-1976

YEAR	CT	CTS	DEVIATION	% DEVIATION
1961	261.815	271.074	-9.259	-3.45
1962	275.843	291.687	-15.944	-.77
1963	282.061	287.678	-.617	.03
1964	311.802	296.718	15.084	2.84
1965	340.318	302.855	37.463	.71
1966	378.105	347.517	30.588	-.27
1967	411.377	373.076	38.301	1.54
1968	465.176	425.903	39.273	1.75
1969	516.392	487.369	29.023	1.54
1970	575.031	547.243	27.788	-.94
1971	607.078	566.174	40.924	-1.24
1972	679.443	628.448	50.995	-.47
1973	805.732	735.587	70.145	-.16
1974	978.265	892.580	85.685	-.27
1975	1119.390	1102.774	16.616	.39
1976	1234.208	1286.783	-52.575	-.24

STATISTICS MAE=.96 MAPE=.24 RMSE=1.19 RMSPE=.33 TIC=.00

YEAR	CRP	CRPS	DEVIATION	% DEVIATION
1961	108.625	108.149	.476	.44
1962	112.437	110.971	1.466	1.30
1963	111.659	114.337	-2.677	-2.40
1964	122.241	118.055	4.188	3.43
1965	130.583	122.536	8.047	6.16
1966	132.843	126.871	5.972	4.50
1967	141.881	131.018	10.863	7.66
1968	143.328	135.513	7.815	5.45
1969	138.071	140.308	-2.237	-1.62
1970	142.387	144.902	-2.515	-1.77
1971	140.686	149.635	-8.949	-6.36
1972	131.741	154.952	-23.211	-17.62
1973	150.259	160.768	-10.509	-6.99
1974	167.481	166.761	.720	.43
1975	172.471	173.382	-.911	-.53
1976	191.394	182.249	9.145	4.78

STATISTICS MAE=6.23 MAPE=4.46 RMSE=8.41 RMSPE=6.10 TIC=.00

YEAR	CM	CMS	DEVIATION	% DEVIATION
1961	122.009	135.756	-13.751	-11.27
1962	131.487	155.625	-24.138	-18.36
1963	135.929	140.747	-4.818	-1.54
1964	147.672	141.812	1.860	2.61
1965	155.229	134.176	21.393	13.56
1966	183.582	160.177	23.405	12.75
1967	199.400	164.701	34.699	17.40
1968	239.945	194.395	45.550	18.98
1969	281.680	230.051	51.629	18.33
1970	321.358	263.786	57.572	17.92
1971	323.686	254.887	68.799	21.25
1972	360.024	287.305	72.719	20.20
1973	434.754	364.553	70.201	16.15
1974	487.009	415.374	71.635	14.71
1975	574.531	567.864	6.667	1.16
1976	640.995	707.924	-66.929	-10.44

STATISTICS MAE=39.84 MAPE=31.1 RMSE=5.4 RMSPE=15.0 TIC=.02

YEAR	CG	CGS	DEVIATION	% DEVIATION
31.483	27.466	4.017	12.88
31.919	25.091	6.828	21.39
34.482	27.605	6.877	19.95
41.887	34.851	7.036	16.80
54.506	46.144	8.362	15.34
61.680	60.469	1.211	1.96
70.096	77.357	-7.261	-10.36
81.903	95.996	-14.093	-17.21
96.641	117.010	-20.369	-21.08
111.286	138.555	-27.269	-24.50
142.726	161.652	-18.926	-13.26
187.678	186.192	1.486	.79
220.719	210.266	10.453	4.74
323.775	310.446	13.329	4.12
372.388	361.528	10.860	2.92
401.819	396.609	5.210	1.30

STATISTICS MAE=10.2 MAPE=11.0 RMSE=12.3 RMSPE=14.2 TIC=.00

TABLE 5-3 Continued

YEAR	CTPD	CTPDS	DEVIATION	% DEVIATION
1961	1.054	1.057	-.003	-.27
1962	1.075	1.038	.037	3.42
1963/	1.087	1.083	.004	.38
1964	1.125	1.084	.040	3.58
1965	1.139	1.123	.016	1.37
1966	1.140	1.104	.036	3.16
1967	1.119	1.174	-.055	-4.89
1968	1.139	1.176	-.037	-3.26
1969	1.148	1.185	-.037	-3.21
1970	1.181	1.216	-.035	-2.94
1971	1.247	1.349	-.102	-8.20
1972	1.371	1.357	.013	.96
1973	1.495	1.580	-.385	-5.66
1974	1.803	1.920	-.117	-6.48
1975	1.931	1.864	.067	3.46
1976	2.225	2.154	.071	3.20

CTDPD	CTDPDS	DEVIATION	% DEVIATION
1.053	1.056	-.003	-.30
1.073	1.037	.035	3.31
1.085	1.081	.004	.34
1.121	1.083	.038	3.41
1.135	1.120	.015	1.32
1.137	1.103	.035	3.05
1.118	1.170	-.052	-4.67
1.136	1.171	-.035	-3.06
1.146	1.181	-.035	-3.03
1.181	1.214	-.033	-2.78
1.246	1.341	-.095	-7.66
1.368	1.356	.012	.89
1.491	1.567	-.076	-5.10
1.835	1.939	-.104	-5.67
1.982	1.926	.056	2.84
2.251	2.188	.063	2.78

STATISTICS: MAE=.05 MAPE=3.4 RMSE=.06 RMSPE=4.0 TIC=.00

STATISTICS: MAE=.04 MAPE=3.14 RMSE=.05 RMSPE=3.67 TIC=.00

YEAR	CTPA	CTPAS	DEVIATION	% DEVIATION
1961	50.100	50.264	-.164	-.33
1962	60.800	36.392	24.408	40.14
1963	72.100	26.383	45.717	63.41
1964	87.000	37.472	49.528	56.93
1965	101.000	77.420	23.580	23.35
1966	119.700	111.091	8.609	7.19
1967	140.100	145.397	-5.297	-3.78
1968	165.000	184.712	-19.712	-11.95
1969	195.700	221.396	-25.696	-13.13
1970	228.500	271.836	-43.336	-18.97
1971	274.900	330.433	-55.533	-20.20
1972	359.700	379.737	-20.037	-5.57
1973	486.700	527.233	-40.533	-8.33
1974	692.700	800.812	-108.112	-15.61
1975	1068.600	1181.693	-113.093	-10.58
1976	1498.600	1515.236	-16.636	-1.11

CISA	CTSAS	DEVIATION	% DEVIATION
20.400	20.564	-.164	-.80
24.800	.392	24.408	98.42
29.400	-16.317	45.717	155.50
35.500	-14.028	49.528	139.52
41.200	17.620	23.580	57.23
48.800	40.191	8.609	17.64
59.100	64.397	-5.297	-8.96
67.100	86.812	-19.712	-29.38
80.900	106.596	-25.696	-31.76
89.300	132.636	-43.336	-48.53
111.600	167.133	-55.533	-49.76
153.200	173.237	-20.037	-13.08
220.700	261.233	-40.533	-18.37
308.900	417.012	-108.112	-35.00
445.900	558.993	-113.093	-25.36
563.500	580.136	-16.636	-2.95

STATISTICS: MAE=37.5 MAPE=18.8 RMSE=60.3 RMSPE=24.3 TIC=.01

MAE=37.38 MAPE=45.8 RMSE=49.1 RMSPE=68.3 TIC=.05

YEAR	DYO	DYOS	DEVIATION	% DEVIATION
1961	186.652	204.967	-18.315	-9.81
1962	198.975	216.254	-17.279	-8.68
1963	219.924	215.865	4.059	1.85
1964	242.798	232.964	9.834	4.05
1965	261.346	232.053	29.293	11.21
1966	291.298	261.953	29.345	10.07
1967	342.898	303.165	39.733	11.59
1968	386.246	346.396	39.850	10.32
1969	420.518	386.168	34.350	8.17
1970	471.704	433.269	38.435	8.15
1971	528.077	491.933	36.144	6.84
1972	631.352	555.927	75.425	11.95
1973	885.516	847.887	37.629	4.25
1974	1127.309	1107.943	19.366	1.72
1975	1186.584	1163.946	22.638	1.91
1976	1414.677	1464.227	-49.550	-3.50

STATISTICS: MAE=31.3 MAPE=7.13 RMSE=35.4 RMSPE=7.9 TIC=.00

YEAR	ΔBCBA	ΔBCBAS	DEVIATION	% DEVIATION
1961	.010	-1.550	1.560	15604.27
1962	.010	-8.227	8.237	82367.77
1963	.010	-9.693	9.703	97027.50
1964	.010	-7.233	7.243	72434.66
1965	.601	3.008	-2.407	-400.47
1966	.042	3.931	-3.889	-9258.61
1967	2.730	.743	1.987	72.79
1968	5.866	-.503	6.369	108.58
1969	6.300	-.357	6.657	105.67
1970	10.400	11.781	-1.381	-13.28
1971	-1.800	3.205	-5.005	278.06
1972	20.600	1.456	19.144	92.93
1973	69.900	88.644	-18.744	-26.82
1974	-74.900	-107.913	33.013	-44.08
1975	29.100	36.114	-7.014	-24.10
1976	16.100	10.004	6.096	37.86

STATISTICS: MAE=8.7 MAPE=** RMSE=**1 RMSPE=** TIC=.18

DY	DYS	DEVIATION	% DEVIATION
274.439	291.944	-17.505	-6.38
287.702	304.880	-17.178	-5.97
310.116	307.438	2.678	.86
334.922	328.241	6.681	1.99
360.821	332.060	28.761	7.97
394.147	366.579	27.568	6.99
453.899	412.252	41.647	9.18
505.869	460.375	45.494	8.99
543.734	505.377	38.357	7.05
600.730	557.469	43.261	7.20
652.685	621.297	31.388	4.81
762.864	691.115	71.749	9.41
1024.380	989.443	34.937	3.41
1274.210	1256.039	18.171	1.43
1343.230	1319.294	23.936	1.78
1581.550	1629.357	-47.807	-3.02

MAE=31.1 MAPE=5.4 RMSE=35.3 RMSPE=6.1 TIC=.00

DEP	DEPS	DEVIATION	% DEVIATION
19.160	19.318	-.158	-.82
19.990	20.960	-.970	-4.85
21.100	22.088	-.988	-4.68
22.700	22.338	.362	1.60
25.520	23.716	1.804	7.07
27.630	25.219	2.411	8.73
30.620	28.348	2.272	7.42
31.920	31.202	2.718	8.01
36.830	34.939	1.891	5.13
40.610	39.676	.934	2.30
44.470	44.408	.062	.14
50.710	48.645	2.065	4.07
58.390	55.821	2.569	4.40
68.220	63.014	5.206	7.63
78.380	75.765	2.615	3.34
87.770	84.844	2.926	3.33

MAE=1.9 MAPE=2.6 RMSE=2.3 RMSPE=3.3 TIC=.00

YEAR	DISTOY	DISTOYS	DEVIATION	% DEVIATION
1961	1.969	2.121	-.152	-7.71
1962	2.141	2.187	-.046	-2.13
1963	2.319	1.988	.331	14.26
1964	2.329	2.097	.232	9.98
1965	2.471	1.854	.617	24.96
1966	2.296	2.022	.274	11.93
1967	2.184	2.001	.183	8.38
1968	2.229	2.178	.051	2.29
1969	2.201	2.245	-.044	-2.00
1970	2.293	2.279	.014	.62
1971	2.349	2.324	.025	1.08
1972	2.574	2.560	.014	.55
1973	2.693	3.378	-.685	-25.43
1974	2.968	3.921	-.953	-32.12
1975	2.312	2.972	-.659	-28.52
1976	2.198	3.305	-1.107	-50.34

STATISTICS: MAE=.34 MAPE=13.9 RMSE=.48 RMSPE=681 TIC=.04

FEXRA	FEXRAS	DEVIATION	% DEVIATION
14.100	16.724	-2.624	-18.61
17.100	10.045	7.055	41.25
19.800	10.165	9.635	48.66
27.400	28.021	-.621	-2.27
23.000	30.840	-7.840	-34.09
20.500	27.109	-6.609	-32.24
18.200	31.802	-13.602	-74.73
12.200	29.940	-17.740	-145.41
7.100	23.105	-16.005	-225.43
-14.600	-4.954	-9.646	66.07
21.500	27.552	-6.052	-28.15
55.400	59.073	-3.673	-6.63
107.100	108.708	-1.608	-1.50
458.300	513.917	-55.617	-12.14
408.600	454.513	-45.913	-11.24
513.100	474.502	38.598	7.52

MAE=15.2 MAPE=39.0 RMSE=22.2 RMSPE=74.8 TIC=.01

YEAR	GNPH	GNPHS	DEVIATION	% DEVIATION
1961	309.095	324.311	-15.216	-4.92
1962	324.388	340.996	-16.608	-5.12
1963	341.895	340.405	1.490	.44
1964	368.745	359.783	8.962	2.43
1965	414.426	378.404	36.022	8.69
1966	456.019	427.403	28.616	6.28
1967	506.778	468.357	38.421	7.58
1968	560.269	523.614	36.655	6.54
1969	618.252	595.959	22.293	3.61
1970	687.153	667.547	19.606	2.85
1971	759.357	724.562	34.795	4.58
1972	886.760	833.679	53.081	5.99
1973	1018.760	937.465	81.295	7.98
1974	1177.040	1133.929	43.111	3.66
1975	1293.930	1249.156	44.774	3.46
1976	1456.650	1503.885	-47.235	-3.24

STATISTICS: MAE=33.0 MAPE=4.6 RMSE=36.0 RMSPE=5.1 TIC=.00

GDPH	GDPHS	DEVIATION	% DEVIATION
318.406	328.657	-10.251	-.51
335.747	352.545	-16.798	-1.26
354.940	361.953	-7.012	-.52
383.171	380.491	2.680	-.67
434.966	408.007	26.958	1.72
474.567	455.607	18.960	.59
527.647	496.395	31.252	1.95
589.254	556.793	32.461	1.63
651.992	628.953	23.039	.80
725.073	702.293	22.780	.19
795.302	770.787	24.515	.16
907.095	879.066	28.029	.44
1032.852	977.547	55.305	.93
1172.040	1101.447	70.593	-1.04
1292.974	1272.636	20.338	2.93
1451.122	1503.209	-52.087	-.91

MAE=1.0 MAPE=.17 RMSE=1.2 RMSPE=.2 TIC=.00

YEAR	GDL	GDCS	DEVIATION	% DEVIATION
1961	259.311	270.978	-11.667	-4.50
1962	275.289	291.695	-16.406	-5.96
1963	280.841	283.150	-2.309	-.82
1964	307.812	296.815	10.997	3.57
1965	337.569	301.852	35.717	10.58
1966	373.305	344.024	29.281	7.84
1967	406.462	368.093	38.368	9.44
1968	458.336	417.842	40.494	8.84
1969	507.330	476.497	30.833	6.08
1970	561.534	532.688	28.847	5.14
1971	583.911	547.593	36.318	6.22
1972	646.225	598.962	47.263	7.31
1973	746.132	678.355	67.778	9.08
1974	871.016	785.672	85.344	9.80
1975	963.084	948.233	14.851	1.54
1976	1075.625	1126.345	-50.721	-4.72

STATISTICS: MAE=6.3 MAPE=1.4 RMSE=6.9 RMSPE=1.6 TIC=.00

GDI	GDIS	DEVIATION	% DEVIATION
44.602	46.217	-1.615	-3.62
40.111	44.349	-4.238	-10.57
46.419	48.257	-1.838	-3.96
50.306	52.863	-2.557	-5.08
67.841	60.354	7.486	11.04
67.325	64.514	2.811	4.17
88.207	77.943	10.264	11.64
95.482	85.855	9.627	10.08
100.665	95.458	5.207	5.17
108.688	107.282	1.406	1.29
141.273	139.964	1.309	.93
177.114	173.131	3.983	2.25
198.621	189.061	9.560	4.81
254.900	267.143	-12.243	-4.80
364.455	326.597	37.857	10.39
412.888	420.311	-7.423	-1.80

STATISTICS: MAE=5.7 MAPE=7.2 RMSE=7.2 RMSPE=9.9 TIC=.00

YEAR	GRDT	GRDTS	DEVIATION	% DEVIATION
1961	19.805	21.841	-2.036	-47.62
1962	19.947	23.389	-3.442	-80.27
1963	20.417	24.740	-4.323	-79.51
1964	23.136	26.078	-2.942	-59.99
1965	25.539	27.564	-2.025	-21.48
1966	28.617	29.071	-.454	-4.34
1967	31.830	30.832	.998	7.97
1968	34.438	32.869	1.569	10.42
1969	37.151	35.128	2.023	10.94
1970	40.389	37.647	2.742	11.28
1971	44.479	40.677	3.802	15.69
1972	42.576	44.492	-1.916	-6.69
1973	52.834	50.184	2.650	7.46
1974	63.895	59.731	4.164	10.54
1975	76.563	72.901	3.662	4.78
1976	86.759	85.206	1.553	1.86

STATISTICS: MAE=2.5 MAPE=7.6 RMSE=2.7 RMSPE=9.3 TIC=.00

GRDI	GRDTS	DEVIATION	% DEVIATION
4.275	5.316	-1.041	-24.34
4.288	6.709	-2.421	-56.45
5.437	7.436	-1.999	-36.77
4.904	7.603	-2.699	-55.03
9.425	8.667	.758	8.04
10.462	8.915	1.547	14.79
12.526	10.679	1.846	14.74
15.054	13.087	1.967	13.07
18.496	15.651	2.844	15.38
24.307	18.065	6.241	25.68
24.242	20.832	3.411	14.07
28.654	24.211	4.443	15.51
35.548	27.926	7.622	21.44
39.519	43.255	-3.736	-9.45
76.634	76.607	.326	.03
83.432	81.510	1.922	2.30

STATISTICS: MAE=2.8 MAPE=20.4 RMSE=3.4 RMSPE=25.9 TIC=.01

YEAR	GRP	GRP3	DEVIATION	% DEVIATION
1961	20.615	15.091	5.524	26.80
1962	23.959	16.556	7.403	30.90
1963	25.527	19.404	6.123	23.99
1964	32.725	25.165	7.560	23.10
1965	44.044	34.320	9.724	22.08
1966	41.320	43.776	-2.456	-5.94
1967	48.313	56.653	-8.340	-17.26
1968	54.406	69.498	-15.092	-27.74
1969	66.654	89.475	-22.821	-34.24
1970	71.734	105.307	-33.573	-46.80
1971	124.663	128.531	-3.868	-3.10
1972	130.260	153.520	-23.260	-17.86
1973	208.794	175.279	33.515	16.05
1974	656.939	637.631	19.308	2.94
1975	629.011	614.476	14.535	2.31
1976	631.517	637.352	-5.835	-.92

STATISTICS: MAE=13.7 MAPE=16.9 RMSE=16.8 RMSPE=22.8 TIC=.00

ROCUR	ROCURS	DEVIATION	% DEVIATION
2.143	2.386	-.243	-11.35
2.161	2.584	-.423	-19.58
2.178	2.199	-.020	-.93
2.095	2.110	-.016	-.74
1.997	1.837	.161	8.04
2.251	2.054	.197	8.74
2.220	1.982	.238	10.71
2.564	2.195	.369	14.39
3.032	2.437	.595	19.63
3.254	2.626	.628	19.29
3.219	2.383	.836	25.96
3.710	2.525	1.185	31.94
3.813	2.988	.825	21.64
3.720	3.150	.570	15.32
4.137	3.956	.182	4.39
3.810	4.445	-.635	-16.68

MAE=.49 MAPE=14.5 RMSE=.59 RMSPE=16.6 TIC=.03

YEAR	PY	PYS	DEVIATION	% DEVIATION
1961	278.714	297.260	-6.654	-18.55
1962	291.990	311.589	-6.712	-19.60
1963	315.553	314.874	.215	.68
1964	339.826	335.844	1.172	3.98
1965	370.246	340.727	7.973	29.52
1966	404.609	375.494	7.196	29.12
1967	466.425	422.932	9.325	43.49
1968	520.923	473.462	9.111	47.46
1969	562.230	521.029	7.328	41.20
1970	625.037	575.535	7.920	49.50
1971	676.927	642.129	5.141	34.80
1972	791.518	715.327	9.626	76.19
1973	1059.928	1017.369	4.015	42.56
1974	1313.729	1299.294	1.099	14.43
1975	1419.864	1395.901	1.688	23.96
1976	1664.982	1710.867	-2.756	-45.89

STATISTICS: MAE=32.6 MAPE=5.5 RMSE=37.5 RMSPE=6.3 TIC=.00

LT	LTS	DEVIATION	% DEVIATION
53.908	57.294	-3.386	-6.28
48.529	56.275	-7.746	-15.96
54.029	61.355	-7.325	-13.56
61.879	67.405	-5.526	-8.93
82.465	76.451	6.013	7.29
85.421	81.292	4.129	4.83
109.837	97.155	12.682	11.55
121.749	107.831	13.918	11.43
127.149	119.510	7.639	6.01
134.250	134.213	.037	.03
170.178	171.409	-1.231	-.72
213.318	208.489	4.830	2.26
239.976	227.720	12.256	5.11
296.678	312.284	-15.606	-5.26
466.539	418.171	48.368	10.37
518.937	529.554	-10.617	-2.05

MAE=7.0 MAPE=8.2 RMSE=9.3 RMSPE=12.3 TIC=.00

YEAR	IGT	IGTS	DEVIATION	% DEVIATION
1961	20.396	26.413	-6.017	-29.50
1962	18.160	32.259	-14.099	-77.64
1963	22.318	35.223	-12.905	-57.82
1964	22.850	37.292	-14.442	-63.21
1965	39.925	40.783	-.858	-2.15
1966	38.176	45.919	-7.743	-20.28
1967	54.001	50.790	3.211	5.95
1968	68.680	57.692	10.988	16.00
1969	77.464	65.798	11.666	15.06
1970	80.019	75.779	4.240	5.30
1971	98.379	88.763	9.616	9.77
1972	105.871	102.747	3.124	2.95
1973	130.960	117.047	13.913	10.62
1974	174.668	160.701	13.967	8.00
1975	230.957	219.194	11.763	5.09
1976	278.005	271.415	6.590	2.37

STATISTICS: MAE=9.1 MAPE=20.7 RMSE=10.1 RMSPE=31.1 TIC=.01

IPT	TPT3	DEVIATION	% DEVIATION
33.512	30.981	2.531	7.85
30.369	24.016	6.353	20.92
31.711	26.132	5.579	17.59
39.029	30.113	8.917	22.85
42.540	35.668	6.871	16.15
47.245	35.373	11.871	25.13
55.436	46.365	9.471	16.96
53.069	50.139	2.930	5.52
49.685	53.712	-4.027	-8.11
54.231	58.435	-4.204	-7.75
71.799	82.646	-10.848	-15.11
107.447	105.742	1.705	1.59
109.016	110.672	-1.656	-1.52
122.010	151.582	-29.572	-24.24
235.582	198.977	36.605	15.54
240.932	258.139	-17.207	-7.14

MAE=10.0 MAPE=13.3 RMSE=13.9 RMSPE=15.3 TIC=.02

YEAR	IAP	IAPS	DEVIATION	% DEVIATION
1961	2.499	.282	2.217	88.73
1962	1.385	.542	.842	60.83
1963	1.680	1.639	.042	2.49
1964	1.793	4.837	-3.044	-169.73
1965	1.163	2.059	-.897	-77.10
1966	1.036	1.235	-.199	-19.20
1967	3.028	2.784	.244	8.06
1968	2.266	4.022	-1.757	-77.54
1969	4.238	4.261	-.024	-.56
1970	4.453	5.284	-.831	-18.66
1971	5.657	6.044	-.388	-6.85
1972	12.353	9.714	2.639	21.36
1973	11.471	8.916	2.555	22.27
1974	13.711	12.034	1.677	12.23
1975	24.606	23.026	1.580	6.42
1976	17.731	18.775	-1.045	-5.89

STATISTICS: MAE=1.3 MAPE=37.4 RMSE=1.6 RMSPE=58.3 TIC=.03

ICNP	TCNP3	DEVIATION	% DEVIATION
12.609	14.655	-2.047	-16.23
12.952	16.144	-3.191	-24.64
14.589	17.584	-2.995	-20.53
16.424	18.698	-2.274	-13.85
24.546	20.276	4.270	17.39
27.354	22.119	5.236	19.14
28.102	24.182	3.920	13.95
28.514	26.101	2.413	8.46
28.248	27.914	.333	1.18
28.548	29.285	-.736	-2.58
31.975	31.927	.048	.15
40.259	35.637	4.622	11.48
19.182	38.517	-19.335	-100.80
17.702	45.292	-7.590	-20.13
56.320	49.494	6.826	12.12
84.655	61.545	23.110	27.30

MAE=5.6 MAPE=19.4 RMSE=8.4 RMSPE=29.6 TIC=.06

YEAR	IMMP	IMMPS	DEVIATION	% DEVIATION
1961	6.984	5.865	1.118	16.01
1962	6.855	5.295	1.560	22.75
1963	6.544	4.830	1.715	26.20
1964	9.513	4.909	4.603	48.39
1965	7.528	5.438	2.090	27.76
1966	8.284	7.274	1.010	12.20
1967	11.544	8.887	2.656	23.01
1968	13.355	12.279	1.075	8.05
1969	12.357	14.994	-2.637	-21.34
1970	14.852	21.630	-6.777	-45.63
1971	17.498	27.627	-10.129	-57.89
1972	30.215	30.584	-.369	-1.22
1973	25.868	30.146	-4.277	-16.54
1974	27.614	28.818	-1.204	-4.36
1975	69.995	55.942	14.053	20.08
1976	54.322	54.754	-.432	-.80
STATISTICS:	MAE=5.3	MAPE=41.8	RMSE=7.4	RMSPE=48.8 TIC=.11

YEAR	ITCP	ITCPS	DEVIATION	% DEVIATION
1961	8.745	7.950	.794	9.09
1962	7.791	6.211	1.580	20.28
1963	8.535	4.954	3.581	41.96
1964	9.638	2.436	7.202	74.72
1965	7.500	2.012	5.488	73.17
1966	7.652	1.156	6.496	84.89
1967	10.216	3.841	6.374	62.40
1968	6.616	3.197	3.218	48.65
1969	2.495	4.092	-1.597	-64.01
1970	2.808	1.383	1.425	50.76
1971	13.856	7.876	5.980	43.16
1972	18.975	20.530	-1.555	-8.20
1973	27.646	20.176	7.470	27.02
1974	22.670	22.331	.339	1.50
1975	52.488	43.404	9.084	17.31
1976	53.475	76.050	-22.576	-42.22
STATISTICS:	MAE=9.5	MAPE=22.0	RMSE=5.1	RMSPE=27.5 TIC=.08

YEAR	ISP	ISPS	DEVIATION	% DEVIATION
1961	2.676	2.129	.547	20.46
1962	1.386	-4.176	5.561	401.38
1963	.362	-2.874	3.236	894.36
1964	1.661	-.768	2.429	146.22
1965	1.804	5.883	-4.079	-226.17
1966	2.919	3.590	-.672	-23.01
1967	2.947	6.671	-3.724	-126.35
1968	2.319	4.339	-2.020	-87.07
1969	2.347	2.451	-.104	-4.41
1970	3.568	.853	2.715	76.10
1971	2.813	9.172	-6.359	-226.04
1972	5.646	9.276	-3.631	-64.31
1973	24.849	12.918	11.931	48.02
1974	20.312	43.108	-22.795	-112.22
1975	32.173	27.110	5.063	15.74
1976	30.750	47.014	-16.265	-52.89
STATISTICS:	MAE=5.7	MAPE=157	RMSE=8.3	RMSPE=266 TIC=.15

ISG	ISGS	DEVIATION	% DEVIATION
1.876	3.897	-2.021	-107.70
2.765	.181	2.584	93.45
4.363	5.395	-1.032	-23.65
3.642	4.013	-.371	-10.19
5.710	5.730	-.020	-.35
4.523	9.580	-5.057	-111.81
5.478	4.181	1.298	23.69
7.545	.115	7.429	98.47
8.245	-.310	8.555	103.76
8.520	3.693	4.827	56.66
12.850	.222	12.628	98.27
15.972	21.677	-5.705	-35.72
19.001	-3.035	22.036	115.97
24.431	19.844	4.587	18.77
25.502	15.923	9.578	37.56
29.819	21.168	8.651	29.01
MAE=6.8	MAPE=60.3	RMSE=72.8	RMSPE=642 TIC=.38

YEAR	IWPG	IWPGS	DEVIATION	% DEVIATION
1961	3.132	2.795	.336	10.74
1962	2.831	3.264	-.434	-15.32
1963	3.187	3.794	-.607	-19.03
1964	3.614	4.391	-.778	-21.53
1965	3.549	5.067	-1.518	-42.77
1966	4.639	5.829	-1.190	-25.65
1967	7.875	6.691	1.185	15.04
1968	8.122	7.663	.459	5.65
1969	7.599	8.762	-1.163	-15.30
1970	6.363	10.003	-3.639	-57.19
1971	13.036	11.404	1.632	12.52
1972	14.544	12.987	1.557	10.71
1973	10.263	14.775	-4.512	-43.97
1974	15.092	16.793	-1.702	-11.28
1975	22.459	19.074	3.385	15.07
1976	43.205	46.427	-3.222	-7.46

STATISTICS: MAE=1.7 MAPE=20.6 RMSE=2.1 RMSPE=25.1 TIC=.02

ITPO	ITPOS	DEVIATION	% DEVIATION
1.004	.998	.006	.64
.969	1.022	-.052	-5.38
.943	1.044	-.101	-10.76
1.017	1.083	-.067	-6.57
1.033	1.101	-.068	-6.54
1.045	1.132	-.087	-8.28
1.087	1.132	-.045	-4.11
1.134	1.167	-.032	-2.83
1.261	1.224	.037	2.90
1.263	1.327	-.064	-5.04
1.281	1.358	-.077	-5.98
1.349	1.375	-.026	-1.90
1.527	1.541	-.013	-.87
1.865	1.838	.028	1.48
2.287	2.333	-.046	-2.02
2.778	2.560	.217	7.81

MAE=.06 MAPE=2.6 RMSE=.08 RMSPE=3.4 TIC=.00

YEAR	IGTPO	IGTPOS	DEVIATION	% DEVIATION
1961	.981	.765	.215	21.97
1962	.947	.413	.534	56.38
1963	.914	.514	.400	43.79
1964	.989	.529	.460	46.52
1965	1.014	1.036	-.022	-2.16
1966	1.035	.985	.050	4.83
1967	1.067	1.086	-.019	-1.83
1968	1.108	1.177	-.069	-6.21
1969	1.224	1.315	-.091	-7.45
1970	1.257	1.319	-.062	-4.92
1971	1.235	1.161	.074	6.02
1972	1.354	1.499	-.145	-10.68
1973	1.549	1.496	.053	3.43
1974	1.928	2.100	-.172	-8.93
1975	2.355	2.340	.015	.65
1976	2.812	2.828	-.016	-.57

STATISTICS: MAE=.15 MAPE=10.2 RMSE=.22 RMSPE=22.6 TIC=.02

KAP	KAPS	DEVIATION	% DEVIATION
5.814	3.596	2.217	38.14
7.024	4.031	2.993	42.61
8.494	5.549	2.945	34.67
10.032	10.219	-.187	-1.86
10.894	11.972	-1.078	-9.89
11.603	12.847	-1.244	-10.72
14.283	15.246	-.963	-6.74
16.120	18.811	-2.691	-16.69
19.874	22.508	-2.634	-13.25
23.731	27.117	-3.385	-14.27
28.676	32.348	-3.672	-12.80
40.169	41.092	-.923	-2.30
50.435	48.775	1.660	3.29
62.633	59.346	3.287	5.25
85.360	80.592	4.768	5.59
100.530	96.949	3.581	3.56

MAE=2.4 MAPE=13.9 RMSE=2.7 RMSPE=16.8 TIC=.00

YEAR	KCMP	KCMPS	DEVIATION	% DEVIATION
1961	37.923	39.970	-2.047	-5.40
1962	48.600	53.715	-5.115	-10.52
1963	60.273	68.076	-7.803	-12.95
1964	73.081	82.690	-9.609	-13.15
1965	93.241	98.004	-4.763	-5.11
1966	115.001	114.243	.758	.66
1967	136.203	131.570	4.633	3.40
1968	156.545	149.777	6.768	4.32
1969	175.400	168.704	6.696	3.82
1970	193.424	187.867	5.557	2.87
1971	213.794	209.522	5.272	2.47
1972	241.225	231.647	9.578	3.97
1973	245.933	256.265	-10.332	-4.20
1974	268.879	286.181	-17.302	-6.43
1975	309.066	318.504	-9.438	-3.05
1976	375.178	360.939	14.238	3.80

STATISTICS: MAE=7.5 MAPE=5.4 RMSE=8.5 RMSPE=6.5 TIC=.00

KMMP	KMMPS	DEVIATION	% DEVIATION
24.885	24.091	.794	3.17
31.183	28.856	2.327	7.46
37.847	32.078	5.769	15.24
45.215	32.590	12.625	27.92
50.002	32.647	17.355	34.71
54.654	31.844	22.810	41.73
61.590	33.774	27.815	45.16
64.510	35.145	29.365	45.52
63.134	37.128	26.306	41.19
62.154	36.283	25.871	41.62
72.281	41.982	30.299	41.92
86.919	59.994	26.926	30.98
109.351	76.570	32.781	29.98
125.460	94.307	31.153	24.83
170.421	132.051	38.368	22.51
213.670	200.180	13.490	6.31

STATISTICS: MAE=21.5 MAPE=20.8 RMSE=24.2 RMSPE=21.9 TIC=.07

YEAR	KTCP	KTCPS	DEVIATION	% DEVIATION
1961	17.887	16.768	1.118	6.25
1962	22.059	19.548	2.511	11.38
1963	25.294	21.446	3.849	15.22
1964	31.013	23.138	7.875	25.39
1965	33.889	25.106	8.783	25.92
1966	37.090	28.613	8.476	22.85
1967	43.070	33.208	9.861	22.90
1968	49.964	40.507	9.457	18.93
1969	54.827	49.425	5.402	9.85
1970	61.455	63.641	-2.186	-3.56
1971	69.735	81.721	-11.987	-17.19
1972	89.489	100.047	-10.558	-11.80
1973	101.934	115.186	-13.252	-13.00
1974	114.258	126.726	-12.468	-10.91
1975	167.114	163.659	3.455	2.07
1976	196.369	193.864	2.505	1.28

STATISTICS: MAE=7.1 MAPE=13.7 RMSE=8.1 RMSPE=15.7 TIC=.01

KSP	KSPS	DEVIATION	% DEVIATION
8.336	7.789	.547	6.57
9.472	3.379	6.092	64.32
9.549	.404	9.146	95.77
10.924	-.376	11.300	103.44
12.400	5.918	6.382	55.50
14.947	8.943	6.004	40.17
17.446	15.345	2.100	12.04
19.242	19.224	.018	.09
21.012	21.098	-.385	-.41
23.949	21.318	2.631	10.99
26.044	29.851	-3.807	-14.62
30.909	38.231	-7.323	-23.69
54.830	50.002	4.828	8.81
73.498	91.610	-18.112	-24.64
103.465	115.971	-12.506	-12.09
131.111	159.506	-28.395	-21.66

STATISTICS: MAE=7.5 MAPE=30.9 RMSE=10.9 RMSPE=40.1 TIC=.04

YEAR	KGA	KAGS	DEVIATION	% DEVIATION
1961	4.521	4.555	-.034	-.75
1962	6.240	6.322	-.083	-1.32
1963	7.974	8.096	-.122	-1.53
1964	10.073	10.270	-.198	-1.96
1965	14.177	14.276	-.099	-.70
1966	18.094	18.148	-.054	-.30
1967	22.383	22.349	.034	.15
1968	27.236	26.880	.356	1.31
1969	30.788	30.139	.648	2.11
1970	34.098	33.270	.827	2.43
1971	39.228	38.820	.408	1.04
1972	44.359	43.354	1.005	2.27
1973	50.465	49.755	.711	1.41
1974	57.971	56.542	1.429	2.46
1975	65.666	64.342	1.324	2.02
1976	72.517	71.183	1.334	1.84

STATISTICS: MAE=.54 MAPE=1.5 RMSE=.73 RMSPE=1.7 TIC=.00

KCMG	KCMGS	DEVIATION	% DEVIATION
6.887	6.990	-.103	-1.50
7.684	7.814	-.130	-1.69
8.243	8.387	-.144	-1.75
9.383	9.574	-.191	-2.04
12.404	12.507	-.104	-.84
14.231	14.304	-.073	-.51
16.796	16.804	-.007	-.04
19.802	19.574	.228	1.15
22.845	22.337	.508	2.22
27.907	27.129	.779	2.79
35.628	35.498	.130	.37
48.290	46.740	1.550	3.21
82.814	82.685	.128	.15
117.939	114.531	3.408	2.89
159.603	156.718	2.885	1.81
211.771	208.710	3.061	1.45

MAE=.88 MAPE=1.5 RMSE=1.4 RMSPE=1.8 TIC=.00

YEAR	KHMG	KHMGS	DEVIATION	% DEVIATION
1961	.365	.369	-.004	-1.22
1962	.536	.546	-.009	-1.75
1963	.774	.789	-.015	-1.91
1964	1.281	1.314	-.033	-2.54
1965	3.734	3.711	.023	.61
1966	7.300	7.242	.058	.79
1967	12.873	12.711	.162	1.26
1968	27.777	26.708	1.069	3.85
1969	49.078	46.480	2.598	5.29
1970	72.100	68.441	3.659	5.07
1971	86.258	84.003	2.255	2.61
1972	95.383	91.883	3.500	3.67
1973	109.167	106.570	2.597	2.38
1974	127.384	122.912	4.472	3.51
1975	153.445	149.462	3.983	2.60
1976	179.225	175.284	3.942	2.20

STATISTICS: MAE=1.8 MAPE=2.6 RMSE=2.5 RMSPE=2.9 TIC=.00

KICG	KICGS	DEVIATION	% DEVIATION
15.281	15.471	-.190	-1.25
17.741	18.030	-.289	-1.63
21.510	21.898	-.388	-1.80
23.537	24.044	-.507	-2.15
30.984	31.183	-.199	-.64
37.688	37.749	-.060	-.16
47.733	47.503	.230	.48
56.187	55.078	1.109	1.97
65.800	63.607	2.194	3.33
76.001	73.196	2.805	3.69
89.539	88.752	.787	.88
94.718	92.253	2.465	2.60
97.188	95.685	1.503	1.55
110.735	107.151	3.584	3.24
127.547	124.721	2.826	2.22
146.503	143.884	2.618	1.79

MAE=1.8 MAPE=1.8 RMSE=1.8 RMSPE=2.1 TIC=.00

YEAR	KDG	KDGS	DEVIATION	% DEVIATION
1961	14.398	14.559	-.162	-1.12
1962	18.519	18.798	-.279	-1.51
1963	23.091	23.475	-.384	-1.66
1964	28.213	28.782	-.569	-2.02
1965	36.535	36.893	-.358	-.98
1966	42.397	42.678	-.280	-.66
1967	51.813	51.894	-.080	-.15
1968	62.443	61.808	.634	1.02
1969	72.581	71.133	1.449	2.00
1970	78.835	77.035	1.800	2.28
1971	89.992	89.112	.880	.98
1972	108.629	105.717	2.912	2.68
1973	126.024	123.933	2.091	1.66
1974	155.383	150.637	4.746	3.05
1975	208.418	204.193	4.225	2.03
1976	263.506	259.060	4.446	1.69

STATISTICS: MAE=1.6 MAPE=1.6 RMSE=2.2 RMSPE=1.8 TIC=.00

KMPG	KMPGS	DEVIATION	% DEVIATION
8.663	8.327	.336	3.88
10.931	11.050	-.119	-1.09
13.407	14.125	-.718	-5.35
16.149	17.598	-1.449	-8.97
18.649	21.521	-2.873	-15.40
22.076	25.952	-3.876	-17.56
28.516	30.955	-2.439	-8.55
34.785	36.606	-1.822	-5.24
40.123	42.989	-2.866	-7.14
43.878	50.197	-6.319	-14.40
54.063	58.339	-4.276	-7.91
65.093	67.534	-2.441	-3.75
71.124	77.919	-6.794	-9.55
81.593	89.647	-8.055	-9.87
98.748	102.894	-4.146	-4.20
135.534	142.633	-7.099	-5.24

STATISTICS: MAE=5.5 MAPE=9.9 RMSE=8.2 RMSPE=9.2 TIC=.01

YEAR	KAT	KATS	DEVIATION	% DEVIATION
1961	10.335	8.152	2.184	21.13
1962	13.264	10.353	2.911	21.94
1963	16.468	13.645	2.823	17.14
1964	20.105	20.489	-.384	-1.91
1965	25.071	26.247	-1.176	-4.69
1966	29.697	30.995	-1.298	-4.37
1967	36.666	37.595	-.929	-2.53
1968	43.356	45.691	-2.334	-5.38
1969	50.662	52.647	-1.985	-3.92
1970	57.829	60.387	-2.558	-4.42
1971	67.904	71.167	-3.263	-4.81
1972	84.528	84.446	.082	.10
1973	100.900	98.530	2.370	2.35
1974	120.605	115.889	4.716	3.91
1975	151.026	144.934	6.092	4.03
1976	173.047	168.132	4.915	2.84

STATISTICS: MAE=2.5 MAPE=6.6 RMSE=2.9 RMSPE=9.4 TIC=.00

KCMT	KCMTS	DEVIATION	% DEVIATION
44.810	46.960	-2.150	-4.80
56.284	61.529	-5.245	-9.32
68.516	76.463	-7.947	-11.60
82.464	92.264	-9.800	-11.88
105.645	110.512	-4.867	-4.61
129.232	128.547	.685	.53
152.999	148.373	4.626	3.02
176.347	169.351	6.996	3.97
198.245	191.042	7.203	3.63
221.331	214.995	6.336	2.86
249.422	244.020	5.402	2.17
289.515	278.387	11.128	3.84
328.746	338.950	-10.204	-3.10
386.818	400.712	-13.894	-3.59
468.669	475.223	-6.554	-1.40
586.948	569.649	17.299	2.95

STATISTICS: MAE=7.5 MAPE=4.6 RMSE=8.6 RMSPE=5.0 TIC=.00

YEAR	KMNT	KMTS	DEVIATION	% DEVIATION
1961	25.250	24.460	.790	3.13
1962	31.720	29.402	2.318	7.31
1963	38.621	32.867	5.754	14.90
1964	46.496	33.903	12.592	27.08
1965	53.736	36.358	17.378	32.34
1966	61.953	39.086	22.867	36.91
1967	74.463	46.485	27.978	37.57
1968	92.287	61.853	30.434	32.98
1969	112.212	83.608	28.604	25.49
1970	134.255	104.725	29.530	22.00
1971	158.539	125.985	32.554	20.53
1972	182.303	151.877	30.426	16.69
1973	218.518	183.140	35.378	16.19
1974	252.844	217.219	35.625	14.09
1975	323.865	281.515	42.350	13.08
1976	392.896	375.464	17.432	4.44

STATISTICS: MAE=25.3 MAPE=20.3 RMSE=26.3 RMSPE=&R1 TIC=.02

KICT	KICTS	DEVIATION	% DEVIATION
33.167	32.239	-2.150	-4.80
39.799	37.578	-5.245	-9.32
46.804	43.143	-7.947	-11.60
54.549	47.182	-9.800	-11.88
64.873	56.289	-4.867	-4.61
74.778	66.362	.685	.53
90.803	80.711	4.626	3.02
106.151	95.585	6.996	3.97
120.627	113.031	7.203	3.63
137.456	136.836	6.336	2.86
159.274	170.473	5.402	2.17
184.207	192.308	11.128	3.84
199.122	210.871	-10.204	-3.10
224.992	233.877	-13.894	-3.59
294.662	288.380	-6.554	-1.40
342.872	337.748	17.299	2.95

MAE=6.9 MAPE=6.7 RMSE=7.8 RMSPE=7.8 TIC=.00

YEAR	KST	KSTS	DEVIATION	% DEVIATION
1961	13.226	12.678	.547	4.14
1962	16.980	10.887	6.092	35.88
1963	21.195	12.050	9.146	43.15
1964	25.862	14.562	11.300	43.69
1965	32.600	25.718	6.882	21.11
1966	39.064	33.060	6.004	15.37
1967	46.317	44.217	2.100	4.53
1968	54.792	54.775	.018	.03
1969	63.741	63.827	-.086	-.14
1970	73.917	71.285	2.631	3.56
1971	87.362	91.169	-3.807	-4.36
1972	106.359	113.682	-7.323	-6.88
1973	147.018	142.190	4.828	3.28
1974	187.351	205.463	-18.112	-9.67
1975	239.405	251.910	-12.505	-5.22
1976	292.791	321.186	-28.395	-9.70

STATISTICS: MAE=7.5 MAPE=13.2 RMSE=10.4 RMSPE=10.4 TIC=.01

KT	KTS	DEVIATION	% DEVIATION
149.849	147.375	2.474	1.65
187.497	179.598	7.899	4.21
228.103	215.968	12.135	5.32
273.839	254.781	19.058	6.96
337.108	313.537	23.571	6.99
399.197	366.679	32.518	8.15
481.577	440.230	41.347	8.59
570.160	525.669	44.491	7.80
658.190	618.276	39.914	6.06
747.501	715.461	32.040	4.29
866.555	850.265	16.290	1.88
1020.630	993.942	26.688	2.61
1191.450	1175.532	15.918	1.34
1409.590	1413.443	-3.853	-.27
1784.790	1749.048	35.742	2.00
2187.594	2173.872	13.722	.63

MAE=23.0 MAPE=8.3 RMSE=26.5 RMSPE=5.1 TIC=.00

YEAR	LET	LETS	DEVIATION	% DEVIATION
1961	6.682	6.848	-.166	-2.48
1962	6.740	7.068	-.328	-4.86
1963	6.916	7.214	-.298	-4.31
1964	7.107	7.375	-.268	-3.77
1965	7.311	7.513	-.202	-2.76
1966	7.555	7.679	-.124	-1.64
1967	7.954	7.823	.131	1.65
1968	8.138	7.984	.154	1.89
1969	8.382	8.152	.230	2.74
1970	8.647	8.324	.323	3.74
1971	8.880	8.491	.389	4.38
1972	9.214	8.691	.523	5.67
1973	9.462	8.905	.557	5.89
1974	9.739	9.170	.569	5.85
1975	9.707	9.533	.174	1.79
1976	9.979	9.801	.178	1.79

STATISTICS: MAE=.29 MAPE=3.5 RMSE=.52 RMSPE=5.8 TIC=.00

YEAR	LEA	LEAS	DEVIATION	% DEVIATION
1961	3.600	3.642	-.042	-1.17
1962	3.616	3.686	-.070	-1.93
1963	3.700	3.717	-.017	-.47
1964	3.795	3.739	.056	1.49
1965	3.797	3.750	.047	1.24
1966	3.775	3.752	.023	.60
1967	3.900	3.747	.153	3.93
1968	3.850	3.733	.117	3.03
1969	3.830	3.713	.117	3.05
1970	3.769	3.687	.082	2.17
1971	3.719	3.655	.064	1.72
1972	3.693	3.618	.075	2.03
1973	3.677	3.576	.101	2.74
1974	3.642	3.530	.112	3.07
1975	3.485	3.480	.005	.14
1976	3.418	3.427	-.009	-.26

MAE=.07 MAPE=1.8 RMSE=.08 RMSPE=2.1 TIC=.00

YEAR	LECN	LECNS	DEVIATION	% DEVIATION
1961	.407	.377	.030	7.35
1962	.401	.427	-.026	-6.45
1963	.420	.435	-.015	-3.53
1964	.435	.464	-.029	-6.66
1965	.476	.484	-.008	-1.60
1966	.517	.512	.005	.88
1967	.549	.538	.011	1.98
1968	.560	.568	-.008	-1.41
1969	.563	.599	-.036	-6.33
1970	.608	.631	-.023	-3.75
1971	.657	.666	-.009	-1.38
1972	.717	.709	.008	1.12
1973	.776	.760	.016	2.10
1974	.925	.849	.076	8.20
1975	.887	.940	-.053	-6.02
1976	.915	.898	.017	1.82

STATISTICS: MAE=.02 MAPE=3.8 RMSE=.03 RMSPE=4.5 TIC=.00

LEM	LEMS	DEVIATION	% DEVIATION
.974	1.026	-.052	-5.37
1.012	1.089	-.077	-7.61
1.051	1.148	-.097	-9.23
1.074	1.203	-.129	-12.03
1.137	1.253	-.116	-10.18
1.274	1.303	-.029	-2.30
1.360	1.353	.007	.50
1.470	1.410	.060	4.07
1.591	1.481	.110	6.94
1.724	1.561	.163	9.44
1.809	1.640	.169	9.36
1.908	1.717	.191	10.00
2.035	1.802	.233	11.45
2.184	1.896	.288	13.21
2.141	1.993	.148	6.91
2.285	2.145	.140	6.13

MAE=.13 MAPE=7.8 RMSE=.14 RMSPE=8.5 TIC=.01

YEAR	LETC	LETCS	DEVIATION	% DEVIATION
1961	.215	.225	-.010	-4.61
1962	.214	.233	-.019	-8.94
1963	.216	.240	-.024	-11.28
1964	.218	.249	-.031	-14.38
1965	.221	.257	-.036	-16.41
1966	.225	.271	-.046	-20.41
1967	.249	.286	-.037	-14.78
1968	.256	.305	-.049	-19.15
1969	.301	.325	-.024	-7.90
1970	.335	.347	-.012	-3.58
1971	.347	.375	-.028	-8.19
1972	.444	.413	.031	6.87
1973	.448	.440	.008	1.87
1974	.488	.462	.026	5.25
1975	.555	.489	.066	11.83
1976	.593	.547	.046	7.68

STATISTICS: MAE=.03 MAPE=10.2 RMSE=.03 RMSPE=11.5 TIC=.01

YEAR	LES	LESS	DEVIATION	% DEVIATION
1961	1.423	1.508	-.085	-5.97
1962	1.432	1.558	-.126	-8.79
1963	1.451	1.593	-.142	-9.77
1964	1.502	1.634	-.132	-8.79
1965	1.593	1.678	-.085	-5.31
1966	1.667	1.742	-.075	-4.49
1967	1.791	1.796	-.005	-.25
1968	1.893	1.858	.035	1.86
1969	1.984	1.918	.066	3.34
1970	2.088	1.973	.115	5.51
1971	2.221	2.024	.198	8.90
1972	2.321	2.104	.217	9.35
1973	2.393	2.190	.203	8.47
1974	2.366	2.291	.075	3.16
1975	2.488	2.479	.009	.38
1976	2.606	2.623	-.017	-.64

STATISTICS: MAE=.1 MAPE=5.5 RMSE=.12 RMSPE=6.3 TIC=.00

YEAR	LEO	LEOS	DEVIATION	% DEVIATION
1961	.034	.036	-.002	-5.16
1962	.035	.037	-.002	-6.35
1963	.038	.038	.000	.03
1964	.040	.039	.001	2.72
1965	.042	.041	.001	2.99
1966	.044	.042	.002	4.05
1967	.046	.044	.002	4.71
1968	.047	.046	.001	1.98
1969	.048	.049	-.001	-2.80
1970	.051	.052	-.001	-2.55
1971	.051	.055	-.004	-7.13
1972	.050	.049	.001	2.42
1973	.050	.051	-.001	-2.56
1974	.050	.051	-.001	-2.18
1975	.060	.057	.003	5.53
1976	.062	.060	.002	2.56

STATISTICS: MAE=.00 MAPE=3.5 RMSE=.00 RMSPE=3.9 TIC=.00

YEAR	LEWP	LEWPS	DEVIATION	% DEVIATION
1961	.029	.033	-.004	-14.74
1962	.030	.038	-.008	-26.44
1963	.040	.042	-.002	-6.15
1964	.043	.047	-.004	-9.01
1965	.045	.051	-.006	-13.78
1966	.053	.055	-.002	-4.64
1967	.059	.060	-.001	-1.13
1968	.062	.064	-.002	-2.99
1969	.065	.068	-.003	-4.68
1970	.072	.072	-.000	-.35
1971	.076	.077	-.001	-.70
1972	.081	.081	.000	.13
1973	.083	.085	-.002	-2.87
1974	.084	.090	-.006	-7.18
1975	.091	.095	-.004	-4.27
1976	.100	.100	.000	.01

STATISTICS: MAE=.00 MAPE=6.2 RMSE=.00 RMSPE=9.2 TIC=.00

YEAR	MT	MTS	DEVIATION	% DEVIATION
1961	46.837	44.266	2.571	5.49
1962	43.247	50.229	-6.982	-16.14
1963	40.923	50.356	-9.433	-23.05
1964	57.407	56.811	.596	1.04
1965	66.083	58.629	7.454	11.28
1966	75.146	69.045	6.101	8.12
1967	93.372	80.810	12.562	13.45
1968	112.231	95.695	16.536	14.73
1969	125.324	110.956	14.368	11.47
1970	134.983	126.764	8.219	6.09
1971	161.316	156.418	4.898	3.04
1972	187.599	184.856	2.743	1.46
1973	238.394	237.285	1.109	.47
1974	326.693	299.720	26.973	8.26
1975	499.915	479.708	20.207	4.04
1976	528.981	544.940	-15.959	-3.02

STATISTICS: MAE=9.6 MAPE=8.2 RMSE=12.2 RMSPE=10.3 TIC=.00

	MC	MCS	DEVIATION	% DEVIATION
	11.264	8.856	2.408	21.38
	8.836	8.274	.562	6.36
	9.030	7.338	1.692	18.74
	12.380	8.293	4.087	33.01
	12.769	11.023	1.746	13.67
	13.788	12.481	1.307	9.48
	16.459	16.527	-.068	-.41
	19.809	21.031	-1.222	-6.17
	23.353	25.164	-1.811	-7.76
	28.839	29.897	-1.058	-3.67
	42.239	37.633	4.606	10.91
	52.580	48.851	3.729	7.09
	75.205	72.839	2.366	3.15
	120.746	120.406	.340	.28
	170.267	168.505	1.762	1.03
	167.743	169.597	-1.854	-1.11

MAE=1.9 MAPE=9.8 RMSE=2.3 RMSPE=12.5 TIC=.00

YEAR	MINT	MINTS	DEVIATION	% DEVIATION
1961	23.693	22.779	.914	3.86
1962	23.091	29.215	-6.124	-26.52
1963	20.786	31.562	-10.776	-51.84
1964	29.034	35.474	-6.440	-22.18
1965	34.124	39.020	-4.896	-14.35
1966	38.453	43.794	-5.341	-13.89
1967	50.473	48.120	2.353	4.66
1968	59.912	58.837	1.075	1.79
1969	68.173	67.525	.648	.95
1970	70.338	78.226	-7.888	-11.21
1971	81.703	82.384	-.681	-.83
1972	90.728	86.253	4.475	4.93
1973	106.157	100.397	5.760	5.43
1974	139.352	138.895	.457	.33
1975	186.023	174.241	11.782	6.33
1976	194.371	201.861	-7.490	-3.85

STATISTICS: MAE=4.8 MAPE=10.8 RMSE=5.9 RMSPE=16.9 TIC=.00

	MK	MKS	DEVIATION	% DEVIATION
	9.306	11.077	-1.771	-19.03
	8.454	11.962	-3.508	-41.50
	7.610	13.097	-5.487	-72.11
	11.573	14.542	-2.969	-25.65
	14.624	16.097	-1.473	-10.07
	18.096	16.778	1.318	7.28
	21.631	19.212	2.419	11.18
	26.293	22.001	4.292	16.32
	26.512	24.081	2.431	9.17
	25.752	27.121	-1.369	-5.32
	29.457	31.997	-2.540	-8.62
	36.520	35.673	.847	2.32
	42.315	39.619	2.696	6.37
	43.524	46.886	-3.362	-7.73
	104.185	93.674	10.511	10.09
	108.387	111.581	-3.194	-2.95

MAE=3.1 MAPE=15.9 RMSE=3.8 RMSPE=23.6 TIC=.01

YEAR	MNFS	MNFSS	DEVIATION	% DEVIATION
1961	2.574	1.555	1.019	39.58
1962	2.866	.777	2.089	72.88
1963	3.497	-1.641	5.138	146.94
1964	4.420	-1.498	5.918	133.89
1965	4.566	-7.511	12.077	264.50
1966	4.809	-4.008	8.817	183.33
1967	4.809	-3.049	7.858	163.40
1968	6.217	-6.174	12.391	199.31
1969	7.286	-5.814	13.100	179.79
1970	10.054	-8.481	18.535	184.35
1971	7.917	4.405	3.512	44.36
1972	7.771	14.079	-6.308	-81.17
1973	14.717	24.430	-9.713	-66.00
1974	23.071	-6.468	29.539	128.03
1975	39.440	43.288	-3.848	-9.76
1976	58.480	61.901	-3.421	-5.85

STATISTICS: MAE=8.9 MAPE=117 RMSE=11.4 RMSPE=139 TIC=.34

MBA	MBAS	DEVIATION	% DEVIATION
30.800	31.873	-1.073	-3.48
33.000	17.719	15.281	46.31
36.800	17.472	19.328	52.52
37.300	30.687	6.613	17.73
44.000	54.246	-10.246	-23.29
48.000	58.498	-10.498	-21.87
54.800	66.414	-11.614	-21.19
66.300	77.671	-11.371	-17.15
75.100	84.448	-9.348	-12.45
91.600	102.627	-11.027	-12.04
108.700	119.757	-11.357	-10.17
141.400	125.929	15.471	10.94
188.300	208.651	-20.351	-10.81
310.900	333.504	-22.604	-7.27
419.600	472.527	-52.927	-12.61
566.900	522.207	44.693	7.88

STATISTICS: MAE=17 MAPE=18 RMSE=21 RMSPE=27 TIC=.01

YEAR	MUSA	MUSAS	DEVIATION	% DEVIATION
1961	39.900	44.517	-4.617	-11.57
1962	43.800	29.739	14.061	32.10
1963	49.000	29.482	19.518	39.83
1964	53.900	43.279	10.621	19.71
1965	60.300	67.874	-7.574	-12.56
1966	66.800	72.312	-5.512	-8.25
1967	77.100	80.578	-3.478	-4.51
1968	87.400	92.329	-4.929	-5.64
1969	90.400	99.405	-9.005	-9.96
1970	97.400	118.384	-20.984	-21.54
1971	117.000	136.267	-19.267	-16.47
1972	158.700	142.711	15.989	10.08
1973	202.700	229.073	-26.373	-13.01
1974	327.200	359.419	-32.219	-9.85
1975	446.500	504.559	-58.059	-13.00
1976	611.200	556.425	54.775	8.96

STATISTICS: MAE=19 MAPE=14.8 RMSE=25 RMSPE=17.4 TIC=.01

POPT	POPTS	DEVIATION	% DEVIATION
22.372	22.392	-.020	-.09
22.689	22.854	-.165	-.73
23.385	23.479	-.094	-.40
24.114	24.206	-.092	-.38
24.872	24.979	-.107	-.43
25.789	25.799	-.010	-.04
26.793	26.630	.163	.61
27.578	27.481	.097	.35
28.398	28.336	.062	.22
29.256	29.187	.069	.24
30.020	30.025	-.005	-.02
30.820	30.889	-.069	-.22
31.645	31.692	-.047	-.15
32.496	32.425	.071	.22
33.375	33.118	.257	.77
33.592	33.743	-.151	-.45

MAE=.13 MAPE=1.2 RMSE=.4 RMSPE=1.5 TIC=.00

YEAR	POPR	POPRS	DEVIATION	% DEVIATION
1961	14.678	14.673	.005	.04
1962	14.721	14.813	-.092	-.63
1963	15.001	15.051	-.050	-.33
1964	15.294	15.347	-.053	-.35
1965	15.592	15.649	-.057	-.37
1966	15.979	15.979	.000	.00
1967	16.406	16.295	.111	.68
1968	16.685	16.620	.065	.39
1969	16.975	16.938	.037	.22
1970	17.274	17.237	.037	.21
1971	17.506	17.509	-.003	-.02
1972	17.748	17.811	-.063	-.35
1973	17.992	18.018	-.026	-.14
1974	18.239	18.107	.132	.72
1975	18.489	18.118	.371	2.01
1976	17.877	18.008	-.131	-.73

STATISTICS: MAE=.08 MAPE=.45 RMSE=.12 RMSPE=.65 TIC=.00

POPU	POPUS	DEVIATION	% DEVIATION
7.694	7.719	-.025	-.33
7.968	8.041	-.073	-.91
8.384	8.428	-.044	-.52
8.820	8.859	-.039	-.44
9.280	9.330	-.050	-.54
9.810	9.821	-.011	-.11
10.387	10.335	.052	.50
10.893	10.861	.032	.30
11.423	11.398	.025	.22
11.982	11.949	.033	.27
12.514	12.516	-.002	-.01
13.072	13.078	-.006	-.05
13.653	13.675	-.022	-.16
14.257	14.318	-.061	-.43
14.886	15.000	-.114	-.77
15.715	15.736	-.021	-.13

MAE=.04 MAPE=.4 RMSE=.05 RMSPE=.4 TIC=.00

YEAR	RUCUR	RUCURS	DEVIATION	% DEVIATION
1961	2.143	2.386	-.243	-11.35
1962	2.161	2.584	-.423	-19.58
1963	2.178	2.199	-.020	-.93
1964	2.095	2.110	-.016	-.74
1965	1.997	1.837	.161	8.04
1966	2.251	2.054	.197	8.74
1967	2.220	1.982	.238	10.71
1968	2.564	2.195	.369	14.39
1969	3.032	2.437	.595	19.63
1970	3.254	2.626	.628	19.29
1971	3.219	2.383	.836	25.96
1972	3.710	2.525	1.185	31.94
1973	3.813	2.988	.825	21.64
1974	3.720	3.150	.570	15.32
1975	4.137	3.956	.182	4.39
1976	3.810	4.445	-.635	-16.68

STATISTICS: MAE=.45 MAPE=10.3 RMSE=.55 RMSPE=10.6 TIC=.07

VT	VTS	DEVIATION	% DEVIATION
299.368	307.583	-8.215	-2.74
316.453	329.809	-13.356	-4.22
335.350	338.039	-2.689	-.80
361.002	355.380	5.622	1.56
410.180	381.197	28.983	7.07
446.757	427.343	19.414	4.35
497.090	466.816	30.274	6.09
555.636	524.744	30.892	5.56
616.121	595.105	21.016	3.41
686.057	666.019	20.038	2.92
752.543	731.831	20.712	2.75
867.519	837.574	29.945	3.45
996.218	943.564	52.654	5.29
1117.745	1051.316	66.429	5.94
1234.611	1217.935	16.676	1.35
1402.961	1456.601	-53.640	-3.82

MAE=3.8 MAPE=.7 RMSE=4.2 RMSPE=.8 TIC=.00

YEAR	VA	VAS	DEVIATION	% DEVIATION
1961	87.787	86.977	.810	.92
1962	88.727	88.626	.101	.11
1963	90.192	91.573	-1.381	-1.53
1964	92.124	95.277	-3.153	-3.42
1965	99.475	100.007	-.532	-.53
1966	102.849	104.626	-1.777	-1.73
1967	111.001	109.087	1.914	1.72
1968	119.623	113.979	5.644	4.72
1969	123.216	119.210	4.006	3.25
1970	129.026	124.200	4.826	3.74
1971	124.608	129.364	-4.756	-3.82
1972	131.512	135.189	-3.677	-2.80
1973	138.864	141.555	-2.691	-1.94
1974	146.901	148.097	-1.196	-.81
1975	156.646	155.347	1.299	.83
1976	166.873	165.130	1.743	1.04

STATISTICS: MAE=2.5 MAPE=2.1 RMSE=2.9 RMSPE=2.5 TIC=.00

VCN	VCNS	DEVIATION	% DEVIATION
14.245	14.897	-.652	-4.57
14.070	16.110	-2.040	-14.50
16.310	17.328	-1.018	-6.24
17.115	18.521	-1.406	-8.21
22.155	19.807	2.348	10.60
21.350	21.281	.069	.32
24.920	22.742	2.178	8.74
26.145	24.347	1.798	6.88
26.530	26.045	.485	1.83
27.335	27.801	-.466	-1.70
29.225	29.740	-.515	-1.76
31.990	32.090	-.100	-.31
35.595	34.872	.723	2.03
34.370	39.775	-5.405	-15.72
49.560	44.774	4.786	9.66
70.805	73.794	-2.989	-4.22

STATISTICS: MAE=1.7 MAPE=5.1 RMSE=2.3 RMSPE=7.1 TIC=.01

YEAR	VMM	VMMS	DEVIATION	% DEVIATION
1961	36.507	36.155	.352	.97
1962	41.491	40.613	.878	2.12
1963	45.229	44.179	1.050	2.32
1964	47.347	46.777	.570	1.20
1965	53.888	47.558	6.330	11.75
1966	63.046	49.427	13.619	21.60
1967	72.515	51.507	21.008	28.97
1968	83.293	57.149	26.144	31.39
1969	91.579	68.867	22.712	24.80
1970	101.609	85.455	16.154	15.90
1971	118.678	101.557	17.121	14.43
1972	140.047	117.768	22.279	15.91
1973	164.717	137.511	27.206	16.52
1974	194.932	161.350	33.582	17.23
1975	226.891	187.335	39.556	17.43
1976	260.469	236.362	24.107	9.26

STATISTICS: MAE=17 MAPE=14.5 RMSE=20.8 RMSPE=17.2 TIC=.05

VTC	VTCS	DEVIATION	% DEVIATION
28.530	27.614	.916	3.21
29.932	27.739	2.193	7.33
30.709	27.654	3.055	9.95
31.626	28.289	3.337	10.55
33.115	28.675	4.440	13.41
34.073	31.119	2.954	8.67
38.562	34.084	4.478	11.61
37.074	38.629	-1.555	-4.19
39.663	43.444	-3.781	-9.53
44.249	49.194	-4.945	-11.18
46.186	57.138	-10.952	-23.71
52.688	68.437	-15.749	-29.89
66.552	75.766	-9.214	-13.85
82.820	82.009	.811	.98
104.398	89.762	14.636	14.02
115.213	108.169	7.044	6.11

STATISTICS: MAE=5.6 MAPE=11 RMSE=7.2 RMSPE=13.2 TIC=.02

YEAR	VS	VSS	DEVIATION	% DEVIATION
1961	85.710	95.474	-9.764	-11.39
1962	89.959	103.736	-13.777	-15.31
1963	95.251	99.776	-4.525	-4.75
1964	109.207	102.346	6.861	6.28
1965	125.562	107.902	17.660	14.06
1966	138.126	132.568	5.558	4.02
1967	151.078	148.802	2.276	1.51
1968	174.195	173.472	.723	.42
1969	196.098	196.815	-.717	-.37
1970	223.066	216.831	6.235	2.80
1971	253.316	233.321	19.995	7.89
1972	307.823	277.286	30.537	9.92
1973	365.381	327.064	38.317	10.49
1974	429.741	390.098	39.643	9.22
1975	488.132	530.000	-41.868	-8.58
1976	552.653	632.700	-80.047	-14.48

STATISTICS: MAE=19.9 MAPE=7.6 RMSE=28.8 RMSPE=8.9 TIC=.01

VNP	VNPS	DEVIATION	% DEVIATION
1.960	1.839	.121	6.20
2.153	2.865	-.712	-33.06
4.153	4.024	.129	3.11
4.747	5.333	-.586	-12.34
5.547	6.811	-1.264	-22.79
7.473	8.481	-1.008	-13.49
8.767	10.367	-1.600	-18.25
10.633	12.496	-1.863	-17.52
13.213	14.902	-1.689	-12.78
15.853	17.619	-1.766	-11.14
20.507	20.687	-.180	-.88
20.807	24.152	-3.345	-16.08
26.380	28.066	-1.686	-6.39
31.480	32.486	-1.006	-3.20
35.747	37.479	-1.732	-4.84
39.620	43.117	-3.497	-8.83

MAE=1.4 MAPE=12 RMSE=1.7 RMSPE=14 TIC=.01

YEAR	WAA	WAAS	DEVIATION	% DEVIATION
1961	5.540	5.967	-.427	-7.71
1962	5.789	5.581	.208	3.59
1963	5.951	5.959	-.008	-.13
1964	6.737	5.950	.787	11.68
1965	7.363	6.745	.618	8.39
1966	7.540	6.700	.840	11.14
1967	8.030	8.586	-.556	-6.93
1968	8.737	8.848	-.111	-1.27
1969	9.418	9.469	-.051	-.54
1970	10.484	10.539	-.055	-.52
1971	11.176	12.137	-.961	-8.60
1972	13.068	12.279	.789	6.04
1973	15.390	15.832	-.442	-2.87
1974	19.032	21.215	-2.183	-11.47
1975	25.580	23.296	2.284	8.93
1976	32.873	32.565	.308	.94

STATISTICS: MAE=.7 MAPE=5.7 RMSE=.9 RMSPE=7 TIC=.00

WCNA	WCNAS	DEVIATION	% DEVTATION
24.815	25.827	-1.012	-4.08
23.574	23.249	.325	1.38
23.055	22.427	.628	2.72
24.784	21.783	3.001	12.11
25.627	24.667	.960	3.75
25.986	25.419	.567	2.18
27.571	27.089	.482	1.75
30.742	29.161	1.581	5.14
35.139	33.387	1.752	4.99
36.474	39.577	-3.103	-8.51
37.459	43.578	-6.119	-16.34
44.014	44.992	-.978	-2.22
53.477	57.243	-3.766	-7.04
68.880	75.245	-6.365	-9.24
101.915	94.087	7.828	7.68
142.100	141.539	.561	.40

MAE=2.8 MAPE=5.6 RMSE=3.4 RMSPE=7 TIC=.00

TABLE 5-3 Continued

YEAR	MMA	MMAS	DEVIATION	% DEVIATION
1961	7.170	7.115	.055	.77
1962	7.156	7.008	.148	2.07
1963	7.020	7.839	-.919	-11.67
1964	7.384	8.011	-.627	-8.49
1965	7.566	8.718	-1.152	-15.23
1966	8.751	8.571	.180	2.05
1967	9.116	9.753	-.637	-6.99
1968	9.845	9.940	-.095	-.96
1969	10.573	10.263	.310	2.94
1970	11.120	10.950	.170	1.53
1971	12.303	13.140	-.837	-6.80
1972	14.179	13.481	.698	4.93
1973	16.699	17.018	-.319	-1.91
1974	20.650	22.319	-1.669	-8.08
1975	27.756	27.944	-.188	-.68
1976	35.669	32.667	3.002	8.42

STATISTICS: MAE=.7 MAPE=5.2 RMSE=1.0 RMSPE=6.7 TIC=.00

YEAR	MSA	MSAS	DEVIATION	% DEVIATION
1961	34.782	34.886	-.104	-.30
1962	34.712	34.183	.529	1.52
1963	34.053	38.043	-3.990	-11.72
1964	35.820	38.723	-2.903	-8.11
1965	36.694	42.214	-5.520	-15.04
1966	42.440	41.680	.760	1.79
1967	44.210	47.696	-3.486	-7.89
1968	47.746	48.724	-.978	-2.05
1969	51.280	50.220	1.060	2.07
1970	53.930	53.338	.592	1.10
1971	59.669	63.983	-4.314	-7.23
1972	68.768	65.764	3.004	4.37
1973	80.940	83.611	-2.671	-3.30
1974	100.090	110.415	-10.325	-10.32
1975	134.531	136.853	-2.322	-1.73
1976	172.886	160.553	12.333	7.13

STATISTICS: MAE=3.4 MAPE=5.3 RMSE=4.8 RMSPE=6.8 TIC=.00

MTCA	MTCAS	DEVIATION	% DEVIATION
27.291	23.123	-.832	-3.73
22.246	22.631	-.385	-1.73
21.823	24.900	-3.077	-14.10
22.956	25.324	-2.368	-10.31
23.516	27.332	-3.816	-16.23
27.199	27.041	.158	.58
28.333	30.730	-2.397	-8.46
30.600	31.598	-.998	-3.26
32.864	32.781	.083	.25
34.563	35.056	-.493	-1.43
38.241	42.041	-3.800	-9.94
44.072	43.963	.109	.25
51.904	54.782	-2.878	-5.54
64.184	70.599	-6.415	-10.00
86.270	85.856	.414	.48
110.866	100.929	9.937	8.96

MAE=2.4 MAPE=6.0 RMSE=3.5 RMSPE=7.8 TIC=.01

MOA	MOAS	DEVIATION	% DEVIATION
96.558	69.526	27.032	28.00
109.989	77.834	32.155	29.23
88.904	109.470	-20.566	-23.13
99.226	81.433	17.793	17.93
107.234	111.475	-4.241	-3.95
116.843	98.422	18.421	15.77
125.058	142.621	-17.563	-14.04
121.493	134.280	-12.787	-10.52
128.856	144.073	-15.217	-11.81
135.518	161.912	-26.394	-19.48
163.828	209.803	-45.975	-28.06
194.923	144.416	50.507	25.91
248.000	299.799	-51.799	-20.89
324.401	392.289	-67.888	-20.93
457.535	362.413	95.122	20.79
638.719	594.346	44.373	6.95

MAE=34 MAPE=18.5 RMSE=41.2 RMSPE=20 TIC=.07

TABLE 5-3 Continued

YEAR	WWPA	WWP AS	DEVIATION	% DEVIATION
1961	54.448	47.889	6.559	12.05
1962	53.359	51.103	2.256	4.23
1963	52.345	58.784	-6.439	-12.30
1964	55.061	60.989	-5.928	-10.77
1965	56.405	68.787	-12.382	-22.31
1966	65.238	66.928	-1.690	-2.59
1967	97.958	80.763	17.195	17.55
1968	73.395	82.419	-9.024	-12.29
1969	78.826	85.262	-6.436	-8.16
1970	82.901	92.150	-9.249	-11.16
1971	100.219	117.204	-16.985	-16.95
1972	119.241	120.083	-.842	-.71
1973	151.711	161.185	-9.474	-6.24
1974	198.453	223.251	-24.798	-12.50
1975	279.899	295.669	-15.770	-5.63
1976	390.738	348.991	41.747	10.68

STATISTICS: MAE=11.6 MAPE=10 RMSE=15.8 RMSPE=11.8 TIC=.01

YEAR	WMA	WMAS	DEVIATION	% DEVIATION
1961	13.236	12.971	.265	2.00
1962	12.679	12.546	.133	1.05
1963	12.677	13.073	-.396	-3.12
1964	13.582	13.187	.395	2.90
1965	14.077	14.759	-.683	-4.85
1966	15.207	14.915	.292	1.92
1967	16.928	16.707	.221	1.31
1968	17.322	17.552	-.230	-1.33
1969	18.805	19.086	-.281	-1.49
1970	19.682	21.516	-1.834	-9.32
1971	21.433	24.994	-3.560	-16.61
1972	25.229	25.832	-.603	-2.39
1973	30.433	33.213	-2.780	-9.13
1974	39.300	44.556	-5.256	-13.37
1975	56.202	56.871	-.669	-1.19
1976	75.939	73.845	2.094	2.76

STATISTICS: MAE=1.2 MAPE=4.7 RMSE=1.9 RMSPE=6.6 TIC=.00

YEAR	WA	WAS	DEVIATION	% DEVIATION
1961	5.256	5.646	-.390	-7.42
1962	5.386	5.377	.009	.17
1963	5.473	5.501	-.028	-.51
1964	5.990	5.487	.503	8.39
1965	6.467	6.007	.460	7.12
1966	6.616	6.071	.546	8.24
1967	7.175	7.314	-.139	-1.94
1968	7.672	7.524	.148	1.93
1969	8.205	7.993	.212	2.59
1970	8.876	8.667	.208	2.35
1971	8.965	8.998	-.033	-.37
1972	9.534	9.045	.489	5.13
1973	10.292	10.021	.271	2.63
1974	10.557	11.051	-.495	-4.69
1975	13.250	12.500	.750	5.66
1976	14.775	15.121	-.346	-2.34

STATISTICS: MAE=1.3 MAPE=4.4 RMSE=1.5 RMSPE=5.1 TIC=.00

YEAR	WLM	WCNS	DEVIATION	% DEVIATION
1961	23.543	24.436	-.894	-3.80
1962	21.933	22.396	-.463	-2.11
1963	21.204	20.706	.498	2.35
1964	22.035	20.086	1.948	8.84
1965	22.508	21.966	.542	2.41
1966	22.803	23.032	-.230	-1.01
1967	24.634	23.075	1.559	6.33
1968	26.994	24.798	2.196	8.14
1969	30.615	28.183	2.432	7.94
1970	30.879	32.549	-1.671	-5.41
1971	30.047	32.307	-2.260	-7.52
1972	32.112	33.144	-1.032	-3.21
1973	35.762	36.230	-.468	-1.31
1974	38.206	39.197	-.991	-2.59
1975	52.791	50.483	2.308	4.37
1976	63.867	65.721	-1.853	-2.90

STATISTICS: MAE=1.3 MAPE=4.4 RMSE=1.5 RMSPE=5.1 TIC=.00

TABLE 5-3 Continued

YEAR	WHM	WMS	DEVIATION	% DEVIATION
1961	6.802	6.731	.071	1.04
1962	6.658	6.750	-.093	-1.39
1963	6.456	7.238	-.781	-12.10
1964	6.565	7.387	-.822	-12.52
1965	6.645	7.764	-1.119	-16.84
1966	7.679	7.767	-.088	-1.14
1967	8.145	8.308	-.163	-2.00
1968	8.645	8.453	.192	2.22
1969	9.212	8.663	.549	5.96
1970	9.414	9.005	.409	4.34
1971	9.869	9.741	.127	1.29
1972	10.345	9.931	.414	4.00
1973	11.167	10.771	.396	3.55
1974	11.454	11.627	-.173	-1.51
1975	14.377	14.994	-.616	-4.29
1976	16.032	15.168	.863	5.38

STATISTICS: MAE=.43 MAPE=5.0 RMSE=.54 RMSPE=6.8 TIC=.00

YEAR	WS	WSS	DEVIATION	% DEVIATION
1961	32.999	33.007	-.008	-.03
1962	32.295	32.929	-.634	-1.96
1963	31.319	35.122	-3.804	-12.15
1964	31.847	35.708	-3.861	-12.12
1965	32.228	37.593	-5.365	-16.65
1966	37.241	37.767	-.526	-1.41
1967	39.501	40.628	-1.127	-2.85
1968	41.925	41.434	.491	1.17
1969	44.678	42.393	2.285	5.11
1970	45.657	43.866	1.791	3.92
1971	47.862	47.434	.428	.90
1972	50.173	48.446	1.726	3.44
1973	54.127	52.919	1.208	2.23
1974	55.517	57.517	-2.000	-3.60
1975	69.686	73.430	-3.744	-5.37
1976	77.704	74.549	3.155	4.06

STATISTICS: MAE=2.01 MAPE=4.8 RMSE=2.5 RMSPE=6.6 TIC=.00

WIC	WICS	DLVIATION	% DFVIATION
21.148	21.878	-.730	-3.45
20.697	21.801	-1.104	-5.33
20.071	22.989	-2.919	-14.54
20.410	23.351	-2.942	-14.41
20.654	24.340	-3.686	-17.85
23.867	24.502	-.635	-2.66
25.315	26.176	-.861	-3.40
26.869	26.870	-.000	-.00
28.633	27.672	.961	3.36
29.261	28.831	.430	1.47
30.674	31.167	-.493	-1.61
32.155	32.386	-.232	-.72
34.710	34.673	.337	.11
35.601	36.777	-1.176	-3.30
44.687	46.067	-1.380	-3.09
49.829	46.864	2.965	5.95

MAF=1.3 MAPE=3.1 RMSE=1.7 RMSPE=4.4 TIC=.00

WO	WOS	DLVIATION	% DFVIATION
91.608	65.781	25.826	28.19
102.331	74.979	27.352	26.73
81.765	101.067	-19.302	-23.61
88.219	75.091	13.128	14.88
94.182	99.271	-5.089	-5.40
102.529	89.181	13.348	13.02
111.737	121.485	-9.748	-8.72
106.681	114.188	-7.507	-7.04
112.265	121.617	-9.352	-8.33
114.728	131.160	-16.432	-16.07
131.411	155.537	-24.126	-18.36
142.214	106.387	35.827	25.19
165.846	189.749	-23.303	-14.41
179.936	204.352	-24.416	-13.57
237.000	194.455	42.545	17.95
287.074	275.972	11.102	3.87

MAE=19 MAPE=15 RMSE=22 RMSPE=17 TIC=.0

TABLE 5-3 Continued

YEAR	WWP	WWS	DEVIATION	% DEVIATION
1961	51.657	45.309	6.347	12.29
1962	49.644	49.229	.415	.84
1963	48.142	54.272	-6.130	-12.73
1964	48.953	56.239	-7.286	-14.88
1965	49.540	61.434	-11.895	-24.01
1966	57.246	60.644	-3.398	-5.94
1967	87.524	68.795	18.729	21.40
1968	64.447	70.087	-5.639	-8.75
1969	68.677	71.973	-3.296	-4.80
1970	70.183	75.786	-5.603	-7.98
1971	80.389	86.889	-6.500	-8.09
1972	86.997	88.462	-1.464	-1.68
1973	101.454	102.017	-.563	-.56
1974	110.076	116.297	-6.221	-5.65
1975	144.986	158.644	-13.658	-9.42
1976	175.618	162.047	13.571	7.73

STATISTICS: MAE=6.9 MAPE=9.1 RMSE=8.5 RMSPE=11.2 TIC=.00

YEAR	WIM	WIMS	DEVIATION	% DEVIATION
12.557	12.272	.285	2.27	
11.796	12.086	-.289	-2.45	
11.659	12.069	-.410	-3.52	
12.075	12.160	-.385	-.70	
17.363	13.144	-.780	-6.31	
13.344	13.514	-.171	-1.28	
15.125	14.231	.894	5.91	
15.210	14.926	.285	1.87	
16.384	16.111	.273	1.66	
16.663	17.695	-1.332	-6.20	
17.192	18.529	-1.337	-7.77	
18.407	19.029	-.622	-3.38	
20.352	21.021	-.670	-3.29	
21.798	23.210	-1.412	-6.48	
29.112	30.515	-1.402	-4.82	
34.131	34.288	-.157	-.46	

STATISTICS: MAE=.63 MAPE=3.6 RMSE=.8 RMSPE=4.3 TIC=.00

YEAR	WBT	WBTS	DEVIATION	% DEVIATION
1961	91.246	95.241	-3.996	-4.38
1962	90.755	97.768	-7.013	-7.73
1963	90.753	105.373	-14.620	-16.11
1964	97.283	108.447	-11.164	-11.48
1965	104.912	119.389	-14.477	-13.80
1966	121.544	124.255	-2.711	-2.23
1967	139.935	140.920	-.985	-.70
1968	152.614	149.004	3.610	2.37
1969	170.430	160.562	9.868	5.79
1970	184.494	175.539	8.955	4.85
1971	200.690	193.199	7.491	3.73
1972	222.857	200.945	21.912	9.83
1973	250.109	232.370	17.739	7.09
1974	265.772	264.033	1.739	.65
1975	349.379	351.475	-2.095	-.60
1976	412.976	397.452	15.524	3.76

STATISTICS: MAE=9.0 MAPE=5.9 RMSE=10.9 RMSPE=7.5 TIC=.00

FOOTNOTES

Chapter 5

1. For more detailed analysis, see Pindyck and Rubenfeld (1976), pp. 314-320.

2. Two observations are lost because of the existence of lags and correction for autocorrelation in some equations.

3. Y^a and Y^s are each a vector of (nxl) dimension where n is the number of endogenous variables.

4. Theil (1966), pp. 26-36, and Koutsoyiannis (1977), pp. 492-494.

5. Cooper (1972), pp. 813-925.

6. The errors MAE, MAPE, RMSE, RMSPE and TIC are all in terms of the "levels" of variables. Thus they might have a higher tendency to compound over time than errors measured in terms of "changes". (See Fair (1971), pp. 128-129; and Parhizgari (1976), p. 122.) For this reason the errors presented here might be overestimated.

7. Theil (1966), pp. 76-77.

8. See Pindyckk and Rubenfeld (1976), pp. 318-320.

9. See Wynn and Holden (1974), pp. 178-185, Parhizgari (1976), pp. 122-126, and Palma-Carrillo (1976), pp. 209-211.

10. This is mainly due to the price deflator for government total investment (IGTPD) which has very poor predicted values for these periods. This variable enters the budget constraint in order to transform some relevant variables which are in real terms, to their nominal values.

11. There are a total of 107 endogenous variables in the model, out of which 93 variables are analysed here. The rest of the variables do not have very significant natures such as slope dummy variables.

12. One year lag of CG is originally used in the CG equation. After correction for autocorrelation, a two year lag of CG is required.

13. Total sectoral investments are given in the Iranian national accounts data. See the appendix to Chapter 3 and the data appendix.

14. All sectoral real government investments are considered to be endogenous since they include the effect of the endogenous price deflator for total government investment (IGTPD).

CHAPTER 6

POLICY SIMULATION

(6-1) INTRODUCTION

Policy simulation and/or multiplier analysis are one of the main uses of any macro model. The examination of an econometric model is not complete until multiplier anlaysis is explored. It is only then that concrete suggestions as to policy action can be made so as to alter the course of future economic activity.

Obtaining multipliers for linear models involves a straightforward procedure[1]. Unfortunately, no such simplified scheme can be used if the equations are non-linear as in the case of the model we have presented in this study. Nonlinearities are due to the use of relative prices in import functions and price times quantity terms in the accounting identities.

Additional problems arise with the introduction of a dynamic structure through lagged variables. The effects of disturbing the model at any period will be transmitted to the other periods by the lagged variables. Hence, a sequence of multipliers will be generated. The first period

multiplier is called the impact multiplier, and the sequence of multipliers are known as the dynamic multipliers.

As mentioned in the first section of the previous chapter, the model was solved through the method of successive iterations[2]. Using actual values of the exogenous variables and lagged endogenous variables generated by the model, the solution is computed for a number of years - sixteen years in this study (1962-1976). The solution obtained is called the control solution. The impacts of policy changes are investigated by introducing a disturbance, for example, a one unit increase in one of the exogenous variables, and computing a new solution. The solution obtained is a disturbed solution. The ratio of the difference of the endogenous variables of the control and disturbed solution over the difference of the exogenous variables of the control and disturbed solution yields the multipliers. If the disturbance is a one unit change in the exogenous variable, the above mentioned ratio reduces to the difference of the endogenous variables in the control and disturbed solution.

The results of this procedure will depend on the particular period in which the disturbance is introduced due to the non-linearity of the model.

The main objective of policy simulation of the model is to examine the effects of altering the pattern of

The policy experiments are implemented over the period 1965 through 1976. The year 1965 is chosen for this purpose because the total government current investment expenditures were doubled in that year, due to the rise in the government's total revenues from oil particularly, and non-petroleum sources generally. There are, in total, seven policy experiments as follows:

Policy #1: A non-sustained one billion current Rials increase in the total government investment in agriculture sector (IAGA) in the period 1965.

Policy #2: A sustained one billion current Rials increase in the total government investment expenditures in the agriculture sector in the period 1965-1976.

Policy #3: A sustained one billion current Rials increase in government investment in agriculture sector in the period 1965-1976, accompanied by a simultaneous decrease in the government investment in the construction sector by the same amount; the total government investment is held constant.

Policy #4: A sustained one billion current Rials increase in government investment in the agriculture sector in the period 1965-1976, accompanied by a simultaneous decrease in its investment in the manufacturing and mining sector by the same amount; the total government investment remains unchanged.

Policy #5: A sustained one billion current Rials increase in government investment in the agriculture sector in the period 1965-1976, accompanied by a simultaneous decrease in its investment in the services sector by the same amount; the total government investment is held constant.

Policy #6: A sustained one billion current Rials increase in the government investment in construction in the period 1965-1976.

Policy #7: A sustained one billion current Rials increase in the total government investment in the period 1965-1976, which is distributed equally between the agriculture and construction sectors.

As historical analysis indicates (see Chapter 2), government industrialization policies in the 1960s and especially the 1970s, generated an unbalanced economic growth between the Iranian agriculture and non-agriculture sectors. The non-agriculture sector, by using a large portion of the financial and non-financial resources, grew very rapidly, while the agriculture sector witnessed relatively slower growth. By choosing the above policy simulations, we intend to analyse some of the consequences of this unbalanced growth in the Iranian economy.

(6-2) Policy Simulation One:

One Billion Current Rials Increase in Total Government Investment Expenditures in the Agricultural Sector (IAGA) in Period 1(=1965)

The purpose of implementing this policy is to investigate the behavioural response of the model to a one shot disturbance. IAGA is allowed to increase by one billion current Rials only in period 1(=1965). Table 6-1 shows the effects of this policy on the behavioural variables of the model. A general view of the behaviour of the variables indicates that the majority of them have a cyclical response pattern. Only the effects on the variables CRP, IGT, IAP, KAP, KAG, KAT, LEA and VA are not cyclical, with the initial impact dampened throughout the period. This is so, perhaps, because prices are not present in the corresponding equations or do not have any significant effect on the explanatory variables in these equations. A close look at the variations of the variables will help to explore the effects of this policy on the model.

The private consumption in rural areas (CRP), is not affected in the initial year (1965) because the explanatory

variable VA which is disturbed by the lagged private capital stock in agriculture (KAP-1) does not change until the next period (1966). The effect of the policy on CRP reaches a peak in 1971 and then slowly declines. This response pattern is as a result of similar changes in VA, which in turn is affected by KAT. Capital stock in agriculture (KAT) reaches a peak in 1970 and then gradually declines. The pattern of reponse of KAT is the result of changes in its two component variables, KAG and KAP. The government capital stock in agriculture (KAG) declines gradually due to depreciation. The private capital stock in agriculture (KAP) reaches a peak in 1972 and then declines and is based on increased private investment in agriculture (IAP), which is stimulated by government investment. The increase in IAP is largest in 1966, and declines thereafter. This pattern of response of IAP, coupled with depreciation accounts for the pattern of KAP. The total cumulative effect on this variable over the simulation period is fairly high (2.316 billion constant Rials). The increment in private urban consumption (CUP) has a cyclical pattern. The effect would appear to extend well beyond the end of the simulation period (1976), which is the result of the interaction of cyclical patterns in the price of consumer goods (CTPD), urban disposable income (DYU) and private credit (CTPA), as well as the lagged CUP term. The urban private consumption

(CUP) increases in the initial period. This is because changes in the private credit (CTPA) and urban disposable income (DYU) overcome the adverse effect of the rise in the price of domestically produced consumer goods (CTPD). In the second and third periods (1966 and 1967), CUP tends to fall since the rise in CTPA is not able to override the negative effects of the rise in CTPD and the fall in DYU. In periods four and five, DYU and CTPA rise, while CTPD falls, all leading to an increase in CUP. In periods seven through ten, there are falls in CTPA and DYU so that the increment in CUP begins to decline. The decline is gradual due to the lagged CUP term in the CUP equation. Finally, in the eleventh and twelfth periods, the increment in CUP becomes negative, primarily due to the large fall in DYU. The total cumulative effect of this policy in the simulation period, on CUP is positive and it stands to an amount of 1.103 billion constant Rials. However, the simulation is too short to determine whether the cyclical response pattern will damp out over time, and is thus too short to accurately determine the cumulative effect.

Changes in CTPD, with the exception of periods 1 - 3 (1965-1967) and 12 (1976) are negative. The variable is determined through the interaction of supply and demand for domestically produced and consumed consumer goods and services in the model. This policy introduces greater

shifts in the supply side than in the demand side in eight out of twelve periods. Despite a fall in value-added in manufacturing and mining (VMM), transportation and communications (VTC), and construction (VCN), value-added in agriculture (VA) and services (VS) rises enough, given the adjusted input-output coefficients, to increase the domestic supply of consumer goods. On average, over the simulation period, a shift in the supply is larger than that of demand, so that the total cumulative changes in CTPD for this period is -0.002. Again, a longer simulation period would be desirable in order to estimate the cumulative effect more accurately. The price deflator for total consumption (CTDPD) has a pattern of change similar to CTPD.

Total credit to the private sector, CTPA, is affected by money supply and its own one year lagged value. CTPA follows the pattern of the money supply (MOSA) and hence the monetary base (MBA), which in turn are affected by the net bond sold to the central bank, ΔBCBA (for financing the deficit which results from the increase in government investment in agriculture, IAGA), and changes in foreign exchange reserves, FEXRA (which accrue mainly because of changes in total imports). The magnitude of the changes in CTPA is greater than that of the changes in MOSA and MBA. The total changes of CTPA for 12 years is 3.964 billion constant Rials. The total cumulative change in MBA is 1.525

billion constant Rials as a result of cumulative changes in net government bonds sold to the central bank (BCBA), and foreign exchange reserves (FEXRA) of 2.832 and -1.307 billion constant Rials, respectively.

Urban disposable income (DYU) is computed as a residual and is affected by several endogenous variables, namely government revenues from indirect tax (GRIDT) and direct taxes (GRDT), value-added in agriculture (VA) and real gross national product (GNPM). (See equation 3.3.75 in Chapter 3.) Changes in DYU are similar to that of GNPM with the exception of period seven through nine (1971-1973), in which the changes in DYU are negative, while those of GNPM are positive, but they are close to zero. This difference in the pattern of changes is mainly caused by VA, because DY (total disposable income) mirrors the variation of GNPM. The total cumulative effects of the policy on DYU and DY are -2.979 and -0.433 respectively. At the end of the simulation period there seems to be an acceleration in the decline of DYU, DY and GNPM. A longer simulation period would be desirable in order to determine whether this response is stable.

Depreciation (DEP) basically follows the pattern of changes of GNPM. Net government bond sold to the central bank (ΔBCBA), which is the sole financing source of the government deficit in this policy, increases almost the same

amount as the deficit (1.00 billion current Rials) in the initial period (1965). In later periods, there is increased government investment in services as well as changes in different sources of government income which result in a small deficit in all but period six and twelve (1970 and 1976). The cumulative total change in ΔBCBA is 2.832 billion Rials.

The functional distribution of income (DISTOY), which is the ratio of the gross profit (PROFIT) to the gross total wage bill (WBT), falls in all periods except 5 and 6 (1969 and 1970). In these two periods, PY (personal income from which the total wage bill is subtracted in order to arrive at the total gross profits) changes by a larger percentage than WBT. However, the cumulative total changes in DISTOY is -0.034 points, indicating a fall in the share of profits.

Foreign exchange reserves (FEXRA) fall in all periods except in periods 2 - 4 (1965-1968) and 11 and 12 (1975 and 1976). In these periods, MT (total imports of goods and services), which is influenced by the real gross national product (GNPM) tends to fall. As XT (total exports of goods and services) and NIOCA (net inflow of financial capital) are assumed to be exogenous, changes of FEXRA are soley determined by MT. Foreign exchange reserves fall in the amount of 1.317 billion current Rials during the 12 periods, due to implementation of the first policy.

Real gross national product (GNPM) falls in periods 2, 3, 10, 11 and 12 (1966, 1967, 1974, 1975 and 1976 respectively). Changes in GNPM are influenced by all of its endogenous component variables. Therefore, it is difficult to identify those variables which have the most influence on GNPM. However, the fall in total real private investment (IPT) is a major factor which leads to a total cumulative fall of GNPM in the amount of 0.322 billion constant Rials during the twelve periods.

Government revenues from indirect tax (GRIDT) which is a function of imports of consumer goods (MC) and its own one year lagged value (GRIDT-1), basically follows the pattern of MC with a lag. The total cumulative effect of the policy on GRIDT is an increase of .073 billion constant Rials. Government revenues from direct tax resources (GRDT) follow the pattern of changes of its explanatory variable PY (personal income). The total cumulative change of GRDT is positive in the amount of 0.028 billion constant Rials. Government revenues from petroleum (GRP) are completely unaffected by implementation of this policy. GRP is soley dependent upon XO (the total exports of petroleum) which is assumed to be exogenous. This is an indication of the forward linkages of the petroleum sector to the rest of the sectors in the Iranian economy, and the absence of any reprecusionary effects (i.e. backward linkages) from these sectors.

Total private investment (IPT) falls throughout the period, with a total cumulative change in the amount of 7.634 billion constant Rials. Since the total cumulative change of total government investment (IGT) is 3.938 billion constant Rials, total investment in these periods falls almost 3.6 billion constant Rials. With the exception of private investment in agriculture (IAP); private investment in all other sectors - construction (ICNP), manufacturing and mining (IMMP), transportation and communication (ITCP), and services (ISP) tend to fall. Two points worth mentioning here: 1) increasing government investment expenditures in the agricultural sector drive economic resources (such as labour and private capital) from the other sectors and 2) government influences the decision of the private sector in the areas of investment; that is, once the government increases its investment in the agriculture sector, the private sector, with a one year lag, begins to make investments in this sector.

One mechanism which draws resources out of other sectors is the higher price of investment goods (ITPD), which is caused by the increased government demand for investment goods. This results in a reduction in private investment in other sectors, which in turn reduces the capital stock, employment and value-added in these sectors.

Private investment in manufacturing and mining (IMMP), construction (ICNP), and transportation and communication (ITCP), fall throughout the period by the total cumulative amount of 5.255, 0.945 and 1.438 billion constant Rials respectively. Private investment in services (ISP) increases in some periods and falls in others. However, the cumulative total decline is 0.244 billion constant Rials. Private investment in agriculture (IAP) is the only private investment that increases, by a total cumulative amount of 0.248 billion constant Rials.

There is some indication that the decline in ICNP, IMMP and ITCP are increasing at the end of the simulation period. The equations for value-added, private investment and private capital stock in each of these sectors form a dynamic system which may be unstable. This possibility may be checked by substituting the value-added and private invesment equations into the capital stock equation and examining the coefficient of the lagged capital stock. When this is done for the private capital stocks in manufacturing and mining (KMMP), construction (KCNP), and transportation and communication (KTCP), the resulting values are 0.96, 1.04 and 1.02 respectively. These high values are primarily due to the low depreciation rates which are assumed for these sectors. Thus, the capital stock in these sectors appears to be marginally unstable. There are other

feedbacks in the model, however, which may stabilize these capital stocks, in particular through the price of investment goods. A fall in investment demand will reduce the price of investment goods and encourage more investment. There is also a possibility that the slope dummies which are introduced in later periods have changed the structure of the model, making it unstable. These possibilities can only be investigated when a much longer simulation period is considered. Examination of this feature of the model will be reserved for future work.

Changes in government investment in services (ISG), which is defined as a residual, are explained by the other government sectoral investments (except government investment in water and power, IWPG, which is unaffected by this policy), which are exogenous in their current values and become endogenous in real terms (due to changes in the total government investment price deflator, IGTPD), and total government investment (IGT). The total cumulative increases in ISG amount to 1.862 billion constant Rials during the 12 periods. Government investment in water and power (IWPG) is unaffected by this policy. This sector is basically a government-owned monopoly. The formulation of the equation for IWPG is such that there is no feedback from the activities of other sectors (see equation 3.3.10 in Chapter 3). Changes in total government investment (IGT),

which is originally increased through the rise in nominal investment in the agriculture sector, dampen over the period. The endogenous explanatory variables in this equation, urban and rural population (POPU and POPR respectively), government revenues from petroleum, indirect and direct taxes, (GRP, GRIDT and GRDT respectively), with the exception of GRDT, have a similarly dampened pattern. For the entire period, IGT increases by 3.938 billion constant Rials.

In the definition of the total government investment price deflator, IGTPD (see Chapter 3, equation 3.3.62), there are only three endogenous variables whose behaviour influence its pattern of response. These are IWPG, IGT and ISG. As IWPG is unaffected by the policy, only IGT and ISG are sources of changes in IGTPD. With the exception of periods one and twelve, IGTPD falls during the period. The total reduction amounted to 0.027 points. The total domestically produced investment price deflator (ITPD) is determined by the forces of demand for and supply of domestically produced and consumed investment goods. This variable is rising throughout the period. This indicates that the magnitudes of outward shifts in the demand for the domestically produced and consumed investment goods are greater than that of the corresponding supply. The reasons for this event comes mainly from the fall in the value-addeds

of construction (VCN), manufacturing and mining (VMM) and transportation and communication (VTC) sectors. Although value-addeds in agriculture (VA) and especially services rise a significant amount, their relatively small adjsuted input-output coefficients do not allow these changes to be transmitted to the supply side of the investment goods balance. Therefore, ITPD tends to rise for the total of 0.063 points.

The patterns of changes of capital stocks follows closely the corresponding investments. The effects of the policy on government sectoral investments (with the exception of capital stock in water and power, KWPG) dampen and remain positive throughout the period (1965-1976). The total changes are: agriculture (KAG), 10.722, construction (KCNG), 0.739, manufacturing and mining (KMMG), 1.805, transportation and communication (KTCG), 1.828, services (KSG), 13.400, and oil (KOG), 1.758 billion constant Rials. On the contrary, the private capital stocks in all sectors but agriculture tend to fall and their total changes are: agriculture (KAP), 1.953, construction (KCNP), -4.310, manufacturing and mining (KMMP), -25.915, transportation and communication (KTCP), -5.271, and services (KSP), -2.758 billion constant Rials. However, the change in the grand total capital stock of the economy (KT), remains positive until period 6 (1970) and then starts declining for the rest of the simulation period. Its total fall counted for 6.052 constant Rials.

Generally, the sectoral labour employment, value-added and capital stocks have similar patterns of change due to the effects of the policy. However, this is not surprising because in each sector, capital stock determines value-added and value-added determines how many labourers are required for that sector annually. Like the corresponding capital stocks, labour employed in the construction (LECN), manufacturing and mining (LEMM) and transportation and communication (LETC) sectors tend to fall. LECN, LEMM and LETC decline 0.004, 0.037 and 0.003 million respectively in 12 periods. This occurs because of the decline in demand for labour in those sectors which are determined by their corresponding value-addeds. Annual declines in the value-addeds of construction (VCN), manufacturing and mining (VMM) and transportation and communication (VTC), continue to prevail throughout simulation period. The respective total changes are -0.237, -15.523 and -0.943 billion constant Rials. Labour employment, capital stock and value-added in manufacturing and mining fall (to a great extent) more than the other two sectors. This clearly indicates that most of the additional resources used in the agriculture and services sectors are received from the manufacturing and mining sector.

Total labour employment in the agriculture (LEA) and services (LES) sectors increases annually. However, the magnitudes of these increases are not large enough to compensate for the total fall of labour employed in the other sectors[3]. The total increases in LEA and LES amount to 0.0002 and 0.023 million man-years. Hence, total employment in the economy falls 0.021 million during the simulation period of 1965-1976. Value-addeds in the agriculture (VA) and services (VS) sectors also increase annually. The respective total changes are 2.535 and 20.567 billion constant Rials. These increases in VA and especially VS are large enough to compensate for the fall in VCN, VMM and VTC.

The total imports of goods and services (MT) are basically influenced by the changes in the real gross national product (GNPM) throughout the period. This is because GNP is the only endogenous variable in the MT equation. Thus, as the total GNPM falls, the total MT also falls by the amount of 0.083 billion constant Rials. Variations in MC (imports of consumer goods) are explained by DY (disposable income), lagged MC and the relative price of MCPD/CTPD (the ratio of price deflators for imports of consumer goods to domestic consumer goods). However, the pattern of changes follows closely that of DY. The total amount of increase in MC measures 0.033 billion constant Rials.

Import of intermediate goods (MINT) increases annually and totally, basically due to the rise in total value-added and the fall in the relative price MKPD/ITPD (the ratio of price deflators for imports of capital goods to domestic capital goods). The total increase is 5.239 billion constant Rials. MK (imports of capital goods) is affected by the total gross investment (IT) and the relative price (MKPD/ITPD). Despite the fall in the former, MK increases in all periods except 11 and 12 (1975, 1976). This is mainly due to the fall in MKPD/ITPD throughout the period. The total increase is 0.643 billion constant Rials. Imports of non-factor services (MNFS) is a residual calculated by subtracting MC, MINT, and MK from MT. Hence, its changes are a by-product of the changes in all imports. This value falls 5.999 billion constant Rials in total during the period 1965-1976.

Monetary base (MBA) and money supply (MOSA), as well as banking credit to the private sector (CTPA) are related to each other. MBA determines MOSA directly and affects CTPA (through MOSA) indirectly. MBA is influenced by two variables, 1) ΔBCBA (changes in bonds sold to the Central Bank) and 2) FEXRA (foreign exchange reserves). In the earlier periods (1965-1970), MBA is influenced by ΔBCBA. However, from period 7 (1971) and onward, MBA follows closely the variation of FEXRA. It increases by

decreasing amounts up to the period 1969 and then falls until 1974 and increases again in 1975 and 1976. In total, MBA and MOSA rise 1.525 and 1.592 billion constant Rials respectively. Despite the total increase in the money supply, the consumer good price deflator (CTDPD) falls. This is mainly because of the supply effect of increased output in agriculture and services.

The policy effects on POPU (urban population) and POPR (rural population) come through WIMA (nominal wages in industry and mining). They both follow the patterns of change of WIMA which increases throughout the period. As WIMA is positively related to POPU and negatively to POPR, POPU tends to rise and POPR tends to fall (0.006 and 0.014 million in total, respectively).

Personal income (PY) changes along with GNPM. The total fall (0.415 billion constant Rials) is larger than that of GNPM (.332), basically because of the total increases in the amount of the government revenue from indirect taxes and levels of depreciation (GRIDT and DEP respectively).

Implementation of policy one, to some extent, narrows the differences in per capita consumption between the urban and rural areas. The ratio of the per capita consumption in the urban and rural areas (ROCUR) falls in total 0.031 points. This result is partly due to the fall in POPR throughout the period. Policies of this kind could

help to eliminate the disparities between these two areas which always follow implementation of unbalanced growth strategies by the developing nations. Under these programs, cities tend to grow rapidly without corresponding growth in the rural areas.

Nominal wages in all sectors except agriculture, and construction and services, fall in total during the 12 periods. Value-added and the domestic price deflator for consumer goods (CTPD) are the variables which determine the level of nominal wages in each sector. Nominal wages in agriculture (WAA) which is also affected by nominal wages in construction (WCNA), along with value-added in agriculture (VA) and CTPD increases in all the periods (1965-1976). Interaction of demand for LEA, due to the continuous rise in VA and supply of LEA (due to the rising WCNA and erratic changes of CTPD), leads to an increase in WAA throughout the period. The total increases in WAA amount to 0.197 thousand current Rials.

Nominal wages in construction (WCNA) tends to increase in each period. These wages are independent of the demand for labour in construction (indicated by VCN) since there is a horizontal supply curve of labour in construction. WCNA, which is affected by WCNA(-1) and CTPD, increases initially due to an increase in CTPD in 1965-1967. This increase persists for many years in spite of the later

fall in CTPD. The coefficient of WCNA(-1) which is of greater than unity is the main reason that the supply curve of labour (LECN) keeps shifting upward. Modification of this equation will be reserved for future work.

Nominal wages in manufacturing and mining (WMMA) and transportation and communication (WTCA) fall throughout the period. This is because VMM and VTC decline in the entire period and the fall in CTPD in many periods reinforces downward movements in WMMA and WTCA. The total reductions in these wages due to the implementation of this policy amounts to .133 and .202 thousand current Rials respectively.

In spite of significant increases in the value-added in services in periods 2 to 12 (1966 to 1976), the nominal wages in services (WSA) fall in 5 periods (4-6, 8 and 9). This indicates that in these periods the fall in CTPD is able to shift the supply curve of labour in services to the right to a greater extent than the right-ward shift of the corresponding demand which is mainly affected by VS. However, the total increase in WSA for the policy simulation period is 0.178 thousand current Rials.

Nominal wages in the petroleum (WOA) and water and power (WWPA) sectors fall in 9 periods. The patterns of change are exactly similar to that of CTPD because CTPD is the only factor which affects nominal wages in these

sectors. As was mentioned earlier, VO and VWP and hence LEO and LEWP are unaffected by the policy. That is, there are no increases in demand for labour in these sectors. Therefore, shifts in their supply of labour which are controlled solely by CTPD, determine the movements in these wages. The total decline in WOA and WWPA are .803 and 0.365 thousand current Rials.

Nominal wages in industry and mining (WIMA) increase throughout the period. Changes in WIMA are a by-product of wages and labour employed in the manufacturing and mining, construction, and water and power sectors. WIMA increases in total by 0.516 thousand current Rials.

Real wages in all sectors (which are the result of the divison of their corresponding nominal wages by CTPD), follow variations of their related nominal wages (see Table 6-1). The real total wage bill (WBT) which is a summation of labour employment in each sector multiplied by the corresponding real wages, increases throughout the period. This indicates that the higher wages and employment in the agriculture and services sectors are able to compensate for the lower wage bills in other sectors. This total increase for 12 years is 2.002 billion constant Rials.

Implementation of the first policy, (increase in government investment expenditures in the agricultural sector by one billion current Rials) causes some economic indicators such as real gross national product (GNPM), disposable income (DY), personal income (PY), total private investment (IPT) and total government investment (IGT) to fall. However, it helps WBT to rise, and hence decreases functional distribution of income (DISTOY) and it also increases value-added in the agricultural sector (VA), which raises employment and wages in this sector. The ratio of per capita consumption in urban to rural areas (ROCUR) also tends to fall, which helps to narrow the gap between these two areas.

POLICY SIMULATION #1: ONE BILLION CURRENT RIALS INCREASE IN GOVERNMENT INVESTMENT IN THE AGRICULTURE SECTOR IN 1965.

YEAR	CRP	CUP	CG	CTPD	CTDPD	CTPA	CTSA	DYU	DEP	ΔBCBA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	.025429	-.002882	.001145	.001119	2.545238	2.545238	.147684	0.000000	1.018920
1966	.181666	-.816186	-.006976	.001347	.001309	.822501	.822501	-.712969	.009582	.223823
1967	.207395	-.488433	-.008885	.000361	.000347	1.263003	1.263003	-.408142	-.024872	.331102
1968	.217131	.257109	-.008418	-.000488	-.000462	1.006488	1.006488	.090361	-.010362	.315739
1969	.220903	.823696	-.006939	-.000908	-.000854	.331925	.331925	.425628	.019080	.253942
1970	.220922	1.067396	-.004613	-.001447	-.001353	-1.258103	-1.258103	.516629	.040306	-.109952
1971	.221156	.478520	-.005822	-.000347	-.000319	-.984308	-.984308	-.053367	.046499	.084218
1972	.218414	.314796	-.007494	-.000772	-.000706	-.900819	-.900819	-.149379	.014271	.159136
1973	.214325	.249875	-.009818	-.000912	-.000808	-1.064061	-1.064061	-.249251	.003318	.098159
1974	.209927	.028064	-.015171	-.000443	-.000378	-.163170	-.163170	-.552300	-.086096	.279024
1975	.204836	-.199553	-.023908	-.000183	-.000161	.610426	.610426	-.876541	-.027919	.181459
1976	.199436	-.588057	-.036398	.000602	.000521	1.754812	1.754812	-1.157043	-.053859	-.003660
1 TOTAL	2.316	1.103	-.137	-.002	-.002	3.964	3.964	-2.979	.010	2.832

YEAR	BISTOY	FEXRA	GHPM	GRIDT	GRDT	GRP	IAP	ICNP	IHHP	ITCP
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.001603	-.039521	.147709	.002025	0.000000	0.000000	0.000000	-.061980	-.500210	-.153062
1966	-.000019	.092677	-.496193	.002301	.007495	0.000000	.076904	-.057220	-.404368	-.128693
1967	-.004072	.154897	-.228752	.001910	-.025278	0.000000	.054066	-.067223	-.474109	-.128222
1968	-.000247	.071555	.399506	.002737	-.010454	0.000000	.037327	-.064052	-.412349	-.100776
1969	.001717	-.126218	.707146	.005514	.016094	0.000000	.025566	-.060306	-.337785	-.079512
1970	.002431	-.374162	.841769	.009327	.034650	0.000000	.017154	-.053634	-.241064	-.052988
1971	-.002088	-.462976	.786198	.011942	.040201	0.000000	.012782	-.064757	-.316001	-.070425
1972	-.002638	-.505768	.127369	.012928	.011569	0.000000	.008885	-.074474	-.362527	-.087776
1973	-.003945	-.507606	.005051	.012447	.005084	0.000000	.006091	-.081137	-.376816	-.098070
1974	-.005355	-.341817	-.170351	.009946	-.000544	0.000000	.004324	-.099970	-.509024	-.143514
1975	-.005150	.051432	-.643003	.004853	-.016453	0.000000	.002964	-.121661	-.627192	-.185462
1976	-.005430	.678905	-1.030289	-.002542	-.033999	0.000000	.002002	-.138703	-.683955	-.209969
2 TOTAL	-.034	-1.307	-.332	.073	.028	0.000	.248	-.945	-5.255	-1.438

YEAR	ISP	IPT	ISG	IMPG	IGT	IGTPD	IIPD	INF	KAP	KAG
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.076255	-.799508	.043243	0.000000	.964248	.001466	.005469	.105779	0.000000	.957286
1966	-.182643	-.696021	.433383	0.000000	.729287	-.009128	.004392	.020092	.076904	.972852
1967	.080691	-.534797	.347904	0.000000	.538299	-.005057	.005282	-.094951	.128663	.966299
1968	.059781	-.480069	.275884	0.000000	.401439	-.002946	.004728	-.073909	.162130	.950395
1969	-.011913	-.463950	.212250	0.000000	.311184	-.002278	.004046	-.033967	.182832	.928897
1970	-.153285	-.483617	-.012062	0.000000	.252970	-.005718	.003112	-.040131	.194702	.918256
1971	-.059887	-.498288	.140859	0.000000	.212719	-.001079	.004190	.096294	.201643	.896808
1972	-.021009	-.536901	.132581	0.000000	.170524	-.000849	.004723	-.029105	.204478	.873080
1973	-.033924	-.583852	.080688	0.000000	.135789	-.000779	.004682	-.001313	.204434	.850917
1974	.018460	-.729724	.082874	0.000000	.106162	-.000448	.006320	.040349	.202629	.826944
1975	.008203	-.923149	.061629	0.000000	.074823	-.000171	.007603	.012105	.199511	.802816
1976	.128252	-.904373	.062950	0.000000	.040494	.000323	.008252	.039127	.195527	.777765
3 TOTAL	-.244	-7.634	1.862	0.000	3.938	-.027	.063	.040	1.953	10.722

YEAR	KAT	KCNP	KCNG	KCNT	KMMP	KMMG	KMMT	KICP	KICG	KICT
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.957286	-.061780	-.004951	-.066930	-.508210	-.003496	-.511706	-.153062	-.015169	-.168230
1966	1.049756	-.115482	.021575	-.093907	-.882085	.035364	-.846721	-.258796	.102879	-.155917
1967	1.094962	-.175776	.036295	-.139480	-1.303269	.061398	-1.241871	-.348198	.160977	-.187221
1968	1.112524	-.229280	.043623	-.185657	-1.637422	.094044	-1.542578	-.396746	.173810	-.222935
1969	1.111730	-.275829	.047799	-.228031	-1.876962	.126028	-1.750934	-.416746	.176706	-.240041
1970	1.112958	-.312913	.071106	-.241807	-2.005408	.224125	-1.781284	-.407223	.231865	-.175358
1971	1.098451	-.358895	.076153	-.282742	-2.201085	.229000	-1.972085	-.416564	.221805	-.194758
1972	1.077559	-.411835	.079036	-.332799	-2.431547	.222460	-2.209087	-.441855	.197905	-.243950
1973	1.055351	-.468256	.094569	-.373687	-2.662470	.219681	-2.442789	-.473647	.177256	-.296391
1974	1.029569	-.540131	.095804	-.444327	-3.011746	.210769	-2.800977	-.546114	.155513	-.390600
1975	1.002327	-.629384	.093570	-.535814	-3.458234	.200553	-3.257681	-.649659	.134596	-.515063
1976	.973292	-.730324	.081191	-.649132	-3.936695	.184686	-3.752008	-.762179	.110234	-.651945
4 TOTAL	12.676	-4.310	.736	-3.574	-25.915	1.805	-24.110	-5.271	1.828	-3.442

YEAR	KSP	KSG	KST	KOG	KWPG	KT	LFA	LECN	LEMM	LEIC
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.076255	.043244	-.033011	-.012666	0.000000	.164741	0.000000	0.000000	0.000000	0.000000
1966	-.256610	.475330	.218719	.058682	0.000000	.230612	.000016	-.000099	-.000935	-.000167
1967	-.168224	.808973	.640752	.106984	0.000000	.274125	.000018	-.000138	-.001547	-.000155
1968	-.103394	1.060588	.957194	.132631	0.000000	.251178	.000018	-.000206	-.002270	-.000186
1969	-.112205	1.241021	1.128816	.147937	0.000000	.169477	.000018	-.000274	-.002818	-.000222
1970	-.262125	1.191728	.929605	.177806	0.000000	.021919	.000017	-.000337	-.003199	-.000239
1971	-.314148	1.296836	.982688	.185876	0.000000	-.182571	.000019	-.000357	-.003255	-.000174
1972	-.325732	1.390512	1.064780	.191043	0.000000	-.452454	.000018	-.000418	-.003604	-.000194
1973	-.349884	1.429485	1.079601	.196502	0.000000	-.781413	.000018	-.000491	-.004037	-.000242
1974	-.320928	1.469474	1.148546	.196318	0.000000	-1.261470	.000018	-.000552	-.004464	-.000295
1975	-.303098	1.487019	1.183921	.194588	0.000000	-1.927721	.000018	-.000657	-.005118	-.000389
1976	-.165753	1.505359	1.339607	.182030	0.000000	-2.558157	.000017	-.000792	-.005953	-.000512
5 TOTAL	-2.758	13.400	10.641	1.758	0.000	-6.052	.000111	-.004	-.037	-.003

YEAR	LES	LEU	LEWP	LET	MT	MC	MINI	MK	MNFS	MUSA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	0.000000	0.000000	.037578	.022547	.527586	.164740	-.677294	1.022492
1966	-.000083	0.000000	0.000000	-.001768	-.122037	.004726	.390344	.117170	-.634278	.330421
1967	.000550	0.000000	0.000000	-.001273	-.057469	-.002484	.514866	.136633	-.706484	.507383
1968	.001612	0.000000	0.000000	-.001031	.077687	.010754	.491097	.100373	-.524538	.404334
1969	.002407	0.000000	0.000000	-.000888	.177548	.033150	.453778	.066436	-.376017	.133344
1970	.002839	0.000000	0.000000	-.000917	.211289	.046943	.365090	.025055	-.225799	-.505414
1971	.002338	0.000000	0.000000	-.001430	.071888	.036705	.404272	.039258	-.408347	-.395423
1972	.002472	0.000000	0.000000	-.001724	.031971	.020702	.467381	.044749	-.500865	-.361883
1973	.002678	0.000000	0.000000	-.002075	.001268	.005164	.396619	.014243	-.414758	-.427463
1974	.002716	0.000000	0.000000	-.002577	-.080410	-.017715	.499382	.019490	-.581567	-.065550
1975	.002889	0.000000	0.000000	-.003257	-.173947	-.048606	.377941	-.042265	-.461019	.245225
1976	.002978	0.000000	0.000000	-.004261	-.258609	-.078387	.350115	-.042767	-.487569	.704956
6 TOTAL	.023	0.000	0.000	-.021	-.083	.033	5.239	.643	-5.999	1.592

YEAR	MMA	POPU	POPR	PY	ROCUR	ROINF	VA	VCN	VMM	VIC
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.979398	.000130	-.000392	.147685	.000276	.102687	0.000000	0.000000	0.000000	0.000000
1966	.316496	.000289	-.000797	-.478076	-.013382	.019675	.207397	-.005418	-.390183	-.056868
1967	.485999	.000349	-.000853	-.205989	-.009315	-.092578	.227430	-.007602	-.649636	-.052705
1968	.387292	.000335	-.000715	.317132	-.000848	-.070496	.237225	-.011292	-.946942	-.063788
1969	.127724	.000300	-.000566	.642752	.004292	-.031812	.241030	-.015030	-1.176236	-.075359
1970	-.484114	.000229	-.000348	.732136	.007057	-.037365	.240857	-.018459	-1.335110	-.081142
1971	-.378758	.000316	-.000645	.227957	.000829	.090576	.241124	-.019575	-1.358252	-.059277
1972	-.346632	.000379	-.000808	.100170	-.000173	-.026700	.237981	-.022889	-1.503741	-.065836
1973	-.409446	.000473	-.001040	-.010713	-.001648	.000112	.233454	-.026941	-1.684457	-.082464
1974	-.062787	.000705	-.001658	-.324200	-.003302	.037850	.228643	-.030252	-1.862658	-.100191
1975	.234889	.001067	-.002578	-.669937	-.006114	.010388	.223057	-.035969	-2.135781	-.132036
1976	.675246	.001586	-.003852	-.973887	-.009243	.033453	.217155	-.043376	-2.484074	-.174110
7 TOTAL	1.525	.006	-.014	-.415	-.031	.036	2.535	-.237	-15.521	-.943

YEAR	VS	VHP	WAA	WCMA	WMMA	WICA	WSA	WOA	WWPA	WIMA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	.012679	.019676	.017001	.050205	.085555	.450336	.204373	.023073
1966	-.072991	0.000000	.018704	.048438	.017418	.052251	.099450	.529652	.240367	.034779
1967	.483608	0.000000	.013256	.068483	.001102	.009548	.034787	.142148	.064510	.025476
1968	1.416759	0.000000	.007663	.079668	-.013492	-.028935	-.013637	-.191690	-.086993	.015600
1969	2.116441	0.000000	.009134	.086828	-.021244	-.048000	-.033778	-.356928	-.161982	.011130
1970	2.495913	0.000000	.000522	.086766	-.030300	-.073135	-.067968	-.569013	-.258231	.002905
1971	2.055438	0.000000	.012688	.105585	-.014124	-.022300	.007124	-.136473	-.061935	.027166
1972	2.172813	0.000000	.011547	.122470	-.021400	-.041736	-.022773	-.303775	-.137860	.027535
1973	2.354325	0.000000	.013209	.141787	-.024659	-.049822	-.030249	-.358482	-.162687	.036159
1974	2.187096	0.000000	.022066	.174678	-.018875	-.031383	.005311	-.174086	-.079004	.065354
1975	2.539539	0.000000	.031182	.221429	-.016821	-.023798	.027175	-.071900	-.032629	.100345
1976	2.617758	0.000000	.048746	.295026	-.007462	.005607	.087110	.236964	.107519	.146966
8 TOTAL	20.567	0.000	.197	1.451	-.133	-.202	.178	-.803	-.365	.516

1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.005483	-.002101	.007106	.018940	.037326	.319608	.117464	.007733	.115085	0.000000
1966	.010298	.021174	.006278	.016574	.043813	.389331	.143055	.016407	.146861	0.000000
1967	.009439	.053699	-.001610	-.000052	.017408	.093474	.034503	.018061	.101270	0.000000
1968	.009050	.073807	-.007872	-.013025	.005687	-.116541	-.044054	.018342	.103350	0.000000
1969	.008877	.082477	-.010744	-.018451	.004590	-.191742	-.075879	.018661	.124190	0.000000
1970	.007718	.085353	-.013024	-.022820	-.001782	-.262058	-.108378	.017471	.116324	0.000000
1971	.010654	.078673	-.007517	-.007847	.016893	-.049723	-.021289	.022744	.175881	0.000000
1972	.011832	.094278	-.009167	-.010747	.010786	-.117235	-.043696	.027182	.175180	0.000000
1973	.012397	.096816	-.008612	-.010257	.011276	-.098939	-.038208	.031053	.195228	0.000000
1974	.012619	.089561	-.006489	-.007034	.014882	-.031606	-.011980	.035551	.215520	0.000000
1975	.016085	.110657	-.006797	-.007427	.019561	-.011879	-.001572	.050927	.279559	0.000000
1976	.017056	.110506	-.006984	-.009486	.017864	.027484	.003803	.053956	.251434	0.000000
9 TOTAL	.132	.895	-.065	-.072	.198	-.050	-.046	.318	2.007	0.000

(6-3) Policy Simulation Two:

A Sustained One Billion Current Rials Increase in the Total Government Investment in the Agriculture Sector

The second policy simulation examines the effect of a sustained increase in the total government investment (IGT) in the agriculture sector. Nominal government investment in agriculture (IAGA) is allowed to increase by one billion current Rials for twelve periods (1965 to 1976). Table 6-2 provides the results of this policy.

The government finances the additional investment by sales of bonds to the Central Bank. However, the amount of bonds sold to the Central Bank (ΔBCBA) is more than the deficit which is created in each year. This is due to a rise in real government investment (endogenous) in other sectors throughout the simulation period, and is also due to a fall in foreign exchange reserves (FEXRA)[4] which continue to decline from 1969 onwards. The government budget remains in deficit throughout the simulation period. The total sales of bonds to the Central Bank (ΔBCBA) over the period 1965 to 1976 is 29.8 billion Rials. This increase leads to an expansion of the money supply and credit to the private sector.

The initial impact of the policy on private urban consumption (CUP) is a small increase of 0.0254 billion

constant Rials. Subsequently, CUP falls for three consecutive periods (1966-1968) and then increases until the last period (1976) in which it declines. The decrease in urban disposable income (DYU) depresses urban private consumption (CUP) in the earlier periods. However, the increase in total banking credit to the private sector (CTPA) tends to increase CUP. A sharp fall in DYU along with a rise in CTPD force CUP to decline in the last period (1976). Hence, despite a total of 11.08 billion Rials decline in DYU, CUP increases by 9.35 billion Rials. Rural private consumption (CRP) rises for the entire simulation period, due to the increase in value-added in agriculture (VA) in all periods. The pace of increase is fairly uniform and the total increase is 12.11 billion Rials. The rise in CRP causes the ratio of per capita consumption in urban to rural areas (ROCUR) to fall in most of the periods with the largest decline in the last period (-0.048). Therefore, the gap between per capita consumption in the urban and rural areas tends to narrow as the implementation of this policy is continued.

Changes in the monetary base (MBA), money supply (MOSA) and total banking credit to the private sector (CTPA) which are created by increases in government bonds sold to the Central Bank (ΔBCBA) and changes in foreign exchange reserves (ΔFEXRA), are positive in all periods. The total

changes in MBA, MOSA and CTPA are 21.05, 21.97 and 54.70 billion Rials respectively. Price deflators of domestically produced and total consumer goods (CTPD and CTDPD) change very moderately. This is mainly because the supply of domestically produced consumer goods (GQC) increases by almost the same amount as the corresponding demand. The total increase in GQC over the simulation period is 20.014 billion Rials. Gross national product at constant prices (GNPM) increases in most of the periods, falling in only five periods (1966 to 1968, 1975 and 1976). The total increase throughout the simulation period is 3.86 billion Rials. Real personal income (PY) and disposable income (DY) follow the pattern of changes in gross national product at constant prices (GNPM), with total changes in PY and DY which are 2.50 and 2.22 billion Rials, respectively.

Total gross investment (IT) increases in the first four periods (1965-1968), then it tends to fall throughout the remainder of the simulation period. The total reduction in IT is 16.85 billion Rials, which is the result of a fall in total private investment (IPT), which more than offsets the increase in government investment (IGT). Total private investment (IPT) declines by 49.48 billion Rials throughout the period (1965-1976). This variable falls due to falls in all the sectoral private investments, except in agriculture. Private investment in agriculture (IAP) increases by the

small amount of 1.82 billion Rials over the entire simulation period, while private investment in construction (ICNP), manufacturing and mining (IMMP), transportation and communication (ITCP), and services (ISP) are reduced by 4.95, 31.64, 9.25 and 2.45 billion Rials, respectively. Total government investment (IGT) increase by increasing amount in the first six periods (1965-1970), reaches its peak increase in period twelve (1971), with declining increases thereafter. The total increase of 29.64 billion Rials is not large enough to offset the total fall of 49.48 billion Rials in total private investment (IPT). The main factors which cause IPT to fall are declines in private capital stocks and value-addeds in the non-agriculture sectors, and an increase in the price deflator for domestically produced investment goods (ITPD). The large magnitudes of the declines of capital stock, investment and value-added in these sectors may be due to the potential instability problem discussed earlier (see Policy Simulation 1). If this is so, then the increases in total investment which occur in the first four periods may be more indicative of the overall impact. Attempts to improve the dynamic structure of the model will be reserved for future work. Total capital stocks in agriculture, services and the oil sector increase, while they fall in the rest of the sectors.

The government investment in real terms (endogenous) tend to increase throughout the period in all sectors (1965-1976)[5]. The only exceptions are government investment in construction (ICNG), manufacturing and mining (IMMG), transportation and communication (ITCG), and oil (IOG) sectors, which decline in the initial period and increase thereafter. The reason for this is that these variables are fixed in nominal terms and thus are solely affected by the price deflator for total government investment (IGTPD) which increases in the first period (1965) and falls for the rest of the simualtion period (1966-1976). As was mentioned in the theoretical chapter, IGTPD is defined as a ratio (see Chapter 3, identities and definitions block). The numerator of this ratio consists of the exogenous government nominal investments in agriculture (IAGA), construction (ICNGA), manufacturing and mining (IMMGA), transportation and communication (ITCGA), and oil (IOGA). The denominator of IGTPD consists of real total government investment (IGT) less real government investment in services (ISG) and water and power (IWPG). The numerator changes by one billion current Rials every year, while changes in the endogenous variables IGT and ISG are very erratic[6]. In the initial period (1965), the numerator increases more than the denominator which leads to an increase in IGTPD. However, in the later periods, IGT less ISG increases more than IAGA and hence

IGTPD declines. This causes upward movements of real government investments in agriculture, construction, manufacturing and mining, transportation and communication and oil, which in turn lead to increases in the government capital stocks in all sectors. This increase partially compensates for the declines in the private sectoral capital stocks in these sectors. Changes in the total capital stock (KT) are positive in the first seven periods (1965-1971). This occurs because the increase of the capital stocks in agriculture, services and oil outweigh the declines in the other sectors. However, the rapid declines of the private sectoral capital stocks, in most of the sectors (see Table 6-2), forces KT to fall significantly in the last five years (1972-1976), so that the total reduction is 21.78 billion Rials throughout the simulation period (1965-1976). Again, the potential instability of some sectoral models may be responsible for the decline of KT in these later periods.

Value-addeds in all sectors except services (VS), and agriculture (VA) tend to decline throughout the simulation period. This is mainly due to the substantial decreases in the corresponding capital stocks. However, the upward movements of value-added in services (VS) are large enough to increase the total value-added (VT). The total increase in VT is 35.45 billion Rials over the simulation period. The rise in VS (101.37 billion Rials in total),

stems mainly from a significant increase in government capital stock in services (KSG). Implementation of this second policy leads to a substantial increase in government investment in services (ISG), which rises by 69.06 billion Rials throughout. Changes in ISG basically occur due to changes in the total government investment and its price deflator (IGT and IGTPD respectively). Despite the increase in total value-added (VT), the amount of domestically produced investment goods (GQI) falls throughout the period. The total decrease of GQI is 20.64 billion constant Rials. Although supply of the domestically produced investment goods (GQI) and the corresponding demand (DQC = IT-MK)[7] fall for the entire period (1965-1976), the latter falls less than the former. Thus, the price deflator for domestically produced investment goods (ITPD) rises in all periods. The upward movement of ITPD (along with the other factors mentioned above, falls in sectoral value-addeds and capital stocks) tends to discourage private investment in construction (ICNP), manufacturing and mining (IMMP), transportation and communication (ITCP) and services (ISP).

Labour employments are affected by the corresponding value-addeds and thus tend to increase in agriculture (LEA) and services (LES), and fall in the rest of the sectors (labour employment in the water and power (LEWP) and oil (LEO) sectors remain unchanged since their respective

value-added are unchanged). Total employment (LET) falls in each period with a total decline of 90.6 thousand persons. Nominal wages, which are affected by the price deflator for domestically produced consumer goods (CTPD) and the corresponding labour employments decrease in manufacturing and mining (WMMA), and transportation and communication (WTCA). Wages in other sectors, on the contrary, increase. The total wage bill (WBT) rises in each period and the total increase is 10.46 billion Rials. The increase in the total wage bill, WBT, and the reduction in total gross profit, PROFIT (which is defined as personal income, PY, minus WBT), lead to a fall in the ratio of PROFIT to WBT (which is the index of the distribution of income, DISTOY) in each period. The largest reduction in DISTOY is -0.028.

Finally, the changes in total imports (MT) follow the changes in the main explanatory variable, gross national product at constant price (GNPM), increasing by 0.79 billion Rials in total over the simulation period. Imports of consumer goods (MC) are affected by disposable income (DY) and the price deflator for domestically produced consumer goods (CTPD). Although DY falls in 1966-1968, MC continues to increase due to the increase in CTPD which makes the domestically produced consumer goods more expensive relative to the counterpart imported goods. However, declines in DY and CTPD in the last two periods cause MC to fall. The

total increase in imports of consumer goods (MC) is 0.74 billion Rials for the entire simulation period (1965-1976). As gross domestic product at constant price (GDPM) and the price deflator for domestically produced investment goods (ITPD) rise, imports of intermediate goods increase in all periods, with a total increase of 27.85 billion Rials. Although total gross investment (IT) falls in 1969 and onwards, imports of capital goods (MK) increase. This is because the price of domestically produced investment goods (ITPD) rises, which makes domestically produced investment goods more expensive than imported capital goods (MK). However, the decline in total gross investment (IT) forces MK to fall in the last two periods (1975 and 1976). Over the entire simulation period, MK increases by 3.80 billion Rials.

In summary, implementation of the second policy has the following impacts:

Private investment (IPT) falls and government investment (IGT) tends to increase. However, the latter does not increase as much as the former, so that total investment (IT) declines. Economic resources are diverted from producing investment goods (GQI) to consumer goods (GQC). This shift moderates the rise in the price of domestically produced consumer goods (CTPD) and leads to a sharp increase in the price of domestically produced

investment goods (ITPD). Other indicators of the economy, GNPM, private urban and rural consumption (CUP and CRP respectively) move upwards, while government consumption (CG) falls. In real terms, the government devotes its resources more to investment purposes and decreases its consumption expenditures. Per capita consumption in the rural area increases more than in the urban area, and hence the ratio of the latter to former (ROCUR) tends to fall. Distribution of income, DISTOY, which is measured by the ratio of profit (PROFIT) to wage bill (WBT), moves downwards. That is, the gap between the profit makers and wage earners becomes narrower.

EXPENDITURES IN THE AGRICULTURE SECTOR IN THE PERIOD 1965-1976

YEAR	ERP	EOP	EC	EIPD	EIDPD	EIPA	EI	DYD	DEP	ZWCHA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	.025429	-.002882	.001145	.001110	2.545238	.022547	.147684	0.000000	1.018920
1966	.181666	-.794639	-.009160	.002206	.002145	2.674774	-.622133	-.572678	.009582	.975188
1967	.408724	-2.070027	-.021817	.004354	.004180	5.797646	-1.683120	-1.593956	-.015765	1.859882
1968	.618511	-1.062869	-.031728	.002581	.002449	7.770236	-.476086	-.889064	-.058679	2.534055
1969	.810205	1.049111	-.036193	.000343	.000326	7.472444	1.823123	.437926	-.010101	2.788954
1970	.980883	2.909514	-.033840	-.002523	-.002450	2.527518	3.856557	1.394869	.040429	1.666138
1971	1.155354	1.641553	-.040833	.000221	.000215	2.395710	2.756074	-.090411	.151624	2.080497
1972	1.345095	1.226562	-.054619	.000392	.000372	5.119715	2.517038	-.713650	.094314	3.451382
1973	1.484793	2.986707	-.063427	-.004449	-.003917	1.142278	4.408073	.132688	.048117	2.617877
1974	1.626768	1.900143	-.092017	-.000767	-.000640	5.097404	3.434894	-1.729859	.089093	4.294078
1975	1.713830	1.986028	-.134295	-.002813	-.002479	5.561327	3.565563	-2.769883	-.017922	3.989640
1976	1.788453	-.433038	-.199038	.000559	.000558	6.595622	1.156377	-4.033010	-.109805	2.571036
1 TOTAL	12.11428	9.36447	-.71985	.00125	.00187	54.69591	20.75891	-11.07934	.25089	29.84765

YEAR	DISTOY	FEXRA	GNPM	GRIOT	GRUT	GRP	IAP	ICNP	IRMP	ITCP
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.031603	-.039521	.149709	.002325	0.000000	0.000000	0.000000	-.061980	-.508210	-.153062
1966	-.089272	.054055	-.344164	.004040	.007495	0.000000	.076904	-.117300	-.896978	-.277063
1967	-.019490	.371030	-1.156288	.004315	-.018158	0.000000	.139294	-.197977	-1.509484	-.431447
1968	-.013613	.455904	-.315188	.006053	-.058609	0.000000	.159861	-.263400	-1.906790	-.540953
1969	-.004008	.086416	1.321497	.013833	-.013325	0.000000	.182685	-.310413	-2.083860	-.601042
1970	.003588	-.693559	2.648014	.027674	.066877	0.000000	.183839	-.333146	-2.028169	-.588179
1971	-.008514	-1.158637	1.499731	.041040	.128901	0.000000	.188571	-.413309	-2.515954	-.707110
1972	-.014005	-1.482873	.965088	.051861	.086314	0.000000	.199807	-.510996	-3.137137	-.974778
1973	-.0014483	-2.178332	1.911214	.062393	.042067	0.000000	.187118	-.556767	-3.221198	-.925923
1974	-.024605	-2.332616	.298107	.066532	.091386	0.000000	.183388	-.638941	-4.092197	-1.202977
1975	-.024320	-1.849661	-.846793	.063836	.007226	0.000000	.159670	-.751051	-4.752974	-1.428776
1976	-.028259	-.033064	-2.992373	.041977	-.045153	0.000000	.142805	-.804525	-4.984395	-1.519459
2 TOTAL	-.15858	-8.80086	3.12860	.38257	.27504	0.00000	1.81394	-4.95981	-31.63737	-9.25077

YEAR	ISP	IPT	ISG	IMPG	IGI	IGIPD	ITPD	II	KAP	KAG
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.076255	-.799508	.043243	0.000000	.964248	.001466	.005469	.164740	0.000000	.957286
1966	-.362007	-1.576465	.281183	0.000000	1.768048	-.014080	.009693	.191583	.076904	2.033752
1967	-.037003	-2.036618	1.030307	0.000000	2.260705	-.008555	.016525	.224087	.213891	2.948366
1968	.030255	-2.451027	1.391410	0.000000	2.532810	-.006686	.021059	.081783	.377336	3.745269
1969	-.025785	-2.838616	1.458261	0.000000	2.668694	-.009993	.023343	-.169922	.548701	4.427801
1970	-.591275	-3.356930	.835322	0.000000	2.813054	-.025756	.023323	-.543876	.716080	5.139305
1971	-.492546	-3.940347	1.320693	0.000000	3.060445	-.012896	.029968	-.879902	.893168	5.930652
1972	-.034216	-4.327320	1.989046	0.000000	3.017602	-.008083	.037304	-1.309718	1.056479	6.448458
1973	-.491097	-5.007868	1.269101	0.000000	2.990734	-.014632	.038486	-2.017134	1.211903	7.008020
1974	-.080894	-5.831622	1.782387	0.000000	2.769662	-.010061	.048477	-3.061960	1.358931	7.286076
1975	-.388018	-7.161149	1.180859	0.000000	2.536242	-.012064	.055983	-4.624907	1.477836	7.539741
3 TOTAL	-2.44804	-46.48204	13.62311	0.00000	29.63703	-.13341	.36873	-16.84502	9.49754	61.16366

YEAR	KAT	KCNP	KCNG	KCNI	KMNP	KMNG	KMNI	KICP	KICG	KICI
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.957286	-.061980	-.004951	-.066930	-.508210	-.003496	-.511706	-.153062	-.015169	-.168230
1966	2.110656	-.175562	.035132	-.140430	-1.374716	.055342	-1.319374	-.407166	.162721	-.244445
1967	3.162256	-.363005	.060209	-.302795	-2.801717	.099815	-2.701903	-.777537	.263128	-.514410
1968	4.122605	-.604624	.078238	-.526387	-4.540405	.178353	-4.362052	-1.201860	.307844	-.894016
1969	4.976504	-.878760	.133513	-.775247	-6.351841	.330339	-6.021501	-1.622524	.389465	-1.233159
1970	5.855385	-1.159180	.217020	-.942161	-7.998899	.793773	-7.205127	-1.967410	.704560	-1.262850
1971	6.813820	-1.502938	.316481	-1.186457	-10.034919	.967436	-9.067483	-2.379408	.897441	-1.481966
1972	7.534938	-1.923758	.368833	-1.554925	-12.569961	.978325	-11.591636	-2.897274	.852510	-2.044744
1973	8.219923	-2.365099	.731242	-1.633858	-15.036961	1.120080	-13.916881	-3.388607	.896031	-2.492576
1974	8.645009	-2.862134	.845989	-2.016146	-18.226941	1.150859	-17.076082	-4.083293	.872894	-3.210399
1975	9.017577	-3.441458	1.043233	-2.398225	-21.886298	1.253302	-20.632996	-4.899575	.912026	-3.987549
1976	9.275235	-4.039495	1.234998	-2.804496	-25.957515	1.322236	-24.235279	-5.684097	.932126	-4.751973
4 TOTAL	70.66119	-19.37799	5.02994	-14.34806	-126.88838	8.24636	-118.64202	-29.46191	7.17560	-22.28632

						LEA	LECN	LEMN	LETC	
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
1965	-.076255	.043244	-.033011	-.012666	0.000000	.164741	0.000000	0.000000	0.000000	
1966	-.435975	.323130	-.112846	.095366	0.000000	.388929	.000016	-.000099	-.000915	-.000167
1967	-.459900	1.313742	.853843	.177484	0.000000	.674476	.000036	-.000207	-.002411	-.000243
1968	-.355848	2.665740	2.309892	.237852	0.000000	.887894	.000053	-.000447	-.004918	-.000512
1969	-.371158	4.054029	3.682871	.315802	0.000000	.945271	.000069	-.000777	-.007971	-.000889
1970	-.951298	4.767730	3.816433	.463238	0.000000	.724918	.000084	-.001145	-.011004	-.001226
1971	-1.415305	5.945392	4.530087	.611229	0.000000	.219230	.000099	-.001391	-.013167	-.001255
1972	-1.377062	7.756076	6.379014	.695743	0.000000	-.611611	.000115	-.001752	-.016570	-.001474
1973	-1.826848	8.792496	6.965648	.887113	0.000000	-1.970631	.000127	-.002296	-.021183	-.002033
1974	-1.852936	10.311108	8.458172	.991605	0.000000	-4.207840	.000139	-.002413	-.025433	-.002479
1975	-2.185366	11.182624	8.997259	1.255437	0.000000	-7.748497	.000147	-.002978	-.031205	-.003192
1976	-2.108804	11.908456	9.799652	1.470469	0.000000	-11.246392	.000153	-.003542	-.037705	-.003964
5 TOTAL	-13.41676	69.06377	55.64701	7.18867	0.00000	-21.77951	.00104	-.01705	-.17252	-.01743

YEAR	LES	LEO	LEMP	LET	MF	MC	MINF	MK	MNFS	MOSA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	0.000000	0.000000	.037578	.022547	.527586	.164740	-.677274	1.022492
1966	-.000083	0.000000	0.000000	-.001268	-.086387	.024089	.897334	.275486	-1.283297	1.074530
1967	-.000284	0.000000	0.000000	-.003189	-.292746	.006350	1.499721	.455837	-2.254652	2.329074
1968	.002148	0.000000	0.000000	-.003694	-.079115	.022855	1.898720	.506205	-2.506896	3.121517
1969	.005810	0.000000	0.000000	-.003757	.331703	.091516	2.171608	.483890	-2.415310	3.001886
1970	.009263	0.000000	0.000000	-.004026	.664667	.165397	2.119111	.362018	-1.981859	1.015374
1971	.009600	0.000000	0.000000	-.006115	.376441	.171335	2.589928	.447229	-2.832050	.962422
1972	.011395	0.000000	0.000000	-.008285	.242241	.153881	3.357652	.577032	-3.846329	2.055123
1973	.016045	0.000000	0.000000	-.009340	.479726	.159443	3.053942	.330309	-3.063967	.458885
1974	.017521	0.000000	0.000000	-.012662	.074827	.098007	3.842495	.392796	-4.258471	2.047767
1975	.021276	0.000000	0.000000	-.015953	-.212550	-.010288	3.046191	-.076017	-3.172435	2.234137
1976	.022632	0.000000	0.000000	-.022427	-.751091	-.160451	2.847703	-.121878	-3.316469	2.649643
6 TOTAL	.11532	0.00000	0.00000	-.09364	.78529	.74468	27.85199	3.79765	-31.60902	21.97285

TABLE 6-2 Continued

YEAR	MBA	POPU	POPR	PY	RUCUR	PROFIT	VA	VCN	VMM	VIC
1960	0A000000	0.000000	0 0 0 0	0 0 0 0	0A0C0C0C	0A0C0C00	0A000000	0A000000	0.000000	0 0 0 0
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.979398	.000130	-.030392	.147685	.000276	.032600	0.000000	0.000000	0.000000	0.000000
1966	1.029244	.000388	-.001091	-.357786	-.013166	-.597096	.207397	-.005418	-.370183	-.056868
1967	2.230913	.000913	-.002495	-1.154838	-.031694	-1.599599	.457275	-.011368	-1.006039	-.082631
1968	2.989958	.001278	-.003212	-.262566	-.022751	-.752522	.685106	-.024513	-2.060239	-.173889
1969	2.875370	.001466	-.003377	1.317768	-.002770	.753690	.893167	-.042613	-3.326171	-.302208
1970	.972580	.001420	-.002925	2.539910	.012775	1.966952	1.078164	-.062758	-4.591473	-.416851
1971	.921861	.001857	-.004097	1.307365	-.001383	.478406	1.268575	-.076271	-5.474003	-.426887
1972	1.968509	.002485	-.005672	.828905	-.007376	-.189917	1.476221	-.096048	-6.914074	-.500957
1973	.439545	.002839	-.006231	1.800708	-.000900	.666613	1.625952	-.125876	-8.818773	-.691195
1974	1.961462	.004173	-.009773	.142382	-.012107	-1.190570	1.780854	-.132266	-10.611802	-.842578
1975	2.139978	.005952	-.014150	-.889787	-.023606	-2.800718	1.872950	-.163213	-13.020734	-1.085227
1976	2.537972	.008708	-.020948	-2.924496	-.047908	-4.736268	1.953667	-.194144	-15.732928	-1.347931
7 TOTAL	21.014679	.03181	-.07436	2.49503	-.15061	-7.96843	13.29933	-.93449	-71.99637	-5.92722

YEAR	VS	VWP	WAA	WCMA	WMMA	WICA	WSA	WDA	WWPA	WIMA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	.812679	.019676	.017001	.050205	.085555	.450336	.204373	.023073
1966	-.072991	0.000000	.028224	.063212	.030184	.089948	.163689	.867787	.393821	.052262
1967	-.249512	0.000000	.050336	.155387	.058004	.181037	.321322	1.712460	.777153	.113038
1968	1.887923	0.000000	.058396	.249333	.024729	.092417	.223263	1.015402	.460812	.111715
1969	5.107378	0.000000	.050541	.320915	-.016876	-.021082	.107755	.134913	.061226	.099101
1970	8.143160	0.000000	.032153	.167309	-.069265	-.164812	-.065012	-1.031422	-.458083	.067308
1971	8.438475	0.000000	.072537	.476279	-.033003	-.041322	.152221	.087030	.039496	.150450
1972	10.016430	0.000000	.035124	.619352	-.039846	-.042686	.190356	.154208	.069983	.206858
1973	14.134574	0.000000	.068652	.719419	-.124433	-.277677	-.185607	-1.749659	-.794034	.190698
1974	15.401675	0.000000	.128516	.911731	-.081470	-.134311	.190394	-.301389	-.136777	.302193
1975	18.008789	0.000000	.142367	1.1238 1	. 2 7 0	-. 5 0 6	.090530	-8.008356	-.592088	.529925
1976	19.893750	0.000000	.221075	1.456107	-.094131	-.132216	.369126	.259214	.117637	.794441
8 TOTAL	101.37264	0.00000	.97060	6.47892	-.45688	-.65356	1.72359	.49252	.22352	2.72106

TABLE 6-2 Continued

YEAR	WA	WCN	WMM	WTC	WS	WU	WWP	WIM	WRT	XO
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.035483	-.002101	.097106	.018940	.037326	.319608	.117464	.007733	.115085	0.000000
1966	.014674	.020089	.011763	.031050	.072404	.637390	.234201	.022601	.239310	0.000000
1967	.027980	.070144	.019087	.056378	.125088	1.122214	.415185	.050306	.444761	0.000000
1968	.035344	.170414	.002326	.017694	.096832	.615740	.232760	.066367	.489956	0.000000
1969	.039342	.256621	-.016204	-.025189	.075539	.072402	.028652	.076994	.564078	0.000000
1970	.038209	.317928	-.034793	-.066413	.041903	-.475454	-.196631	.079823	.572958	0.000000
1971	.050007	.332816	-.024802	-.034127	.099669	.031695	.013570	.103697	.828659	0.000000
1972	.062673	.415442	-.029835	-.037984	.116117	.059466	.022164	.136391	1.018822	0.000000
1973	.063099	.489693	-.044529	-.070541	.079964	-.483904	-.186873	.160268	1.134095	0.000000
1974	.064864	.445282	-.034474	-.050272	.112070	-.054727	-.020743	.189700	1.332952	0.000000
1975	.084873	.602209	-.041428	-.059803	.143165	-.183022	-.024217	.294892	1.911011	0.000000
1976	.059493	.599468	-.043941	-.068797	.135173	.030064	.004160	.326647	1.811772	0.000000

YEAR	GDPM	VT	GOCS	GDIS	POPTS	RCONV	DT
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.002025	0.000000	0.000000	0.000300	-.000262	-.147684	.147685
1966	-.321517	-.325557	-.646224	-.083903	-.000705	.022647	-.365281
1967	-.869803	-.874118	-1.689470	-.231748	-.001982	.296485	-1.136681
1968	.379053	.373000	-.498940	-.424425	-.001934	.694241	-.203957
1969	2.356758	2.342928	1.731608	-.653813	-.001911	1.035261	1.331093
1970	4.111039	4.083365	3.691158	-.905891	-.001505	1.463025	2.473033
1971	3.622028	3.580988	2.584739	-1.327130	-.002240	2.122297	1.178164
1972	3.967180	3.915239	2.363157	-1.886752	-.003187	3.002020	.762570
1973	6.095004	6.032614	4.248632	-2.347441	-.003392	4.183790	1.758640
1974	5.571129	5.504497	3.336887	-3.454755	-.005600	5.273022	.050997
1975	6.359164	6.298328	3.575852	-4.548886	-.008198	7.205957	-.896933
1976	4.659543	4.617566	1.316829	-4.777914	-.012240	7.651866	-2.879343
10 TOTAL	35.93152	35.54885	20.01423	-20.64256	-.04276	32.80293	2.21999

(6-4) Policy Simulation 3:

The third policy examines the response of the model to a sustained one billion current Rials increase in the government nominal investment in agriculture (IAGA), and a simultaneous decline in its investment in the construction sector, while the total government investment remains unchanged. Table 6-3 presents the result. In this and later simulations we examine the effects of changing the composition of government investment without increasing the overall (nominal) level of investment. The expansionary effects through the increased money supply and the initial overall increase in investment demand which were present in the previous simultions are absent here. Thus, the effects of changing the composition of supply will be more apparent in these policy simulations.

By implementing this policy, the agriculture sector and its related variables improve significantly. However, economic activities in other sectors tend to decrease. Rural private consumption (CRP) increases throughout the period (1965-1976), due to the significant increase in value-added in agriculture (VA). For the entire period, CRP increases by 11.45 billion Rials. Urban private consumption (CUP) faces a drastic setback because of the fall in urban

disposable income (DYU) and rise in price of domestically produced consumer goods (CTPD). A large increase in the banking credit to the private sector, CTPA (157.91 billion Rials for the entire period) is not able to prevent CUP from falling. This is because of the small coefficient of CTPA in the urban private consumption equation (CUP). Other economic indicators, gross national product in constant price (GNPM), disposable income (DY), personal income (PY), grand total capital stock (KT), total labour employment (LET), total imports (MT) and total gross investment (IT) fall over the period 1965-1976. The prices of domestically produced and total consumer goods (CTPD and CTDPD respectively) fall in the first two periods (1965-1966). However, they begin to rise moderately afterward at an increasing rate. Both the supply of and demand for domestically produced consumer goods (GQC and DQC respectively) decline by a fairly similar magnitude. The rise in agricultural value-added (VA), which is mostly used for consumption purposes[8], prevents GQC from falling drastically. Hence, these factors ease pressure on CTPD and CTDPD, so that they increase only moderately.

Both private and government investments (IPT and IGT respectively) tend to fall over the period 1965-1976. The latter (IGT) is affected by decreases in government revenues from direct and indirect taxes (GRDT and GRIDT) respectively). The total decline over the simulation period

is 2.64 billion Rials. Private investment in all sectors but agriculture tends to fall. Contractionary movements of value-added and capital stocks in these sectors, along with rapid increases in the price of domestically produced investment goods (ITPD) discourage private investment in the non-agriculture sectors[9]. Private investment in manufacturing and mining (IMMP) suffers the most, with a decline of 20.04 billion Rials over the simulation period (1965-1976). It is followed by private investment in construction (ICNP) with a total decline of 16.9 billion Rials. Total investment (IT) begins to fall from the second period (1966) and continues to do so, with a total decline of 40.24 billion Rials. The supply of domestically produced investment goods (GQI) decreases more rapidly than the respective demand (DQI = IT-MK)[10]. This in turn leads to an increase in the price of domestically produced investment goods (ITPD) which continues to rise rapidly throughout the simulation period, increasing by .073 in the last period.

Apart from agriculture, value-added in all sectors tends to decline with manufacturing and mining (VMM) suffering the most. Total value-added (VT) increases in the first three periods (1965-1968), since the rise in value-added in agriculture (VA) is large enough to overcome the fall in value-added in other sectors. However, VT tends to fall at an increasing rate afterwards. Labour employment

in all sectors but agriculture falls throughout the simulation period. The rise in labour employment in agriculture (LEA) is not large enough to absorb the release of the labour from other sectors. Therefore, total labour employment (LET) falls by 0.2100 million person-years in total for the entire period (1965-1976). Nominal wages in all sectors decrease only for the first two periods. They then increase sharply for the remainder of the period. This is mainly due to the rise in the price of domestically produced consumer goods (CTPD) which enters all the wage equations with large coefficients.

A drastic fall in gross national product in constant prices (GNPM) begins in 1966 and continues at a rapid pace through the end of the simulation period, with a total reduction of 63.74 billion Rials. Total imports of goods and services (MT) also tend to decline due to the fall in GNPM. All components of total imports (MT) but imports of intermediate goods (MINT) decrease over the period. However, MINT, being mostly affected by the price of domestically produced investment goods, rises by 8.83 billion Rials in total.

As all components of the balance of payments except total imports (MT) are assumed to be exogenous, foreign exchange reserves (FEXRA) increase as MT falls. Foreign exchange reserves (FEXRA) keeps on accumulating over the

entire period to a total amount of 32.02 billion Rials by 1976. The government budget which is in deficit up to 1972, turns to surplus thereafter (1973-1976). This is shown by changes in government bonds sold to the Central Bank (BCBA) which tends to fall from 1972 onwards with a total reduction of 16.78 billion Rials. Since a fixed exchange regime is assumed throughout the study, changes in the amount of government bonds held by the Central Bank (BCBA) and foreign exchange reserves (FEXRA) are transmitted to the monetary base (MBA). Being affected by MBA, the money supply (MOSA) and total banking credit to the private sector (CTPA) increase throughout the period (1965-1976). The total increases in MBA, MOSA and CTPA over the twelve periods (1965-1976) are 60.77, 63.44 and 157.92 billion Rials. Effects of these variables on prices are fairly minimal, due to the fall in gross national product at market price (GNPM), and in the supply of domestically produced investment and consumption goods (GQI and GQC, respecively). The total wage bill (WBT), like most economic indicators, falls by a total amount of 4.1 billion Rials. However, total gross profit (PROFIT) also falls by the very significant amount of 55.56 billion Rials in total. Hence, the index of distribution of income (DISTOY), which is defined as the ratio of PROFIT/WBT, declines, falling by as much as .03 in 1974. The ratio of per capita consumption in urban to rural areas (ROCUR) also tends to decline (see Table 6-3).

In summary, implementation of the third policy causes almost all major economic indicators - gross national product in constant price (GNPM), domestically produced investment (GQI) and consumption (GQC) goods, total gross investment (IT) and so forth - to fall. Agriculture is the only sector that has benefited from this policy, and its contribution in absorbing labour employment released by the other sectors (due to the recession created by this policy) is minor. Rises in prices of domestically produced consumer (CTPD) and investment (ITPD) goods, and prices of total consumer goods (CTDPD) are explained by the fall in their corresponding supply in the economy. As a rise in prices is associated with the decline in total employment (increased unemployment), it may be said that policy 3 creates a stagflationary situation in the economy.

When the results of this experiment are compared to the results of the previous policy simulation, it becomes clear that the effects of reducing government investment in construction in order to finance increased government investment in agriculture are negative, as compared to the effects of financing this investment by borrowing from the central bank. The reduction in supply which accompanies this policy has both inflationary and contractionary real effects.

TABLE 6-3

POLICY SIMULATION #3: A SUSTAINED ONE BILLION CURRENT RIALS INCREASE IN GOVERNMENT INVESTMENT IN AGRICULTURE SECTOR IN THE PERIOD 1965-1976, ACCOMPANIED BY A SIMULTANEOUS DECREASE IN THE GOVERNMENT INVESTMENT IN CONSTRUCTION SECTOR BY THE SAME AMOUNT; THE TOTAL GOVERNMENT INVESTMENT IS HELD CONSTANT.

YEAR	CRP	CUP	CG	CTPD	CTOPD	CTPA	CT	DYU	DEP	BCBA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	.000003	0.000000	0.000000	0.000000	.000295	.000003	.000006	0.000000	.000115
1966	.183077	-.071135	.000855	-.000080	-.000077	.071817	.092797	-.278688	0.000000	.003106
1967	.394699	-.338403	.031995	-.000033	-.000026	.340106	.058291	-.791722	-.006406	.007388
1968	.594341	-.738434	.002540	.000194	.000198	.878134	-.141593	-1.393671	-.025081	.010541
1969	.778251	-1.222608	.001864	.000538	.000526	1.854718	-.442493	-2.075709	-.094082	.008100
1970	.941032	-1.795701	-.000813	.001171	.001124	3.494684	-.855482	-2.855979	-.092006	.048682
1971	1.096504	-2.351274	-.005036	.001675	.001603	5.820457	-1.259806	-3.928360	-.140431	.011239
1972	1.268624	-3.598161	-.012978	.003608	.003360	9.677370	-2.342515	-5.657546	-.212559	-.081832
1973	1.400020	-5.359260	-.028923	.006812	.006186	16.047694	-3.988163	-7.571690	-.329431	-.070097
1974	1.525298	-7.133940	-.051258	.009017	.007752	23.721325	-5.659900	-10.569113	-.469747	-2.218902
1975	1.599247	-10.020100	-.085518	.012571	.010629	31.344354	-8.506371	-14.494542	-.688194	-7.359797
1976	1.674678	-17.958341	-.169597	.034043	.029475	64.648876	-16.453260	-20.553100	-.987443	-7.141220
1 TOTAL	11.45577	-50.60735	-.34687	.06952	.06075	157.91983	-39.49845	-70.19011	-3.00488	-16.78268

YEAR	DISTOY	FEXRA	GNPFA	GRIDT	GRDT	GRP	IAP	ICNP	INMP	ITCP
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000300	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	-.000002	.000006	0.000000	0.000000	0.000000	0.000000	-.000002	-.000018	-.000005
1966	.000165	.024528	-.090220	-.000540	0.000000	0.000000	.077502	-.208488	-.037547	-.011315
1967	-.001105	.123483	-.364096	-.002609	-.004552	0.000000	.133095	-.444435	-.122737	-.037210
1968	-.003375	.335059	-.785718	-.007178	-.018021	0.000000	.162108	-.674378	-.230925	-.070638
1969	-.006330	.705589	-1.325225	-.015127	-.038238	0.000000	.174815	-.901652	-.365269	-.112645
1970	-.009983	1.296059	-2.004651	-.027235	-.063743	0.000000	.175716	-1.126417	-.549584	-.170578
1971	-.013786	2.228452	-3.006670	-.045631	-.095685	0.000000	.175508	-1.383282	-.915827	-.285759
1972	-.021281	3.805649	-4.694471	-.073163	-.143146	0.000000	.184455	-1.700076	-1.464415	-.457105
1973	-.025556	6.245192	-6.704191	-.112427	-.223744	0.000000	.174153	-2.001073	-2.076111	-.651172
1974	-.030061	11.346783	-9.857351	-.170547	-.317015	0.000000	.167971	-2.383100	-3.174377	-.995073
1975	-.027727	19.420991	-14.156999	-.253824	-.467793	0.000000	.144311	-2.770317	-4.489015	-1.423212
1976	-.026488	32.017874	-20.749763	-.368225	-.670663	0.000000	.133147	-3.244882	-6.610602	-2.057698
2 TOTAL	-.16553	77.54966	-63.73935	-1.07651	-2.04340	0.00000	1.70278	-16.85810	-20.03663	-6.27241

TABLE 6-3 Continued

YEAR	ISP	IPT	ISG	IMPG	IGT	IGTPD	ITPD	IT	KAP	KAG
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.000012	.000006	.000085	0.000000	0.000000	.000003	0.000000	.000006	0.000000	.964721
1966	-.025579	-.205428	-.000671	0.000000	-.000233	-.000014	.000404	-.205661	.077501	1.958918
1967	-.039226	-.510513	-.003592	0.000000	-.003265	-.000009	.001325	-.513778	.208271	2.829951
1968	-.014222	-.828056	-.013971	0.000000	-.013329	-.000015	.002501	-.841185	.364132	3.595831
1969	.022429	-1.182322	-.032492	0.000000	-.033050	.000013	.003968	-1.215372	.528024	4.246068
1970	.082626	-1.588237	-.030399	0.000000	-.064111	.000731	.005985	-1.652348	.687900	4.866828
1971	.016991	-2.392368	-.099462	0.000000	-.109188	.000146	.009941	-2.501556	.842770	5.582051
1972	.082289	-3.354852	-.154886	0.000000	-.175444	.000460	.015923	-3.530296	1.001942	6.074426
1973	.432573	-4.121830	-.241166	0.000000	-.276989	.000507	.022631	-4.398819	1.146037	6.559307
1974	.131889	-6.252690	-.030449	0.000000	-.419018	.007369	.034616	-6.671708	1.279626	6.785665
1975	-.019417	-8.577651	-1.656796	0.000000	-.626468	-.013341	.048869	-9.204119	1.385549	7.059685
1976	3.194585	-8.585451	.409914	0.000000	-.919368	.019215	.072601	-9.504819	1.477128	7.135962
3 TOTAL	3.86497	-37.59939	-1.85389	0.00030	-2.64046	.01507	.21875	-40.23985	8.99888	57.65941

YEAR	KAT	KCNP	KCNG	KCNT	KMMP	KMMG	KMMT	KTCP	KTCG	KTCT
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.964721	-.000003	-.964744	-.964746	-.000018	-.000007	-.000026	-.000005	-.000031	-.000036
1966	2.036420	-.208491	-1.929893	-2.138384	-.037564	.000050	-.037513	-.011319	.000145	-.011174
1967	3.038222	-.640416	-2.743833	-3.384248	-.158047	.000096	-.157952	-.046831	.000250	-.046582
1968	3.959963	-1.276369	-3.429867	-4.706236	-.379490	.000280	-.379210	-.110446	.000401	-.110044
1969	4.774092	-2.101439	-3.982264	-6.083704	-.721989	.000055	-.721934	-.206523	.000178	-.206346
1970	5.554728	-3.101770	-4.496991	-7.598761	-1.228253	-.013388	-1.241642	-.346124	-.010236	-.356360
1971	6.424921	-4.298945	-5.090486	-9.389431	-2.070386	-.015064	-2.085450	-.579964	-.012048	-.592011
1972	7.076369	-5.741084	-5.430651	-11.171736	-3.410577	-.018062	-3.428639	-.950075	-.015317	-.965391
1973	7.705344	-7.397691	-5.806529	-13.204220	-5.282253	-.023850	-5.306103	-1.458736	-.018894	-1.477630
1974	8.065291	-9.336930	-6.022486	-15.359416	-8.139695	-.093628	-8.233323	-2.234999	-.096926	-2.331924
1975	8.445234	-11.567031	-5.811191	-17.378222	-12.140328	.101751	-12.038577	-3.322961	.105794	-3.217168
1976	8.613090	-14.117891	-6.208199	-20.326089	-18.022511	-.131245	-18.153756	-4.882215	-.157069	-5.039285
4 TOTAL	66.65830	-59.78806	-51.93713	-111.72519	-51.59111	-.19301	-51.78413	-14.15020	-.20375	-14.35395

TABLE 6-3 Continued

YEAR	KSP	KSG	KST	KOG	KWPG	KT	LEA	LECN	LEMM	LEIC
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.000032	.000086	.000118	-.000325	0.000000	.000006	0.000000	0.000000	0.000000	0.000000
1966	-.025548	-.000587	-.026136	.000080	0.000000	-.176707	.000016	-.001425	0.000000	0.000000
1967	-.064008	-.004162	-.068170	.000164	0.000000	-.618566	.000034	-.003150	-.000068	-.000011
1968	-.076310	-.018008	-.094318	.000307	0.000000	-1.329538	.000051	-.004998	-.000289	-.000047
1969	-.051593	-.049960	-.101552	.000188	0.000000	-2.339255	.000067	-.006950	-.000692	-.000109
1970	.032581	-.078860	-.046278	-.004181	0.000000	-3.692495	.000081	-.008985	-.001319	-.000205
1971	.048595	-.175955	-.127361	-.005870	0.000000	-5.775301	.000094	-.011222	-.002269	-.000354
1972	.129426	-.325564	-.196138	-.011515	0.000000	-8.717051	.000108	-.013867	-.003611	-.000589
1973	.558115	-.556962	.001154	-.018445	0.000000	-12.299900	.000119	-.016529	-.006266	-.000959
1974	.673261	-.570702	.102559	-.113173	0.000000	-17.869985	.000131	-.019501	-.009697	-.001469
1975	.633645	-2.210377	-1.576732	.215073	0.000000	-25.550392	.000137	-.022684	-.013045	-.002319
1976	3.809221	-1.734152	2.075070	-.189165	0.000000	-33.020136	.000144	-.025666	-.022000	-.003198
5 TOTAL	5.66742	-5.72520	-.05778	-.12696	0.00000	-111.38932	.00098	-.13499	-.06146	-.00926

YEAR	LES	LEO	LEWP	LET	MT	MC	MINI	MK	MNFS	MOSA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	0.000000	0.000000	.000001	.000002	.000020	.000006	-.000025	.000118
1966	0.000000	0.000000	0.000000	-.001408	-.022645	-.006009	.052781	-.021034	-.048383	.028851
1967	-.000066	0.000000	0.000000	-.003269	-.091391	-.023479	.147757	-.044147	-.171519	.136630
1968	-.000171	0.000000	0.000000	-.005453	-.197220	-.052999	.234417	-.068833	-.309806	.360805
1969	-.000238	0.000000	0.000000	-.007923	-.332640	-.094337	.324854	-.097427	-.465729	.745091
1970	-.000256	0.000000	0.000000	-.010684	-.503180	-.147112	.402212	-.136489	-.621791	1.403911
1971	-.000117	0.000000	0.000000	-.013868	-.754692	-.226990	.673538	-.186007	-1.015233	2.338237
1972	-.000320	0.000000	0.000000	-.018478	-1.178340	-.343670	1.112985	-.202051	-1.745605	3.887665
1973	-.000494	0.000000	0.000000	-.024128	-1.682792	-.496700	1.131205	-.292381	-2.024916	6.446799
1974	.000003	0.000000	0.000000	-.030533	-2.474254	-.738611	1.905488	-.399443	-3.241688	9.529507
1975	.000258	0.000000	0.000000	-.039654	-3.553491	-1.065984	1.391028	-.853309	-3.025727	12.591886
1976	-.003966	0.000000	0.000000	-.054687	-5.208315	-1.480307	1.452977	-.685477	-4.495507	25.971227
6 TOTAL	-.03537	0.00000	0.00000	-.21009	-15.99896	-4.67620	8.82926	-2.98659	-17.16543	63.44073

TABLE 6-3 Continued

YEAR	MBA	POPU	POPR	PY	RUCUR	PROFIT	VA	VCN	VMM	VIC
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.000114	0.000000	0.000000	.000306	0.000000	-.000006	0.000000	0.000000	0.000000	0.000000
1966	.027635	-.000038	.000116	-.089580	-.004007	-.054972	.209008	-.078099	-.000020	-.000013
1967	.130872	-.000082	.000226	-.355080	-.010258	-.291522	.441192	-.173109	-.028604	-.003777
1968	.345598	-.000100	.000244	-.753458	-.017975	-.672325	.658234	-.273966	-.120440	-.015747
1969	.713689	-.000072	.000131	-1.256017	-.025384	-1.167446	.857930	-.380985	-.289152	-.037198
1970	1.344742	.000035	-.000189	-1.889411	-.032594	-1.807875	1.034311	-.492495	-.550484	-.069752
1971	2.239691	.000198	-.000619	-2.820608	-.037085	-2.723799	1.203438	-.615145	-.946760	-.120462
1972	3.723817	.000526	-.001484	-4.408748	-.047798	-4.320744	1.391944	-.760105	-1.590183	-.200121
1973	6.175095	.001196	-.003257	-6.262332	-.066724	-6.130705	1.533102	-.906008	-2.614382	-.326336
1974	9.127880	.002110	-.005505	-9.217557	-.077447	-8.897116	1.669370	-1.068925	-4.045972	-.499491
1975	12.061194	.003556	-.009092	-13.214981	-.102248	-12.256416	1.747354	-1.243395	-6.278015	-.788272
1976	24.876654	.007213	-.018887	-19.394394	-.152835	-17.239757	1.829669	-1.406825	-9.179571	-1.087516
7 TOTAL	60.76698	.01454	-.03832	-59.65796	-.57435	-55.56268	12.57555	-7.39906	-25.64359	-3.14869

YEAR	VS	VWP	WAA	WCNA	WMMA	WICA	WSA	WDA	WMPA	WIMA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	.000001	.000002	.000002	.000005	.000009	.000048	.000022	.000002
1966	.008260	0.000000	-.000820	-.001362	-.001179	-.003484	-.005929	-.031232	-.014174	-.006844
1967	-.057789	0.000000	-.000502	-.002321	-.000681	-.001905	-.003406	-.013038	-.005917	-.009721
1968	-.150730	0.000000	.031898	.000360	.002093	.006649	.012114	.076523	.034728	-.007333
1969	-.208547	0.000000	.006266	.009709	.006079	.019145	.036849	.211610	.096033	-.000122
1970	-.224541	0.000000	.015100	.032605	.013752	.043011	.083891	.460578	.209020	.015235
1971	-.102327	0.000000	.025075	.070707	.018622	.059060	.123536	.658913	.299029	.030605
1972	-.281606	0.000000	.053757	.152903	.043068	.134280	.265059	1.419026	.643985	.068231
1973	-.433678	0.000000	.104870	.313631	.083874	.259674	.502005	2.679115	1.215843	.145797
1974	.002551	0.000000	.159819	.558152	.107153	.335647	.673753	3.546219	1.609354	.223155
1975	.226767	0.000000	.245580	.933570	.145166	.456922	.942843	4.943650	2.243519	.364614
1976	-3.486295	0.000000	.554592	1.785180	.444804	1.362608	2.487459	13.388329	6.075921	.830450
8 TOTAL	-4.71593	0.00000	1.16564	3.85314	.86275	2.67161	5.11818	27.33974	12.40738	1.65407

TABLE 6-3 Continued

YEAR	WA	WCN	WMM	WTC	WS	WO	WWP	WIM	WRI	XO
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000300	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.000001	-.000001	.000001	.000302	.000004	.000034	.000012	.000001	.000012	0.000000
1966	-.000352	.000101	-.000508	-.001342	-.002646	-.022987	-.008447	-.005304	-.034708	0.000000
1967	-.000250	-.001512	-.000352	-.000582	-.001784	-.008576	-.003172	-.008023	-.063558	0.000000
1968	.000563	-.002372	.000369	.001971	.003347	.046497	.017577	-.008247	-.081133	0.000000
1969	.002316	.000927	.001062	.002965	.010964	.113544	.044933	-.005783	-.088571	0.000000
1970	.005770	.010585	.002187	.005914	.023772	.211689	.087548	-.000512	-.077536	0.000000
1971	.009376	.029221	.001360	.003626	.029700	.239727	.102640	.004193	-.096809	0.000000
1972	.017975	.052867	.004084	.006881	.057435	.546013	.203508	.006980	-.088004	0.000000
1973	.027187	.085204	.005173	.010223	.077965	.736071	.284254	.013001	-.131627	0.000000
1974	.032959	.135253	.000115	-.001302	.068891	.640947	.242937	.015969	-.320441	0.000000
1975	.046204	.183515	-.020335	-.057747	.010850	.811790	.107411	.001848	-.958565	0.000000
1976	.034340	-.040925	-.028318	-.093030	-.018373	1.531213	.211867	-.103393	-2.154337	0.000000
9 TOTAL	.17609	.45286	-.03516	-.12162	.26012	4.84596	1.29107	-.08927	-4.09520	0.00000

YEAR	GDPM	VT	GDCS	GDIS	PUPTS	RCONV	DY
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	0.000000	0.000000	0.000000	-.000006	.000007
1966	.130597	.131137	.096803	-.184626	.000078	.220817	-.089680
1967	.179854	.182463	.081772	-.469629	.000144	.543950	-.350530
1968	.108193	.115371	-.088553	-.772552	.000144	.893911	-.735437
1969	-.034841	-.019714	-.348154	-1.117945	.000059	1.290384	-1.217779
1970	-.266454	-.239219	-.708378	-1.515856	-.000154	1.738197	-1.821668
1971	-.531210	-.485579	-1.032815	-2.315550	-.000421	2.475460	-2.724922
1972	-1.370087	-1.296924	-1.998845	-3.328245	-.000958	3.324384	-4.265602
1973	-2.635985	-2.523558	-3.491463	-4.106438	-.002061	4.068206	-6.038588
1974	-3.795199	-3.624652	-4.921288	-6.272263	-.003395	6.062152	-8.899742
1975	-6.121594	-5.867770	-7.440387	-8.350888	-.005536	8.035405	-12.747188
1976	-13.028101	-12.659876	-14.972950	-8.819345	-.011674	7.721662	-18.723431
10 TOTAL	-27.35483	-26.28832	-34.82225	-37.25326	-.02377	36.37452	-57.61456

(6-5) Policy Simulation 4:

Under policy four, nominal government investment in agriculture (IAGA) is allowed to increase by one billion current Rials in period 1965-1976 and, simultaneously, the nominal government investment in manufacturing and mining (IMMGA) is decreased by a similar amount; the total government investment is held constant. Responses of the model to these autonomous changes are examined below.

The behaviour of the model and direction of change of the variables, especially major indicators of the economic activities, are very similar to those in the simulation of policy three (table 6-3). The main differences between these two policies are that the magnitude of changes in major variables in policy four are greater than in policy three (see Table 6-4). Here, total changes in some variables are examined while they are compared with their counterparts in policy three. The increase in private rural consumption (CRP) is similar to that of policy three (6.38 billion Rials total). Private urban consumption (CUP) declines more here than in the case of policy 3 due to greater increases in the price of domestically produced consumer goods (CTPD), and a greater decline in urban disposable income (DYU). The demand for domestically produced consumer goods (DQC = CT-MG, where CT

and MC stands for total consumption and imports of consumer goods respectively) decreases. However, the corresponding supply (GQC) declines by a greater magnitude. Hence, the result is that CTPD rises twice as much in this policy simulation in comparison with that of policy three. The reason is that manufacturing and mining has a greater weight in producing consumer goods than the construction sector. The input-output coefficient attached to value-added in manufacturing and mining in the supply of consumer goods, CMM (see the identities and definitions block, Chapter 3 and the appendix to Chapter 4) is much larger than that of construction, CCN (see appendix to Chapter 4, Table A4-3). Therefore, a fall in government investment in the former sector decreases the output of consumer goods by a greater amount than in the former.

The price of domestically produced investment goods (ITPD), on the contrary, increases less in policy 4, than in policy 3. This is because the coefficient of value-added in manufacturing and mining in the supply of investment goods (see the identities and definition block, Chapter 3, equation 3.3.49) is smaller than that of construction. Hence, a fall in value-added in manufacturing and mining (VMM) has relatively less effect on the supply of domestically produced investment goods (GQI). Therefore, the total reduction of GQI in policy 4 (22.43 billion Rials)

is less than that of policy 3 (37.25 billion Rials). Total investment (IT) also declines less here, because total private investment (IPT) decreases less in policy 4 (19.91 billion Rials) in comparison with policy 3 (37.60 billion Rials). For the same reason, the fall in the total capital stock KT (63.84 billion Rials) becomes much smaller here than in policy 3 (111.39 billion Rials). Total value-added (VT) declines by 33.53 billion Rials compared with a fall of 26.28 billion Rials in policy 3. Total labour employment (LET) decreases less here. This is because the services sector absorbs more labour, while in policy 3, labour employment in services (LES) fell. Nominal wages in all sectors increase more here than in the case of policy 3. This is because of a sharp increase in the price deflator for domestically produced consumer goods (CTPD) as mentioned earlier.

Gross national product in constant prices (GNPM) falls more in policy 4 (by -76.66 billion Rials) relative to its value in policy 3 (-63.74 billion Rials). This is mainly due to the decline in the demand for and supply of consumer goods. Total imports of goods and services (MT) also fall more here, 18.74 billion Rials in comparison with 15.99 billion Rials in policy 3. Increases in the monetary base (MBA), the money supply (MOSA) and total banking credit to the private sector (CTPA) become much greater in the case of policy 4. For instance, CTPA rises by 233.83 billion

current Rials, while its increase in policy 3 is 157.02 billion current Rials. This is mainly due to a greater increase in foreign exchange reserves (FEXRA) which stems from a greater fall (compared with policy 3) in total imports of goods and services, MT (other variables of the balance of payments are assumed to be exogenous in the model). Finally, ratios of per capita consumption in urban to rural areas (ROCUR) and total gross profit to total wage bill (PROFIT/WBT, which is defined as an index of distribution of income, DISTOY) decrease even more in policy 4 than in policy 3. The decline of ROCUR is 0.737 (0.153 in policy 3) and of DISTOY is 0.060 (0.026 in policy 3).

In summary, implementation of policy 4 slows down the economy more than that of policy 3. Supply of and demand for consumer goods suffers more, and the related prices, prices of domestically produced and total consumer goods (CTPD and CTDPD respectively) rise more sharply here in comparison with those of policy 3. The income gap between wage earners and profit makers and the gap between per capita consumption in urban and rural areas become closer here in comparison with policy 3.

TABLE 6-4

POLICY SIMULATION #4: A SUSTAINED ONE BILLION CURRENT RIALS INCREASE IN GOVERNMENT INVESTMENT IN THE AGRICULTURE SECTOR IN THE PERIOD 1965-1976, ACCOMPANIED BY A SIMULTANEOUS DECREASE IN ITS INVESTMENT IN CONSTRUCTION SECTOR BY THE SAME AMOUNT; THE TOTAL GOVERNMENT INVESTMENT REMAINS UNCHANGED.

YEAR	CRP	CUP	CG	CTPD	CTUPD	CTPA	CT	DYU	DEP	DBCHA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	.000003	0.000000	0.000000	0.000000	.000344	.000003	.000007	0.000000	.000134
1966	.183077	-1.239088	-.004455	.001686	.001641	.651871	-1.060466	-1.158585	0.000000	-.008062
1967	.393553	-2.486327	-.012252	.002558	.002467	2.010223	-2.105026	-2.274875	-.053227	-.014462
1968	.592500	-3.759524	-.023887	.003728	.003560	4.026885	-3.190711	-3.411381	-.110060	-.042274
1969	.775780	-5.024067	-.040574	.005182	.004910	6.829529	-4.288861	-4.546160	-.170606	-.096478
1970	.937910	-6.161706	-.065046	.007278	.006845	11.566020	-5.288842	-5.582131	-.234070	.238339
1971	1.089393	-6.187178	-.094171	.007221	.006713	14.855529	-5.191956	-5.980653	-.295348	-.177704
1972	1.259783	-7.593754	-.138607	.010550	.009800	20.051098	-6.472578	-7.595964	-.325817	-.507972
1973	1.389815	-9.345970	-.206660	.014706	.013200	28.234064	-8.162815	-9.237625	-.422893	-.507479
1974	1.513177	-10.830472	-.301671	.015528	.013405	32.193820	-9.618966	-11.389544	-.533948	-4.635668
1975	1.583490	-12.737021	-.445889	.022428	.019017	48.109392	-11.599420	-13.727473	-.685063	-6.218802
1976	1.637751	-13.184948	-.632711	.028259	.024468	69.300096	-12.179908	-14.129758	-.862293	-8.244511
1 TOTAL	11.35623	-78.55005	-1.96592	.11932	.10603	233.82883	-69.15975	-79.03414	-3.69333	-20.21494

YEAR	DISTOY	FEXRA	GNPM	GRIDT	GRDT	GRP	IAP	ICNP	IMMP	IICP
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	-.000002	.000007	.000001	0.000000	0.000000	0.000000	-.000003	-.000021	-.000006
1966	-.012197	.258899	-.952211	-.002535	0.000000	0.000000	.077502	-.004106	-.270684	-.010143
1967	-.020357	.787988	-1.946743	-.010334	-.048192	0.000000	.132610	-.012545	-.566844	-.031490
1968	-.030187	1.591806	-2.985096	-.024274	-.095572	0.000000	.161542	-.022318	-.829318	-.093545
1969	-.039672	2.724456	-4.050994	-.044754	-.144677	0.000000	.174212	-.035456	-1.079368	-.081393
1970	-.048400	4.212224	-5.050980	-.070995	-.194659	0.000000	.175075	-.061802	-1.393347	-.139562
1971	-.048289	5.894056	-5.423377	-.102000	-.240856	0.000000	.173424	-.087179	-1.644656	-.194214
1972	-.060313	8.223562	-6.933694	-.139055	-.259072	0.000000	.182509	-.136103	-2.099121	-.295116
1973	-.070790	11.371846	-8.651901	-.184996	-.328294	0.000000	.172379	-.205164	-2.608981	-.430627
1974	-.073913	17.023734	-10.920644	-.244974	-.408236	0.000000	.166039	-.276974	-3.016960	-.538990
1975	-.058869	24.731107	-13.513804	-.316962	-.514694	0.000000	.141546	-.514288	-4.460037	-.997042
1976	-.059763	33.371752	-14.232993	-.394267	-.634996	0.000000	.122467	-.693014	-5.114472	-1.232658
2 TOTAL	-.52267	110.19143	-74.66243	-1.53495	-2.86925	0.00000	1.67931	-2.04893	-23.08381	-4.00479

YEAR	ISP	IPI	ISG	IWPG	IGI	IGIPD	IIPD	II	KAP	KAG
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.000038	.000007	.000099	0.000000	0.000000	.000004	0.000000	.000007	0.000000	.964719
1966	.077814	-.129618	.031411	0.000000	-.001137	.001037	.000362	-.130755	.077501	1.952881
1967	.174017	-.304252	-.004669	0.000000	-.026109	.000572	.001015	-.330361	.207786	2.821004
1968	.271525	-.472114	-.048291	0.000000	-.071349	.000543	.001736	-.543463	.363895	3.584200
1969	.378443	-.643962	-.098557	0.000000	-.135393	.000851	.002673	-.778955	.526415	4.231811
1970	.606114	-.813522	.385327	0.000000	-.216442	.006571	.004655	-1.029964	.685698	4.832301
1971	.470605	-1.282020	-.226098	0.000000	-.310701	.001273	.005823	-1.592721	.838550	5.541360
1972	.550020	-1.797812	-.317121	0.000000	-.403702	.001939	.009254	-2.201514	.995902	6.028790
1973	.936686	-2.135709	-.369057	0.000000	-.525056	.002209	.013956	-2.660765	1.138404	6.505490
1974	.300745	-3.366141	-.024402	0.000000	-.676685	.012399	.017602	-4.042826	1.270290	6.714849
1975	1.390903	-4.438899	.150300	0.000000	-.867531	.013330	.032819	-5.306430	1.373728	6.860654
1976	2.388506	-4.529172	-.140796	0.000000	-1.096480	.013789	.039606	-5.625652	1.454982	6.979028
3 TOTAL	7.54542	-19.91281	-.95185	0.00030	-4.33058	.05452	.12950	-24.24340	8.93235	57.03718

YEAR	KAT	KCNP	KCNG	KCNI	KMMP	KMMG	KMMI	KTCP	KTCG	KTCI
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.964719	-.000003	-.000012	-.000314	-.000021	-.964742	-.964763	-.000006	-.000036	-.000042
1966	2.030382	-.004109	-.002896	-.007305	-.270704	-1.933083	-2.203787	-.010148	-.012765	-.022913
1967	3.028790	-.016407	-.004526	-.020932	-.821306	-2.749527	-3.570833	-.040115	-.019130	-.059245
1968	3.947374	-.037741	-.006000	-.043740	-1.601345	-3.441682	-5.043028	-.087643	-.023051	-.110695
1969	4.758225	-.070932	-.008169	-.079102	-2.584633	-4.006581	-6.591214	-.155890	-.030378	-.186270
1970	5.517999	-.128478	-.037482	-.165960	-3.822901	-4.631551	-8.456453	-.272069	-.118807	-.390876
1971	6.379919	-.207948	-.046198	-.254146	-5.238184	-5.238326	-10.476509	-.425473	-.130091	-.555563
1972	7.024693	-.331575	-.060430	-.392005	-7.023013	-5.601369	-12.624382	-.656768	-.131959	-.788727
1973	7.643893	-.516843	-.114208	-.631051	-9.210615	-5.964181	-15.174796	-.989880	-.137748	-1.126628
1974	7.985139	-.762807	-.300871	-1.063578	-11.674938	-6.173926	-17.848864	-1.379538	-.252833	-1.632371
1975	8.254382	-1.231307	-.553909	-1.785216	-15.434479	-6.410673	-21.845152	-2.169649	-.400805	-2.570455
1976	8.434010	-1.850443	-.808548	-2.658990	-19.622881	-6.535074	-26.157957	-3.076860	-.518260	-3.595121
4 TOTAL	65.96953	-5.15859	-1.94325	-7.10184	-77.30502	-53.65272	-130.95774	-9.26304	-1.77586	-11.03891

YEAR	KSP	KSG	KST	KOG	KNPG	KI	LEA	LECN	LEMM	LETC
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.000037	.000100	.000137	-.000029	0.000000	.000007	0.000000	0.000000	0.000000	0.000000
1966	.077851	.031509	.109358	-.007836	0.000000	-.101799	.000016	0.000000	-.001761	0.000000
1967	.249532	.025893	.275425	-.013238	0.000000	-.360032	.000034	-.000010	-.004027	-.000023
1968	.513570	-.023174	.490396	-.018139	0.000000	-.777832	.000051	-.000031	-.006526	-.000059
1969	.876605	-.121036	.755570	-.024776	0.000000	-1.367565	.000066	-.000064	-.009215	-.000110
1970	1.456420	-.032078	1.424343	-.063395	0.000000	-2.134041	.000081	-.000117	-.012045	-.000185
1971	1.883333	-.257213	1.626120	-.076983	0.000000	-3.357162	.000093	-.000245	-.015454	-.000389
1972	2.376834	-.566618	1.810236	-.099189	0.000000	-5.069375	.000108	-.000375	-.019145	-.000552
1973	3.242233	-.918676	2.323557	-.127896	0.000000	-7.092920	.000119	-.000579	-.023870	-.000784
1974	3.445712	-.915518	2.530194	-.284006	0.000000	-10.313586	.000130	-.000932	-.027731	-.001120
1975	4.733243	-.737753	3.995490	-.595397	0.000000	-14.547347	.000136	-.001571	-.032617	-.001623
1976	6.979752	-.856415	6.123336	-.864492	0.000000	-18.719214	.000140	-.002637	-.039921	-.002555
5 TOTAL	25.83514	-4.37098	21.46416	-2.17608	0.00000	-63.84087	.00097	-.00656	-.19151	-.00740

YEAR	LES	LEU	LEWP	LET	MT	MC	MINT	MK	MNFS	MUSA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	0.000000	0.000000	.000002	.000003	.000023	.000007	-.000029	.000138
1966	.000001	0.000000	0.000000	-.001746	-.239010	-.029330	-.020429	-.010678	-.178574	.251875
1967	.000275	0.000000	0.000000	-.003758	-.486644	-.087861	-.007459	-.024147	-.369177	.807562
1968	.000693	0.000000	0.000000	-.005871	-.749278	-.163622	-.001433	-.041572	-.542651	1.617710
1969	.001233	0.000000	0.000000	-.008090	-1.016824	-.247777	.015372	-.059514	-.724905	2.743609
1970	.001900	0.000000	0.000000	-.010366	-1.267827	-.328580	.081640	-.067139	-.953747	4.646388
1971	.003582	0.000000	0.000000	-.012411	-1.361300	-.402984	.187858	-.128050	-1.018124	5.967872
1972	.004090	0.000000	0.000000	-.015874	-1.740398	-.495591	.390483	-.139349	-1.495942	8.055076
1973	.004553	0.000000	0.000000	-.019761	-2.171679	-.624671	.406434	-.171150	-1.782293	11.342398
1974	.005845	0.000000	0.000000	-.023808	-2.741147	-.818360	.627052	-.299510	-2.290329	12.933141
1975	.006364	0.000000	0.000000	-.029312	-3.392045	-.996431	.648276	-.437137	-2.606753	19.326846
1976	.010051	0.000000	0.000000	-.034922	-3.572567	-1.122618	.815322	-.436015	-2.829056	26.232840
6 TOTAL	.03859	0.00000	0.00000	-.16591	-18.74072	-5.31802	3.14314	-1.81425	-14.75158	93.93546

YEAR	MBA	POPU	POPR	PY	ROCUR	PROFIT	VA	VCN	VNM	VIC
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.000132	0.000000	0.000000	.000007	0.000000	-.000007	0.000000	0.000000	0.000000	0.000000
1966	.250838	.000202	-.000605	-.949577	-.018738	-1.112094	.209008	-.000001	-.735645	-.000015
1967	.773527	.000513	-.001431	-1.883182	-.036210	-2.139414	.439884	-.000567	-1.680416	-.007745
1968	1.549530	.000984	-.002620	-2.850762	-.052411	-3.270847	.656191	-.001695	-2.722806	-.020027
1969	2.627978	.001677	-.004322	-3.835634	-.066286	-4.472042	.855203	-.003541	-3.845374	-.037418
1970	4.450562	.002711	-.006854	-4.745917	-.077178	-5.672188	1.030874	-.006403	-5.025886	-.062966
1971	5.716352	.003935	-.009661	-5.025029	-.074367	-6.109999	1.195480	-.013435	-6.448155	-.132130
1972	7.715590	.005877	-.014373	-6.468821	-.084768	-7.979374	1.382216	-.020574	-7.988475	-.187800
1973	10.864366	.008822	-.021567	-8.044012	-.102962	-9.804202	1.521907	-.031734	-9.626255	-.266617
1974	12.388066	.012889	-.031306	-10.141722	-.110289	-11.971647	1.656057	-.051086	-11.570979	-.380840
1975	18.512304	.019121	-.046506	-12.512179	-.130806	-14.492609	1.729989	-.086108	-13.609991	-.551798
1976	25.127241	.027084	-.065175	-12.976433	-.137390	-15.253027	1.788320	-.144519	-16.657212	-.868904
7 TOTAL	89.97649	.08382	-.20442	-69.43426	-.89141	-82.27737	12.46513	-.35966	-79.91119	-2.51626

YEAR	VS	VWP	WAA	WCNA	WNMA	WICA	WSA	WDA	WNPA	WIMA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	.000001	.000302	.000002	.000006	.000013	.000056	.000026	.000003
1966	.000303	0.000000	.018727	.028373	.020172	.073916	.125967	.663027	.300896	.035669
1967	.241802	0.000000	.033949	.081209	.026886	.111247	.195041	1.006171	.456623	.065506
1968	.608989	0.000000	.056878	.168475	.037376	.161089	.288382	1.466415	.665492	.109936
1969	1.084308	0.000000	.089592	.305549	.051549	.222760	.404661	2.038240	.924998	.173257
1970	1.670633	0.000000	.138869	.518006	.074860	.311572	.570635	2.862252	1.298954	.269534
1971	3.149350	0.000000	.178581	.790046	.064626	.300827	.590191	2.840034	1.288871	.356146
1972	3.595498	0.000000	.268215	1.198703	.105360	.444506	.853544	4.188490	1.900810	.546598
1973	4.002594	0.000000	.390702	1.793773	.154799	.612912	1.163123	5.783567	2.624712	.823962
1974	5.137595	0.000000	.513860	2.574654	.155608	.639698	1.250285	6.146293	2.789326	1.174157
1975	5.594486	0.000000	.737325	3.695396	.243082	.917353	1.765603	8.820103	4.002761	1.767074
1976	8.834389	0.000000	1.014564	5.236453	.309540	1.135145	2.253425	11.113641	5.043619	2.394477
8 TOTAL	33.91995	0.00000	3.44126	16.39134	1.24382	4.93103	9.46087	46.92829	21.29711	7.71632

YEAR	WA	WCN	WMM	WIC	WS	WD	WMP	WIM	WBT	XD
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.000001	-.000001	.000001	.000303	.000005	.000040	1.000014	.000001	.000014	0.000000
1966	.008655	-.002093	.006382	.028423	.056160	.487223	.179024	.013428	.162917	0.000000
1967	.015174	.032244	.005043	.037196	.078983	.660386	.244322	.020821	.256232	0.000000
1968	.027952	.090272	.004755	.048712	.111131	.888379	.335822	.052614	.420085	0.000000
1969	.045913	.180788	.004519	.059536	.145515	1.089543	.431168	.085853	.636408	0.000000
1970	.070354	.308243	.005370	.070669	.184983	1.309354	.541504	.131431	.926191	0.000000
1971	.089681	.465656	-.005126	.048000	.167985	1.029251	.440677	.175195	1.083970	0.000000
1972	.126780	.660037	-.002700	.058510	.216793	1.603985	.597831	.253632	1.510553	0.000000
1973	.154350	.835064	-.004242	.052524	.213896	1.581678	.610809	.325236	1.760190	0.000000
1974	.168885	.993264	-.014030	.025140	.158035	1.107416	.419742	.399699	1.829925	0.000000
1975	.224783	1.294269	-.043700	-.053810	.059081	1.441526	.190734	.535981	1.980430	0.000000
1976	.259899	1.533117	-.048479	-.075722	.063429	1.274127	.176296	.625669	2.276594	0.000000
9 TOTAL	1.19243	6.39086	-.09221	.29928	1.45600	12.47291	4.16794	2.62758	12.843[illegible]	0.00000

YEAR	GDPM	VT	GOCS	GDIS	PUPIS	RCONV	DY
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.000001	0.000000	0.000000	0.000000	0.000000	-.000006	.000008
1966	-.528984	-.526349	-1.031138	-.120376	-.000403	.423227	-.949577
1967	-.969186	-.958852	-2.017164	-.306214	-.000918	.977557	-1.834991
1968	-1.408051	-1.383777	-3.027288	-.501892	-.001636	1.577045	-2.755190
1969	-1.846899	-1.802145	-4.041084	-.719442	-.002645	2.204095	-3.690957
1970	-2.270084	-2.199089	-4.960263	-.962823	-.004143	2.780896	-4.551257
1971	-2.110033	-2.008033	-4.788973	-1.464570	-.005726	3.313344	-4.785173
1972	-3.103118	-2.964063	-5.976987	-2.062166	-.008496	3.830576	-6.213749
1973	-4.256809	-4.071813	-7.538143	-2.489615	-.012745	4.395092	-7.715719
1974	-5.045991	-4.801017	-8.800606	-3.743317	-.018417	5.874653	-9.733486
1975	-6.725291	-6.408729	-10.602988	-4.869291	-.027385	6.788513	-11.997485
1976	-6.807198	-6.412931	-11.057089	-5.189638	-.038091	7.425795	-12.341437
10 TOTAL	-35.07164	-33.53680	-63.84172	-22.42914	-.12060	39.59079	-66.56901

(6-6) Policy Simulation 5:

In policy five, (the results are presented in Table 6-5) total government investment (IGT) again is held constant. Government nominal investment in agriculture (IAGA) is allowed to increase by one billion current Rials in the period 1965-1976, and simultaneously government investment in sevices (ISGA) is decreased by the same amount. The pattern of changes of variables here is again similar to policy three. The differences are only in the magnitude of the changes of variables (see Table 6-5). For instance, private urban consumption (CUP) falls more (70.99 billion Rials) and private rural consumption (CRP) increase less (10.66 billion Rials) than in policy 3 (50.61 and 11.46 billion Rials, respectively). Total investment (IT), grand total capital stock (KT), gross national product at market prices (GNPM), total imports of goods and services (MT) and total labour employment (LET) fall less, while total value-added (VT) declines more than their respective declines in policy 3. Prices of domestically produced and total consumer goods (CTPD and CTDPD respectively) increase more here, while the price of domestically produced investment goods (ITPD) increases less in comparison wtih policy 3. Nominal wages increase more in this case, simply

because the price of domestically produced consumer goods (CTPD) increases more here than in policy 3. Ratios of per capita private consumption in urban to rural areas (ROCUR) and total gross profit to total wage bill (PROFIT/WBT which is assumed to be an index for distribution of income, DISTOY) decrease by 0.108 and 0.046 points respectively (0.153 and 0.026 points in Policy 3).

The above results suggest that if decision makers are mainly interested in narrowing the gaps between income of wage earners and profit makers, and per capita consumption in urban and rural areas, this policy is better than policies three and four. Also, some important economic indicators such as gross national product at market price (GNPM), total gross investment (IT), total labour employment (LET)and so forth fall less here than under policies three and four. On the other hand, total value-added (VT) falls more and the price of domestically produced consumer goods (CTPD) and hence the nominal sectoral wages increase more here than in policies three and four.

POLICY SIMULATION #5: A SUSTAINED ONE BILLION CURRENT RIALS INCREASE IN GOVERNMENT INVESTMENT IN THE AGRICULTURE SECTOR IN THE PERIOD 1965-1976, ACCOMPANIED BY A SIMULTANEOUS DECREASE IN ITS INVESTMENT IN THE SERVICES SECTOR BY THE SAME AMOUNT; THE TOTAL GOVERNMENT INVESTMENT IS HELD CONSTANT.

YEAR	CRP	CUP	CG	CTPD	CTDPD	CTPA	CT	DYU	DEP	DBCRA
1961	0.000000	0.000000	0.000000	0.000300	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	.012104	-.001706	.000678	.000658	1.622596	.010398	.033663	0.000000	.633502
1966	.167619	-1.200909	-.007797	.002260	.002198	1.977448	-1.041087	-1.063777	.002172	.533870
1967	.363187	-3.110497	-.020072	.004278	.004115	3.735234	-2.767382	-2.600283	-.047667	.587082
1968	.547276	-4.431326	-.036165	.005129	.004882	5.958328	-3.920215	-3.617682	-.126406	.561545
1969	.717942	-5.499042	-.057132	.006376	.006027	8.740140	-4.838232	-4.496441	-.180879	.490221
1970	.872017	-6.312337	-.083738	.007426	.006974	11.355744	-5.524058	-5.213317	-.226624	.100385
1971	1.023819	-7.344395	-.121684	.009954	.009205	16.452214	-6.442260	-6.169376	-.264568	.316269
1972	1.185652	-7.701707	-.171469	.011299	.010374	21.393575	-6.687524	-6.637112	-.316438	.187331
1973	1.309853	-8.272148	-.239759	.013904	.012458	27.224883	-7.202054	-7.288299	-.343991	.015119
1974	1.427976	-8.731895	-.328420	.013580	.011647	27.661941	-7.631539	-8.211728	-.382798	-3.719265
1975	1.497634	-9.500627	-.454956	.017836	.015132	37.593470	-8.457949	-9.222962	-.443346	-4.815793
1976	1.593529	-8.901444	-.603589	.020386	.017655	47.646354	-7.951504	-8.852908	-.517361	-6.021825
1 TOTAL	10.66650	-70.99342	-2.12649	.11311	.10133	211.36193	-62.45341	-63.34022	-2.84791	-11.13156

YEAR	DISTUY	FEXRA	GHPM	GRIDT	GRDT	GRP	IAP	ICMP	IMMP	ITCP
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.001410	-.009133	.034597	.000934	0.000000	0.000000	0.000000	-.012324	-.101052	-.030434
1966	-.012512	.227044	-.868636	-.000100	.001708	0.000000	.070958	-.018722	-.057728	-.053189
1967	-.024656	.850222	-2.292935	-.006807	-.044189	0.000000	.122625	-.038569	-.158656	-.112449
1968	-.032476	1.731199	-3.271639	-.020070	-.113603	0.000000	.149404	-.059404	-.249143	-.170992
1969	-.039667	2.872954	-4.083958	-.039132	-.158603	0.000000	.161602	-.079120	-.343294	-.209887
1970	-.044792	4.269264	-4.740481	-.063387	-.196076	0.000000	.163928	-.092981	-.392553	-.229097
1971	-.049231	6.014484	-5.627783	-.091967	-.225878	0.000000	.166483	-.120338	-.604778	-.287941
1972	-.054724	8.044839	-6.043279	-.123168	-.267516	0.000000	.174084	-.169434	-.759619	-.356500
1973	-.060683	10.460919	-6.639709	-.157461	-.284387	0.000000	.164313	-.217956	-.920469	-.407360
1974	-.059869	14.363480	-7.540575	-.197430	-.311518	0.000000	.158310	-.263664	-.837319	-.380000
1975	-.045825	19.281625	-8.623280	-.240085	-.353239	0.000000	.135877	-.425548	-1.658321	-.637665
1976	-.046344	24.355969	-8.358532	-.281897	-.402949	0.000000	.118862	-.547234	-1.970260	-.750643
2 TOTAL	-.47219	92.46287	-58.05581	-1.22027	-2.35625	0.00000	1.58645	-2.05329	-8.06140	-3.62616

YEAR	ISP	IPT	ISG	IWPG	IGT	IGTPD	ITPD	IT	KAP	KAG
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.176292	.032481	-.496125	0.000000	.000403	.016254	.001087	.032884	0.000000	.883267
1966	.012103	-.046579	-.538594	0.000000	.000997	.013536	.000530	-.045582	.070958	1.803074
1967	.107412	-.079837	-.428435	0.000000	-.021256	.013603	.001485	-.101093	.191454	2.606234
1968	.231175	-.098960	-.416571	0.000000	-.073666	.011864	.002286	-.172626	.335114	3.318215
1969	.341094	-.129604	-.432195	0.000000	-.140718	.010712	.002956	-.270322	.486664	3.938067
1970	.362035	-.188667	-.724935	0.000000	-.217646	.005232	.003111	-.406313	.635992	4.552099
1971	.557257	-.297317	-.570837	0.000000	-.300813	.008867	.005247	-.598130	.783395	5.221451
1972	.633596	-.477873	-.628692	0.000000	-.394782	.009539	.006653	-.872655	.933978	5.686946
1973	.764731	-.616741	-.617194	0.000000	-.487520	.007630	.008337	-1.104261	1.070271	6.143630
1974	.107117	-1.215558	-.276999	0.000000	-.586206	.014408	.007355	-1.801766	1.196472	6.356464
1975	.952657	-1.633001	-.126066	0.000000	-.696825	.012970	.016005	-2.329826	1.296456	6.534491
1976	1.471710	-1.685574	-.345080	0.000000	-.819497	.011832	.019239	-2.505071	1.376423	6.649298
3 TOTAL	5.71718	-6.43723	-5.64172	0.00030	-3.73753	.13664	.07429	-10.17476	8.37718	53.69324

YEAR	KAT	KCMP	KCMG	KCMT	KMMP	KMMG	KMMT	KICP	KICG	KICT
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.883267	-.012325	-.054139	-.066463	-.101052	-.038223	-.139275	-.030434	-.165867	-.196301
1966	1.874032	-.030307	-.088073	-.118381	-.152717	-.090722	-.243439	-.079059	-.305113	-.384172
1967	2.797688	-.067058	-.125755	-.192812	-.302410	-.160814	-.463225	-.179649	-.456612	-.636262
1968	3.653329	-.122438	-.156013	-.278450	-.533408	-.298818	-.832226	-.323694	-.535176	-.858870
1969	4.424731	-.194210	-.178275	-.372487	-.844698	-.452554	-1.297253	-.485027	-.589749	-1.074777
1970	5.188092	-.275539	-.191333	-.466871	-1.186568	-.521287	-1.707856	-.641371	-.575399	-1.216769
1971	6.004846	-.387344	-.255749	-.643094	-1.720153	-.639321	-2.359474	-.833106	-.670542	-1.323646
1972	6.820724	-.533938	-.323618	-.857156	-2.376563	-.681370	-3.057933	-1.064640	-.691595	-1.756235
1973	7.213902	-.719481	-.501755	-1.221237	-3.154438	-.743471	-3.897908	-1.312304	-.675901	-1.988205
1974	7.552936	-.939977	-.696193	-1.636171	-3.802491	-.837566	-4.640057	-1.495459	-.732028	-2.227487
1975	7.830947	-1.309127	-.918245	-2.227372	-5.232662	-.969747	-6.202409	-1.908805	-.803138	-2.711944
1976	8.025721	-1.777813	-1.110324	-2.888136	-6.896971	-1.051623	-7.948594	-2.373127	-.835137	-3.208265
4 TOTAL	62.07042	-6.36916	-4.59947	-10.96863	-26.30413	-6.48552	-32.78965	-10.72668	-7.05626	-17.78293

YEAR	KSP	KSG	KST	KUG	KWPG	KT	LEA	LEGN	LENN	LETC
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.176292	-.486124	-.309832	-.138512	0.000000	.032884	0.000000	0.000000	0.000000	0.000000
1966	.183107	-1.060134	-.877028	-.234969	0.000000	.016044	.000014	-.000098	-.000254	-.000195
1967	.285025	-1.456766	-1.171740	-.362225	0.000000	-.028574	.000032	-.000175	-.000444	-.000382
1968	.307649	-1.829634	-1.321985	-.466109	0.000000	-.104310	.000047	-.000285	-.000847	-.000633
1969	.833513	-2.206940	-1.373426	-.541908	0.000000	-.235119	.000061	-.000411	-.001520	-.000854
1970	1.170543	-2.865667	-1.695123	-.556785	0.000000	-.459313	.000075	-.000550	-.002370	-.001069
1971	1.692684	-3.350533	-1.657849	-.649312	0.000000	-.828529	.000088	-.000689	-.003121	-.001210
1972	2.275500	-3.878710	-1.603210	-.749802	0.000000	-1.403414	.000101	-.000950	-.004312	-.001515
1973	2.971965	-4.379542	-1.407577	-.836346	0.000000	-2.137372	.000112	-.001266	-.005588	-.001746
1974	2.989923	-4.525154	-1.535231	-.996848	0.000000	-3.482857	.000122	-.001804	-.007124	-.001977
1975	3.852882	-4.515466	-.662584	-1.279251	0.000000	-5.252613	.000128	-.002417	-.008479	-.002215
1976	5.289006	-4.725081	.483924	-1.486428	0.000000	-7.021779	.000133	-.003290	-.011334	-.002696
5 TOTAL	22.14809	-35.27975	-13.13166	-8.29849	0.00000	-20.90095	.00091	-.01194	-.04539	-.01449

YEAR	LES	LED	LEMP	LET	MT	MC	MINT	MK	MNFS	MOSA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	0.000000	0.000000	.008684	.010398	.105367	.032884	-.139764	.651841
1966	-.000779	0.000000	0.000000	-.001312	-.218033	-.010750	-.019151	.006619	-.194751	.794395
1967	-.002286	0.000000	0.000000	-.003175	-.575541	-.074746	-.050599	.022954	-.473188	1.500546
1968	-.002947	0.000000	0.000000	-.004663	-.821201	-.153217	-.065771	.028096	-.630310	2.393624
1969	-.003326	0.000000	0.000000	-.006049	-1.024998	-.228564	-.079005	.024380	-.741807	3.511154
1970	-.003455	0.000000	0.000000	-.007369	-1.189889	-.298553	-.141947	-.001770	-.747619	4.561914
1971	-.004264	0.000000	0.000000	-.009196	-1.412607	-.372892	-.076908	.012365	-.975172	6.609306
1972	-.004170	0.000000	0.000000	-.010844	-1.516899	-.422245	.025932	.008432	-1.129020	8.594386
1973	-.004033	0.000000	0.000000	-.012521	-1.666606	-.482056	-.019961	-.027717	-1.136873	10.936982
1974	-.003541	0.000000	0.000000	-.014322	-1.892730	-.573176	-.071927	-.141594	-1.106032	11.112561
1975	-.003862	0.000000	0.000000	-.016844	-2.164495	-.635598	.017646	-.172595	-1.373947	15.102328
1976	-.001666	0.000000	0.000000	-.018854	-2.098042	-.660941	.164875	-.175487	-1.426488	19.140847
6 TOTAL	-.03425	0.00000	0.00000	-.10515	-14.57236	-3.90234	-.21141	-.38343	-10.07517	84.90988

YEAR	NBA	POPU	POPR	PY	RUCUR	PROFIT	VA	VCN	VMN	VIC
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.624369	.000077	-.000232	.033664	.000123	-.034515	0.000000	0.000000	0.000000	0.000000
1966	.760915	.000337	-.000970	-.870708	-.018086	-1.070370	.191361	-.005380	-.106199	-.066357
1967	1.437305	.000842	-.002325	-2.238461	-.043366	-2.562253	.406011	-.009583	-.185625	-.129863
1968	2.292742	.001486	-.003897	-3.125163	-.059487	-3.560117	.606122	-.015609	-.353214	-.215079
1969	3.363174	.002358	-.005974	-3.863546	-.070729	-4.491430	.791498	-.022542	-.634583	-.290327
1970	4.369649	.003489	-.008611	-4.450771	-.078043	-5.289595	.958622	-.030153	-.989172	-.363312
1971	6.330753	.005140	-.012553	-5.271248	-.084798	-6.337685	1.124006	-.037795	-1.302262	-.411311
1972	8.232170	.007291	-.017577	-5.603673	-.085358	-7.049657	1.300956	-.052061	-1.799130	-.515046
1973	10.476037	.010269	-.024596	-6.138256	-.093691	-7.816935	1.434430	-.069389	-2.331714	-.593669
1974	10.644215	.014126	-.033540	-6.960347	-.093851	-8.700439	1.562899	-.098863	-2.972205	-.672083
1975	14.465831	.019681	-.046736	-7.939849	-.107229	-9.941532	1.636351	-.132451	-3.538104	-.752968
1976	18.334145	.026107	-.061171	-7.559274	-.108179	-9.900904	1.696583	-.180313	-4.729418	-.916732
7 TOTAL	81.33131	.09120	-.21818	-53.98763	-.84269	-66.75503	11.70884	-.65414	-18.94163	-4.92679

YEAR	VS	VMP	MAA	MCMA	MMMA	MICA	MSA	MDA	MMPA	MIMA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	.007508	.011651	.010068	.029731	.050664	.266681	.121026	.013664
1966	-.685067	0.000000	.027286	.053809	.032849	.091144	.157818	.888692	.403308	.049943
1967	-1.939187	0.000000	.057690	.142684	.062268	.172039	.288440	1.682388	.763505	.106851
1968	-2.590824	0.000000	.084034	.271570	.073817	.199171	.341555	2.017127	.915418	.157379
1969	-2.923029	0.000000	.122354	.458705	.090480	.244872	.429420	2.507737	1.138067	.230896
1970	-3.036769	0.000000	.169532	.717327	.103725	.282179	.506030	2.920614	1.325440	.321696
1971	-3.748071	0.000000	.246643	1.093261	.139194	.387290	.683489	3.914907	1.776672	.471932
1972	-3.665654	0.000000	.332911	1.599675	.155876	.433847	.785281	4.443739	2.016668	.645450
1973	-3.544843	0.000000	.457883	2.295498	.191041	.538681	.981884	5.468378	2.481672	.902782
1974	-3.112278	0.000000	.586391	3.184485	.181991	.515078	.964590	5.340728	2.423742	1.211533
1975	-3.394535	.0.000000	.802172	4.400516	.241441	.692009	1.278032	7.014487	3.183332	1.711040
1976	-1.465031	0.000000	1.061158	6.007695	.271440	.784260	1.499618	8.017543	3.638540	2.151212
8 TOTAL	-30.10529	0.00000	3.95552	20.23688	1.59421	4.37030	7.96682	44.48302	20.18739	7.97438

YEAR	WA	WCN	WMM	WTC	WS	WO	WWP	WIM	WMT	XO
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.003248	-.001245	.004210	.011221	.022113	.189344	.069589	.004582	.068179	0.000000
1965	.013566	.010712	.013795	.030921	.065288	.652713	.239831	.019915	.199662	0.000000
1967	.026129	.059759	.023307	.050399	.099502	1.102580	.407921	.045817	.323792	0.000000
1968	.043261	.157413	.025316	.048136	.106473	1.220575	.461398	.077450	.434954	0.000000
1969	.066250	.289125	.027458	.049542	.123446	1.339218	.529972	.119879	.627884	0.000000
1970	.093202	.459775	.026522	.044589	.130053	1.335900	.552482	.170013	.838824	0.000000
1971	.123718	.643608	.028008	.046875	.140109	1.416080	.606299	.227742	1.066437	0.000000
1972	.167085	.921313	.026904	.036674	.148711	1.700987	.633985	.313214	1.445984	0.000000
1973	.197685	1.140086	.022106	.025836	.133496	1.496181	.577791	.379923	1.678279	0.000000
1974	.213043	1.312024	.009925	.002577	.079825	.963204	.365081	.438127	1.740092	0.000000
1975	.282336	1.730432	-.011822	-.060841	-.013215	1.148937	.152021	.573367	2.001683	0.000000
1976	.325990	2.043554	-.014932	-.069318	-.006872	.922205	.127602	.630349	2.341630	0.000000
9 TOTAL	1.55551	8.76656	.18080	.21631	1.02893	13.48793	4.72397	3.00038	12.76740	0.00000

YEAR	GDPM	VT	GQCS	GQIS	POPTS	RCONV	DY
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.000934	0.000000	0.000000	0.000000	-.000155	-.033663	.033664
1966	-.673450	-.673350	-1.030337	-.052200	-.000633	.195186	-.872416
1967	-1.820867	-1.814060	-2.692634	-.124046	-.001483	.472068	-2.194273
1968	-2.475072	-2.455002	-3.766998	-.200722	-.002411	.796567	-3.011560
1969	-2.959512	-2.920380	-4.609667	-.294704	-.003616	1.124046	-3.704943
1970	-3.327796	-3.264709	-5.225506	-.404539	-.005122	1.412685	-4.254695
1971	-4.241522	-4.149555	-6.069368	-.610496	-.007413	1.386261	-5.045370
1972	-4.586585	-4.463417	-6.265280	-.881089	-.010286	1.456694	-5.336156
1973	-4.978259	-4.820798	-6.719999	-1.076541	-.014327	1.661450	-5.853869
1974	-5.178443	-4.981013	-7.058362	-1.660171	-.019414	2.362132	-6.648829
1975	-6.068557	-5.828472	-7.822351	-2.157229	-.027055	2.554723	-7.586610
1976	-5.473860	-5.191963	-7.290561	-2.329584	-.035064	2.884672	-7.156326
10 TOTAL	-41.78299	-40.56272	-58.55106	-9.79132	-.12698	16.27282	-51.63138

(6-7) Policy Simulation 6:

Policy six examines the effect of a one billion current Rials sustained increase in total nominal government investment in the construction sector (ICNGA). The results of this policy are presented in Table 6-6. Domestic sources of financing are adopted here. That is, government bonds are sold to the central bank (ΔBCBA) to finance the deficit. The response of the model to this policy is investigated below.

This policy is most readily compared to policy 2, since the same means of financing the additional investment spending is used (financed by increasing money supply). Here the investment spending is directed towards construction, the sector which contributes most to the supply of capital goods. Private rural consumption (CRP) is unchanged in the first period (1965) as value-added in agriculture (VA) remains unchanged[11]. It falls in the second period (1966) and then increases throughout, with a total increase of 0.58 billion Rials. Private urban consumption (CUP) increases in the first period (1965) by 0.03 billion Rials, then falls for the next three consecutive periods (1966-1968), and finally rises for the remainder of the simulation period (1969-1976). The increase in CUP is 54.88 billion Rials. The ratio of per

capita consumption in urban to rural areas (ROCUR) follows the same pattern as CUP, with a total increase of 0.071 points. The supply of domestically produced consumption goods (GQC) remains unchanged in 1965, falls for three consecutive periods (1966-1968), and then increases throughout. The total increase of GQC over the simulation period is higher (49.90 billion Rials) than that of the supply of domestically produced investment goods GQI (17.14 billion Rials). The price of domestically produced consumer goods (CTPD) increases in the first four periods (1965-1968). This is because the supply of domestically produced consumer goods (GQC) decreases faster than the demand for domestically produced consumer goods (DQC = CT-MC, where CT is total consumption and MC is imports of consumer goods). For the remaining periods (1969-1976), CTPD tends to fall, with a change by the end of the simulation period of -0.028.

Total private investment (IPT) decreases until 1974 and then increases thereafter. Private investments in construction (ICNP) and agriculture (IAP) increase, and those in manufacturing and mining (IMMP), transportation and communication (ITCP), and services (ISP) fall in total. Private investment in construction (ICNP) gains the most (12.23 billion Rials in total), and IMMP declines by 10.68 billion Rials for the entire period (1965-1976). Total government investment (IGT), on the other hand, increases in

all periods with a total increase of 32.31 billion Rials. This causes total investment (IT) to increase by 23.93 billion Rials throughout. The price of domestically produced investment goods (ITPD) increases until period 1975, and then falls. Declines in ITPD in 1975 and 1976 are the major reason for the rise in total private investment (IPT) in these periods. The supply of domestically produced investment goods (GQI) increases faster than the corresponding demand (DQI) in 1975 and 1976. Hence, ITPD falls in these periods. It seems that as time goes by, constant increases in government investment in construction (ICNG) helps the supply of both investment and consumer goods to grow faster than respective demands. Therefore, prices of both domestically produced investment and consumption goods (ITPD and CTPD respectively) tend to fall in later periods (CTPD starts falling in 1969 and ITDP takes its downturn in 1975 and onwards).

Total sectoral capital stocks rise in all sectors but manufacturing and mining (KMMT), and transportation and communication (KTCT). The capital stock in construction (KCNT) increases significantly by 99.74 billion Rials in total. The grand total capital stock (KT) increases by 90.68 billion Rials for the entire period (1965-1976). Despite significant decreases in the amount of value-added in manufacturing and mining (VMM) by 45.33 billion Rials, total

value-added (VT) increases by 56.99 billion Rials. The main contribution to VT is given by value-added in services (VS) which increases by 100.02 billion Rials in total. Total labour employment (LET) also increases throughout, with a total increase of 117.83 thousand person-years. This employment is mainly created by the construction and services sectors. This labour is drawn from two sectors - transportation and communication, and especially, manufacturing and mining. Nominal wages tend to decline in all sectors except construction (which itself falls at the end of the period, 1976). This occurs due to the down trend of the price of domestically produced consumption goods (CTPD) which begins in 1968. However, the total wage bill (WBT) increases in all periods by 13.98 billion Rials in total. The index of the distribution of income, DISTOY (PROFIT/WBT) falls for the first four periods (1965-1968), and then increases until the last period (1976) in which it becomes negative again.

Gross national product in constant prices (GNPM) increases slightly in the first period (0.15 billion Rials), then falls in 1966 and 1967, and finally increases to the end of the simulation period. The total increase is 63.17 billion Rials. Personal income (PY), disposable income (DY) and also urban disposable income (DYU) mirror the pattern of changes in GNPM. All increase significantly in total.

Being affected by GNPM, total imports of goods and services (MT) also follows the same pattern of changes. The total increase is 15.86 billion Rials. Imports of consumer goods (MC), intermediate (MINT) and capital goods (MK) rise throughout the simulation period by 5.21, 18.22 and 6.79 billion Rials respectively, in total. The monetary base (MBA), money supply (MOSA) and total banking credit to the private sector (CTPA) increase for the first five periods (1965-1969) and then fall thereafter. These variables are mainly influenced by the foreign exchange reserves (FEXRA) which start falling rapidly from 1969 onwards. The total reduction in FEXRA is 84.59 billion Rials. The other component of the monetary base (MBA), government bonds sold to the central bank (BCBA) increases throughout. However, the magnitude of this increase is not large enough to compensate for the fall in foreign exchange reserves (FEXRA). Hence, MBA tends to decline by 45.77 billion Rials in total. Being affected by MBA, the money supply (MOSA) and total banking credit to the private sector (CTPA) also fall by 118.93 and 47.78 billion Rials, respectively.

In summary, implementarion of policy 6 increases most of the economic indicators, the gross national product (GNPM), urban and rural consumption (CUP and CRP, respectively), total gross investment (IT), total value-added (VT) and so forth. The ratio of the total gross

profit to the total wage bill (PROFIT/WBT, which is used as an index for the distribution of income, DISTOY) increases only moderately in total and it even falls in some periods. The ratio of per capita private consumption in urban to rural areas (ROCUR) declines in the short run but tends to increase in the long run. The resources which are used in agriculture, construction and services in order to increase economic activities in these sectors are drawn from manufacturing and mining, and transportation and communication. The agriculture sector does not absorb significant amounts of resources from the other sectors as value-added in agriculture (VA) does not increase substantially. Thus, the increases in income, private consumption and investment in the rural area is limited.

If policy makers are concerned about improvement of economic activities in the rural area, the above analysis suggests that any government investment in the non-agriculture sector should be accompanied by government investment in the agriculture sector. The next policy simulation tests this view. That is, government investment in construction (ICNGA) is increased along with an increase in government investment in agriculture (IAGA).

IN CONSTRUCTION IN THE PERIOD 1965-1976.

YEAR	CRP	CUP	CG	CTPD	CTDPD	CTPA	CT	DYU	DEP	BCBA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000303	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	.025429	-.002882	.001145	.001110	2.545238	.022547	.147684	0.000000	1.018920
1966	-.001155	-.703312	-.010014	.002286	.002221	2.603443	-.714481	-.274018	.089582	.972342
1967	.011465	-1.729224	-.023825	.004388	.004207	5.454932	-1.741584	-.796214	-.089345	1.852414
1968	.019931	-.317302	-.034315	.002383	.002247	6.861749	-.331686	.517215	-.033392	2.522696
1969	.026596	2.283193	-.038162	-.000204	-.000208	5.594548	2.271627	2.532027	.044922	2.778894
1970	.033272	4.720777	-.033299	-.003769	-.003550	-.915815	4.720750	4.276154	.173343	1.650045
1971	.039007	4.081460	-.035852	-.001575	-.001498	-3.524912	4.094615	3.928046	.293427	2.069026
1972	.064533	4.908644	-.041493	-.003292	-.003056	-4.748746	4.931684	5.036222	.301847	3.529569
1973	.071984	8.436467	-.033943	-.011369	-.010217	-15.190892	8.476508	7.808236	.383206	2.683411
1974	.087458	9.125394	-.039281	-.009940	-.008532	-19.098455	9.173531	8.961393	.564980	6.517280
1975	.100189	12.031721	-.035829	-.019369	-.016485	-35.582111	12.096081	11.750420	.678458	7.759869
1976	.117323	12.010739	-.025522	-.028081	-.024337	-62.983487	12.102540	11.572603	.880394	5.471412
1 TOTAL	.58060	54.87595	-.35442	-.06742	-.05810	-116.93448	55.10213	55.45973	3.28702	38.82588

YEAR	DISTDY	FEXRA	GNPM	GRIDT	GRDT	GRP	IAP	ICNP	INMP	ITCP
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.001603	-.039521	.149709	.002825	0.000000	0.000000	0.000000	-.061980	-.508210	-.153062
1966	-.009431	.029453	-.253679	.004581	.007495	0.000000	-.000489	.090900	-.859442	-.265752
1967	-.018372	.246623	-.739064	.006941	.013593	0.000000	.005068	.249451	-1.385554	-.393899
1968	-.010221	.117681	.478850	.013292	-.040431	0.000000	.006411	.415880	-1.673061	-.469480
1969	.082332	-.626135	2.660305	.029394	.025322	0.000000	.006602	.597623	-1.714000	-.486983
1970	.013526	-2.002448	4.672585	.059195	.131275	0.000000	.006830	.800702	-1.478084	-.417350
1971	.005608	-3.425400	4.598570	.087322	.225536	0.000000	.010879	.982495	-1.585596	-.417769
1972	.037507	-5.356869	5.748954	.126183	.213548	0.000000	.013147	1.205387	-1.650231	-.411274
1973	.011331	-8.528796	8.716875	.176534	.270038	0.000000	.011228	1.463009	-1.117924	-.266539
1974	.005686	-13.847057	10.276004	.239549	.413976	0.000000	.013759	1.767386	-.877663	-.195447
1975	.002761	-21.451737	13.333746	.314304	.480679	0.000000	.014095	2.142611	.403753	.196881
1976	-.005666	-29.707230	13.598565	.390471	.626307	0.000000	.016358	2.581211	1.760856	.635809
2 TOTAL	.00346	-84.59144	63.17142	1.44549	2.34015	0.00000	.10389	12.23468	-10.68476	-2.64486

1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.076255	-.799508	.843243	0.000000	.964248	.001466	.005469	.164740	0.000000	-.006089
1966	-.336350	-1.371133	.282042	0.000000	1.768261	-.014060	.009289	.397128	-.000489	.061174
1967	.002925	-1.522010	1.003918	0.000000	2.263960	-.008546	.015188	.741950	.004593	.097717
1968	.104758	-1.615493	1.405028	0.000000	2.546221	-.006681	.018528	.930728	.010867	.124551
1969	-.048874	-1.645633	1.580052	0.000000	2.702063	-.010029	.019324	1.036430	.017143	.151871
1970	-.665375	-1.753277	.887979	0.000000	2.877958	-.026008	.017333	1.124681	.023460	.226889
1971	-.515393	-1.529343	1.418936	0.000000	3.171057	-.013078	.019840	1.645714	.033635	.294791
1972	-.093329	-.936301	2.145391	0.000000	3.196593	-.008580	.021119	2.250292	.045772	.318232
1973	-.935036	-.844863	1.509688	0.000000	3.273218	-.015209	.015540	2.428355	.035627	.388151
1974	-.223686	.484347	1.799758	0.000000	3.197464	-.017694	.013409	3.681811	.067716	.439479
1975	-1.346246	1.411094	1.032899	0.000000	3.173422	-.022118	-.000075	4.584516	.079780	.514680
1976	-3.262411	1.731823	-.030813	0.000000	3.177523	-.040432	-.014139	4.909346	.093744	.622135
3 TOTAL	-7.39523	-8.38630	12.99812	0.00000	12.31199	-.18097	.14082	23.92569	.43185	3.23358

YEAR	KAT	KCNP	KCNG	KCNI	KMMP	KMMG	KMMI	KTCP	KTCG	KTCI
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.006089	-.061980	.958424	.896444	-.508210	-.003498	-.511706	-.153062	-.015169	-.168230
1966	.060685	.032636	1.978638	2.011277	-1.337159	.055260	-1.281899	-.395854	.162476	-.233379
1967	.102310	.280131	2.824274	3.104407	-2.642484	.099687	-2.542798	-.730374	.262786	-.467590
1968	.135418	.679203	3.532008	4.211211	-4.156996	.178172	-3.978824	-1.090299	.307493	-.782806
1969	.169014	1.236074	4.114132	5.350205	-5.621576	.330750	-5.290826	-1.413737	.389623	-1.024115
1970	.258349	1.962612	4.793892	6.756504	-6.762366	.798982	-5.963384	-1.619027	.708422	-.910605
1971	.328426	2.827351	5.454719	8.282070	-7.942220	.975452	-6.966768	-1.793941	.904932	-.889009
1972	.364005	3.863096	5.868719	9.731815	-9.115918	.990116	-8.125803	-1.936124	.864436	-1.071688
1973	.443779	5.094320	6.593312	11.687632	-9.686487	1.139149	-8.547338	-1.912245	.912978	-.999267
1974	.507195	6.556046	6.931816	13.487862	-9.982961	1.243712	-8.739249	-1.820856	.972388	-.848468
1975	.594460	8.305294	7.398601	15.703895	-8.980230	1.484852	-7.495378	-1.350846	1.139661	-.211186
1976	.715879	10.388187	8.167444	18.555632	-6.680960	1.883288	-4.797352	-.512410	1.499349	.986938
4 TOTAL	3.66543	41.16297	58.57598	99.73895	-71.41717	9.17584	-64.24133	-14.72878	8.10937	-6.61940

YEAR	KSP	KSG	KST	KDG	KWPG	KT	LEA	LECN	LENN	LETC
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.076255	.043244	-.033011	-.012666	0.000000	.164741	0.000000	0.000000	0.000000	0.000000
1966	-.410317	.323989	-.086329	.095216	0.000000	.565572	-.000001	.001324	-.000935	-.000167
1967	-.395084	1.318187	.923103	.177246	0.000000	1.296680	.000001	.002971	-.002342	-.000232
1968	-.278474	2.683670	2.405196	.237575	0.000000	2.227770	.000002	.004585	-.004647	-.000465
1969	-.318994	4.103211	3.784217	.315837	0.000000	3.304332	.000002	.006220	-.007271	-.000778
1970	-.974800	4.868094	3.893295	.464838	0.000000	4.450996	.000003	.007901	-.009668	-.001018
1971	-1.450909	6.140987	4.680079	.615363	0.000000	6.049860	.000004	.009920	-.010898	-.000905
1972	-1.510410	8.102148	6.591738	.705812	0.000000	8.195877	.000005	.012232	-.012731	-.000884
1973	-2.400135	9.368773	6.968638	.905335	0.000000	10.458779	.000006	.014373	-.014849	-.001065
1974	-2.551817	10.887467	8.335651	1.109538	0.000000	13.852530	.000008	.017261	-.015620	-.000994
1975	-3.821509	11.593742	7.772234	1.616803	0.000000	17.980827	.000009	.019920	-.015970	-.000844
1976	-6.959274	11.215118	4.245843	2.422894	0.000000	22.129839	.000010	.023192	-.013697	-.000210
5 TOTAL	-21.15798	70.64863	49.48065	8.69349	0.00000	90.67780	.00095	.11990	-.10863	-.00756

YEAR	LES	LEO	LEWP	LET	MI	MC	MINT	MK	MNFS	MOSA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	0.000000	0.000000	.037978	.022547	.527586	.164740	-.677294	1.022492
1966	-.000083	0.000000	0.000000	.000139	-.063675	.030187	.845211	.296665	-1.235658	1.045875
1967	-.000218	0.000000	0.000000	.000180	-.200570	.030083	1.354004	.501176	-2.085752	2.191396
1968	.002322	0.000000	0.000000	.001797	.120194	.076358	1.668606	.577314	-2.202065	2.756553
1969	.006050	0.000000	0.000000	.004223	.667752	.186762	1.853058	.584591	-1.956652	2.247480
1970	.009518	0.000000	0.000000	.006737	1.172847	.314273	1.727738	.503751	-1.372916	-.367908
1971	.009793	0.000000	0.000000	.007914	1.151759	.402621	1.930509	.638954	-1.820325	-1.416054
1972	.011772	0.000000	0.000000	.010395	1.443022	.503742	2.267888	.789723	-2.118333	-1.907701
1973	.016581	0.000000	0.000000	.015045	2.187988	.663297	1.936781	.631779	-1.043869	-6.102582
1974	.017529	0.000000	0.000000	.018185	2.579339	.845273	1.946472	.804093	-1.016500	-7.652287
1975	.020967	0.000000	0.000000	.024082	3.346851	1.027286	1.359371	.698674	.261521	-14.294310
1976	.019551	0.000000	0.000000	.028846	3.413322	1.103852	.801479	.595210	.912781	-23.302194
6 TOTAL	.11378	0.00000	0.00000	.11754	15.85641	5.20612	18.21870	6.78667	-14.35508	-47.77924

		PUFO	PUFR	PY	RUCUR	PROFIT	VA	VCM	VMM	VIC
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.979398	.000130	-.000392	.147685	.000276	.032600	0.000000	0.000000	0.000000	0.000000
1966	1.031796	.000427	-.001209	-.267842	-.009173	-.541807	-.001319	.072570	-.390183	-.056868
1967	2.039038	.000996	-.002723	-.796659	-.021433	-1.305579	.013147	.162020	-.977464	-.078890
1968	2.640376	.001380	-.003462	.498950	-.004653	-.073480	.022166	.251312	-1.938916	-.158062
1969	2.152759	.001542	-.003520	2.586687	.022935	1.931969	.029339	.340911	-3.033905	-.264615
1970	-.352403	.001396	-.002768	4.444046	.045903	3.788148	.036617	.433117	-4.034324	-.346187
1971	-1.356373	.001659	-.003472	4.207821	.036913	3.280683	.054239	.543723	-4.547158	-.307816
1972	-1.827308	.001953	-.004167	5.320924	.041617	4.209968	.071154	.670461	-5.312252	-.300517
1973	-5.845384	.001620	-.002907	8.197136	.067348	6.890862	.078862	.787823	-6.196030	-.362268
1974	-7.329777	.002002	-.004098	9.471475	.066840	7.817915	.096145	.946152	-6.517456	-.337787
1975	-13.691868	.001823	-.003376	12.340984	.080250	9.431596	.109885	1.091887	-6.663791	-.286812
1976	-24.235818	.001431	-.002199	12.327701	.071466	8.993600	.128791	1.271282	-5.715323	-.071388
7 TOTAL	-45.76556	.01636	-.03429	58.43891	.39829	44.45648	.63903	6.57206	-45.32680	-2.57121

YEAR	VS	VWP	WAA	WCWA	WWWA	WICA	WSA	WDA	WWPA	WIWA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	.012679	.019676	.017001	.050205	.085555	.450336	.284373	.023073
1966	-.072991	0.000000	.029042	.064572	.031359	.093420	.169606	.898931	.407994	.059098
1967	-.190880	0.000000	.060838	.158408	.058687	.182943	.324751	1.725949	.783092	.122870
1968	2.041064	0.000000	.056449	.244601	.022575	.085592	.210871	.937210	.425327	.119331
1969	5.318103	0.000000	.044167	.310770	-.023058	-.040545	.070319	-.079973	-.036294	.099741
1970	8.357245	0.000000	.017283	.335029	-.082603	-.206421	-.147047	-1.482199	-.672655	.053569
1971	8.638424	0.000000	.046144	.403656	-.053418	-.105848	.020744	-.619411	-.281103	.118498
1972	10.348075	0.000000	.040156	.462380	-.083966	-.180263	-.079581	-1.294729	-.587577	.137556
1973	14.574926	0.000000	-.038348	.398753	-.210011	-.542627	-.616540	-4.478867	-2.032610	.041623
1974	15.438287	0.000000	-.034369	.341855	-.190618	-.476162	-.494863	-3.908937	-1.773961	.151043
1975	18.430873	0.000000	-.149573	.106674	-.331588	-.883512	-1.150806	-7.617449	-3.456969	.071434
1976	17.185109	0.000000	-.290651	-.345372	-.454665	-1.239719	-1.021726	-11.043529	-5.011801	.024525
8 TOTAL	100.01824	0.00000	-.20618	2.450120	-1.30030	-3.26314	-3.42872	-26.51307	-12.03223	1.02236

YEAR	WA	WCN	WMM	WTC	WS	WD	WWP	WIM	WRT	XO
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.035483	-.002101	.007106	.018940	.037326	.319608	.117464	.007733	.119885	0.000000
1966	.015024	.019989	.012268	.032383	.075035	.660218	.242589	.027887	.273965	0.000000
1967	.028229	.071647	.019438	.056954	.126077	1.130759	.418346	.058392	.508920	0.000000
1968	.034771	.172808	.001940	.016579	.093423	.568420	.214872	.074894	.572430	0.000000
1969	.036997	.255724	-.017298	-.028231	.064417	-.042937	-.016992	.083325	.654718	0.000000
1970	.032503	.307369	-.036839	-.072060	.018639	-.683856	-.282819	.081306	.655898	0.000000
1971	.040342	.304084	-.026612	-.038918	.068564	-.225873	-.096708	.099930	.927138	0.000000
1972	.044339	.361877	-.034198	-.047508	.057970	-.500530	-.186556	.129023	1.110956	0.000000
1973	.035265	.403280	-.050119	-.081607	.000286	-1.243820	-.480335	.147214	1.266274	0.000000
1974	.031171	.307405	-.034812	-.049347	.041916	-.712912	-.270214	.172162	1.453560	0.000000
1975	.039094	.465021	-.020711	.003001	.130024	-1.270298	-.166079	.305375	2.909388	0.000000
1976	.042227	.516463	-.013537	.029295	.113989	-1.296580	-.179402	.390843	3.334101	0.000000
9 TOTAL	.38544	3.18357	-.19337	-.16352	.82839	-3.29780	-.68783	1.57888	13.98243	0.00000

YEAR	GDPM	VT	GOCS	GOIS	POPTS	RCONV	DY
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.002025	0.000000	0.000000	0.000000	-.000262	-.147684	.147685
1966	-.451704	-.456285	-.744590	.100462	-.000782	-.198025	-.275337
1967	-1.050735	-1.057676	-1.771585	.240775	-.001727	-.251671	-.783067
1968	.271287	.257995	-.408043	.353414	-.002082	-.207563	.539381
1969	2.393606	2.364512	2.084866	.471837	-.001978	-.266699	2.561366
1970	4.380388	4.325193	4.406476	.620931	-.001372	-.292197	4.312771
1971	4.213198	4.125876	3.691994	1.006760	-.001813	-.375372	3.982285
1972	5.389557	5.263374	4.427940	1.470568	-.002214	-.359397	5.107375
1973	8.789807	8.613273	7.813212	1.796579	-.001287	.072932	7.887098
1974	9.420913	9.181364	8.328260	2.877716	-.002096	-.855091	9.057499
1975	12.515667	12.201363	11.068795	3.885842	-.001593	-.818079	11.860305
1976	12.562633	12.172162	10.998691	4.314135	-.000768	-1.035932	11.701393
10 TOTAL	58.43664	56.99115	49.87601	17.13902	-.01793	-4.73478	56.09875

(6-8) Policy Simulation 7:

In policy seven, total government investment increases in two sectors simultaneously and by equal amounts. A one billion current Rials increase in total government investment is distributed equally between the agriculture and construction sectors. The result is presented in Table 6-7.

The behaviour of the model is very similar to that of policy 6. In comparison with policy 6, generally the magnitude of changes in variables are smaller here. As in policy 6, financing the additional investment is done by selling government bonds to the central bank (ΔBCBA). Rural private consumption (CRP) increases more (by 6.35 billion Rials) in comparison with its changes in policy 6 (0.58 billion Rials). On the other hand, private urban consumption (CUP) rises less (by 32.23 billion Rials) relative to its increase in policy 6 (54.88 billion Rials). These results lead to a moderate increase in the ratio of per capita private consumption in urban to rural areas (ROCUR). The largest change in ROCUR is 0.033 as compared to 0.080 in policy 6. In this experiment, the ratio of profit to the wage bill (DISTOY) falls in all but one period, with a maximum decline of 0.019 points, while the values in policy 6 increased in most periods. This was

mainly due to the smaller increase in profit (18.36 billion Rials in total), in comparison with that of policy 6 (44.46 billion Rials in total).

The price of domestically produced consumer goods (CTPD) increases in the first five periods and declines thereafter, a pattern similar to that of policy 6. The price of domestically produced investment goods (ITPD) tends to increase more here and in all periods. Total labour employment rises by a lesser amount but more labour is employed in the agriculture sector. Value-added in agriculture (VA) also tends to increase more here than in the case of policy 6. As policy 7 suggests, a simultaneous increase of government investment in agriculture and constructions sectors tend to narrow down the difference between total gross profit (PROFIT) and total wage bill (WBT), and does not increase the ratio of per capita consumption in urban and rural areas as much as policy 6. Implementation of policy 7 does not increase the overall economic indicators as much in comparison with policy 6.

In conclusion, seven policy simulations suggest that the distribution of total government investment among different sectors plays an important role in changing the level of economic indicators, such as gross national product in constant prices (GNPM), total gross investment (IT), total value-added (VT) and so forth. They also affect the

gaps between total gross profit (PROFIT) and total wage bill (WBT), and per capita consumption in urban and rural areas. Responses of the model to different experiments suggest that policies whose implementation provide higher gross national product in constant price (CNPM), total value-added (VT), total gross investment (IT), total consumption expenditure (CT) and so forth, may widen the gap between total gross profit (PROFIT) and the total wage bill (WBT) and between per capita consumption in urban and rural areas, and visa versa. Increasing total government investment in agriculture increases the output of this sector, and hence the standard of living in the rural area. However, the other sectors, especially manufacturing and mining, face a drastic setback. On the other hand, increasing government investment in a non-agriculture sector, such as construction, improves almost all major economic indicators except in agriculture, which improves by only a small margin. Moreover, the gap between per capita consumption in urban and rural areas becomes wider and the difference between the total wage bill and total profit tends to increase. Therefore, a policy-maker who is interested in increasing the level of economic activity, along with preventing the widening of gaps between the total wage bill and total profit, and per capita consumption in urban and rural areas, may find that a mix of policies is more appropriate.

In particular, a policy of increased government investment in the non-agriculture sectors together with increased government investment in agriculture may be fruitful.

POLICY SIMULATION #7: A SUSTAINED ONE BILLION CURRENT RIALS INCREASE IN THE TOTAL GOVERNMENT INVESTMENT IN THE PERIOD 1965-1976, WHICH IS DISTRIBUTED EQUALLY BETWEEN THE AGRICULTURE AND CONSTRUCTION SECTORS.

YEAR	CRP	CUP	CG	CTPD	CTDPD	CTPA	CT	DYU	DEP	DBCBA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	.025441	-.002884	.001146	.001111	2.546722	.022557	.147717	0.000000	1.019577
1966	.090241	-.747180	-.039584	.002244	.002181	2.639048	-.666523	-.421937	.039584	.974132
1967	.210070	-1.897395	-.022810	.004369	.004191	5.623913	-1.710135	-1.193484	-.012478	1.856096
1968	.319197	-.688414	-.033006	.002481	.002347	7.312865	-.402223	-.184757	-.045938	2.528396
1969	.418375	1.667646	-.037157	.000067	.000057	6.529513	2.048864	1.486093	.017285	2.783967
1970	.507054	3.816530	-.033542	-.003198	-.003002	.802098	4.290042	2.836621	.126956	1.658589
1971	.602161	2.863669	-.038306	-.000681	-.000645	-.570779	3.427524	1.920714	.222598	2.074963
1972	.704801	3.070077	-.048013	-.001454	-.001346	.175105	3.726865	2.163873	.193200	3.490788
1973	.778386	5.716382	-.018636	-.007926	-.007074	-7.037060	6.446132	3.974411	.215833	2.650846
1974	.857121	5.518324	-.065596	-.005366	-.004597	-7.002956	6.309849	3.622366	.327303	5.403986
1975	.907117	7.012821	-.085140	-.011052	-.009448	-14.925653	7.834798	4.497420	.330719	5.920967
1976	.952863	8.875439	-.114212	-.013047	-.011313	-26.357945	6.714090	3.452712	.385853	4.792909
TOTAL	6.34739	32.23334	-.53889	-.03242	-.02754	-30.26493	38.04184	22.30175	1.877091	35.15522

YEAR	DISTOY	FEXRA	GNPM	GRIDT	GRDT	GRP	IAP	ICNP	IMMP	IICP
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.001605	-.039530	.149743	.002026	0.000000	0.000000	0.000000	-.061992	-.508310	-.153092
1966	-.039336	.041363	-.237517	.004316	.007497	0.000000	.038201	-.013206	-.878158	-.271426
1967	-.018915	.307964	-.980940	.005541	-.015805	0.000000	.072174	.025741	-1.447351	-.412671
1968	-.011904	.285569	.093172	.009694	-.049436	0.000000	.088132	.076241	-1.789803	-.505217
1969	-.000824	-.271434	1.992155	.021491	.006060	0.000000	.094640	.143607	-1.898810	-.544008
1970	.008571	-1.349946	3.661549	.041471	.099134	0.000000	.095333	.233775	-1.753049	-.502766
1971	-.001434	-2.274597	3.046202	.064227	.177276	0.000000	.099725	.284607	-2.050474	-.562380
1972	-.003229	-3.423408	3.359869	.089085	.140039	0.000000	.106480	.347249	-2.393020	-.642852
1973	-.001556	-5.358681	5.318387	.119552	.156188	0.000000	.099179	.453228	-2.168204	-.595903
1974	-.009430	-8.098698	5.294290	.153225	.252088	0.000000	.098581	.564509	-2.482158	-.698391
1975	-.010735	-11.664304	6.251794	.187816	.244300	0.000000	.086929	.695272	-2.178818	-.617143
1976	-.016680	-14.935351	5.388115	.217391	.290964	0.000000	.079552	.872673	-1.729483	-.477888
TOTAL	-.07708	-46.80105	33.26682	.91534	1.30911	0.00000	.95893	3.62170	-21.27764	-5.98374

1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.076066	-.799460	.043730	0.000000	.964233	.001483	.005470	.164773	0.000000	.475521
1966	-.349222	-1.473812	.281620	0.000000	1.768139	-.014063	.009490	.294327	.038201	1.047347
1967	-.017278	-1.779386	1.002096	0.000000	2.262358	-.008552	.015854	.482972	.109228	1.522931
1968	.397339	-2.033309	1.398292	0.000000	2.539580	-.006683	.019792	.506271	.194084	1.934802
1969	-.037562	-2.242134	1.484217	0.000000	2.689466	-.010012	.021332	.443332	.282902	2.289739
1970	-.628326	-2.555033	.862012	0.000000	2.845610	-.025877	.020327	.290577	.369749	2.683021
1971	-.504062	-2.732581	1.359979	0.000000	3.115874	-.012986	.024897	.383293	.458381	3.112678
1972	-.048763	-2.630907	2.067473	0.000000	3.107258	-.008330	.029204	.476351	.551109	3.383350
1973	-.713288	-2.924990	1.389852	0.000000	3.132192	-.014917	.027000	.207202	.633755	3.698138
1974	-.193080	-2.670541	1.799586	0.000000	2.983880	-.013917	.030912	.313339	.713322	3.863344
1975	-.855277	-2.869039	1.130209	0.000000	2.855273	-.016808	.027999	.013766	.778852	4.027010
1976	-1.435064	-2.690210	.757064	0.000000	2.716684	-.022501	.023738	.026479	.835032	4.149322
3 TOTAL	-4.72065	27.40140	13.63633	0.00000	30.97655	-.15316	.25601	3.57515	4.96462	32.18720

YEAR	KAT	KCNP	KCNG	KCNT	KMMP	KMMG	KMMT	KTCP	KTCG	KTCT
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.475521	-.061992	.476672	.414680	-.508310	-.003536	-.511846	-.153092	-.015343	-.168435
1966	1.089548	-.071479	1.006807	.935327	-1.355969	.055235	-1.300733	-.401554	.162366	-.239189
1967	1.632160	-.041450	1.442174	1.400725	-2.721962	.099695	-2.622267	-.753992	.262775	-.491218
1968	2.128886	.037279	1.805059	1.842338	-4.348447	.178207	-4.170240	-1.146111	.307511	-.838600
1969	2.572641	.178649	2.188760	2.287408	-5.986351	.330503	-5.655848	-1.518202	.389419	-1.128785
1970	3.052770	.401705	2.485333	2.887039	-7.380218	.796237	-6.583982	-1.793239	.736306	-1.086933
1971	3.971039	.862211	2.685445	3.547656	-8.987879	.971302	-8.016577	-2.086632	.901015	-1.185616
1972	3.934460	.969727	3.118557	4.088284	-10.841627	.984069	-9.857558	-2.416489	.858314	-1.558175
1973	4.331893	1.364772	3.661915	5.026687	-12.359333	1.129426	-11.229906	-2.649919	.904322	-1.745598
1974	4.576666	1.847394	3.888707	5.736101	-14.099931	1.197438	-12.902494	-2.950823	.922859	-2.027963
1975	4.805862	2.431022	4.214169	6.645991	-15.432754	1.365013	-14.067741	-3.125343	1.021858	-2.103486
1976	4.984359	3.150586	4.612196	7.770783	-16.236272	1.552678	-14.683594	-3.134429	1.162029	-1.972401
4 TOTAL	37.15183	10.87722	31.70579	42.58302	-100.25905	8.69627	-91.60279	-22.12983	7.58343	-14.54640

1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	-.076067	.043731	-.032336	-.012812	0.000000	.164773	0.000000	0.000000	0.000000	0.000000
1966	-.423006	.324240	-.098767	.095398	0.000000	.477285	.000008	.000613	-.000935	-.000168
1967	-.427594	1.316608	.889014	.177189	0.000000	.985604	.000018	.001382	-.002377	-.000238
1968	-.317428	2.675402	2.357974	.237541	0.000000	1.557899	.000028	.002069	-.004792	-.000489
1969	-.345468	4.079357	3.733889	.315657	0.000000	2.124964	.000036	.002721	-.007620	-.000834
1970	-.963430	4.818987	3.855558	.463848	0.000000	2.588300	.000044	.003378	-.010335	-.001123
1971	-1.438589	6.044398	4.605808	.612954	0.000000	3.135284	.000052	.004264	-.012832	-.001081
1972	-1.444194	7.930538	6.486144	.700564	0.000000	3.793918	.000060	.005239	-.014650	-.001179
1973	-2.114157	9.082475	6.968318	.895969	0.000000	4.247363	.000066	.006038	-.018014	-.001549
1974	-2.203813	10.599587	8.395774	1.050765	0.000000	4.828849	.000073	.007424	-.020522	-.001736
1975	-2.992975	11.411808	8.418833	1.429106	0.000000	5.128565	.000078	.008471	-.023578	-.002016
1976	-4.338250	11.856919	7.518269	1.858837	0.000000	5.476252	.000082	.009815	-.025708	-.002091
5 TOTAL	-17.08497	70.18365	53.09868	7.82472	0.00000	34.50906	.00055	.05141	-.14056	-.01250

YEAR	LES	LED	LEMP	LET	MI	MC	MINT	MK	MNFS	MOSA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	0.000000	0.000000	.037586	.022557	.527688	.164773	-.677431	1.023168
1966	-.000081	0.000000	0.000000	-.000563	-.074678	.027150	.871339	.286053	-1.259221	1.060178
1967	-.030249	0.000000	0.000000	-.001463	-.246222	.018267	1.426881	.478459	-2.169828	2.259280
1968	.032237	0.000000	0.000000	-.000947	.020876	.049709	1.783773	.541759	-2.354366	2.937779
1969	.005931	0.000000	0.000000	.000234	.500043	.139241	2.012578	.534290	-2.186065	2.623085
1970	.009392	0.000000	0.000000	.001356	.919070	.239941	1.923914	.433015	-1.677799	.322224
1971	.009698	0.000000	0.000000	.000901	.764615	.287117	2.261438	.543426	-2.327367	-.229298
1972	.011585	0.000000	0.000000	.001857	.843348	.329025	2.815958	.684328	-2.985965	.070345
1973	.016315	0.000000	0.000000	.002857	1.334947	.411724	2.499813	.482379	-2.058968	-2.826980
1974	.017528	0.000000	0.000000	.002768	1.328899	.472209	2.903648	.601266	-2.648224	-2.813279
6 TOTAL	.11465	0.00000	0.00000	.01355	8.335017	2.98895	23.14818	5.32480	-23.11176	-12.15825

								VLM	VMM	VIC
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.980046	.000130	-.000392	.147718	.000276	.032563	0.000000	0.000000	0.000000	0.000000
1966	1.015496	.000407	-.001151	-.311417	-.011148	-.567909	.103022	.033570	-.390289	-.056937
1967	2.164062	.000954	-.002608	-.974103	-.026544	-1.450800	.235185	.075718	-.991826	-.080854
1968	2.813964	.001329	-.003335	.119416	-.013702	-.411623	.353609	.113393	-1.999512	-.166049
1969	2.512533	.001503	-.003447	1.953378	.010069	1.344237	.461225	.149143	-3.179862	-.283475
1970	.308643	.001407	-.002844	3.493120	.029300	2.878968	.557365	.185174	-4.312657	-.381569
1971	-.219634	.001756	-.003781	2.759376	.017716	1.881799	.661386	.233715	-5.020371	-.367421
1972	.057380	.002217	-.004915	3.077585	.017042	2.012896	.773674	.287194	-6.112745	-.400780
1973	-2.737835	.002227	-.004564	4.983303	.033105	3.782705	.852404	.330960	-7.516516	-.526718
1974	-2.694712	.003085	-.006930	4.813764	.027223	3.320117	.938509	.406927	-8.562949	-.590073
1975	-5.743338	.003891	-.008776	5.733259	.028090	3.323319	.991539	.464357	-9.838319	-.685522
1976	-10.142442	.005155	-.011831	4.784871	.011937	2.215695	1.041195	.538015	-10.726835	-.711052
7 TOTAL	-11.64584	.02406	-.05457	30.97937	.12336	18.36197	6.96911	2.81817	-58.65188	-4.25045

YEAR	VS	VWP	WAA	WCNA	WMMA	WICA	WSA	WOA	WWPA	WIMA
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	0.000000	0.000000	.012687	.019688	.017011	.850236	.085607	.450612	.284498	.023088
1966	-.071497	0.000000	.028610	.063868	.030736	.091573	.166497	.882441	.400471	.055838
1967	-.218383	0.000000	.060556	.157176	.058310	.181877	.322892	1.718088	.779707	.117900
1968	1.965690	0.000000	.057392	.244699	.023628	.088930	.216974	.975716	.442802	.115471
1969	5.213691	0.000000	.047309	.315795	-.019997	-.030911	.088898	.026659	.012098	.099344
1970	8.255965	0.000000	.024661	.350795	-.075961	-.185807	-.106160	-1.257564	-.570711	.060348
1971	8.524984	0.000000	.059246	.439550	-.043266	-.073762	.086219	-.267704	-.121490	.134338
1972	10.183857	0.000000	.067517	.540111	-.061962	-.111654	.055116	-.571826	-.259508	.172078
1973	14.341890	0.000000	.014961	.558190	-.167319	-.410453	-.361553	-3.116971	-1.414551	.116013
1974	15.407578	0.000000	.046763	.629422	-.136222	-.305781	-.153144	-2.110168	-.957641	.266460
1975	18.563813	0.000000	-.003429	.614148	-.229072	-.566508	-.527253	-4.346504	-1.972540	.301603
1976	18.614798	0.000000	-.027639	.565382	-.264553	-.657007	-.675453	-5.130893	-2.328515	.424267
8 TOTAL	100.478239	0.00000	.38863	4.449498	-.86867	-1.92927	-.80136	-12.74811	-5.78538	1.88655

YEAR	WA	WCN	WMM	ATC	WS	WD	WMP	WIM	WAT	XO
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.005486	-.002102	.007110	.018952	.037349	.319804	.117536	.007738	.115155	0.000000
1966	.014839	.020056	.012000	.031670	.073664	.648131	.238148	.025232	.256492	0.000000
1967	.028091	.070868	.019249	.056472	.125939	1.125869	.416544	.054328	.476697	0.000000
1968	.035040	.171533	.002125	.017109	.095103	.591725	.223682	.070603	.531039	0.000000
1969	.038144	.256047	-.016760	-.026741	.069939	.014310	.005663	.080118	.609141	0.000000
1970	.035323	.312463	-.035803	-.069260	.030242	-.579956	-.239850	.080514	.614152	0.000000
1971	.045130	.318213	-.025719	-.036558	.084073	-.097559	-.041770	.101759	.877577	0.000000
1972	.053454	.388330	-.032024	-.042772	.087031	-.220786	-.082291	.133067	1.064689	0.000000
1973	.049133	.446147	-.047331	-.076096	.040143	-.863836	-.333594	.153742	1.200298	0.000000
1974	.047967	.376026	-.034656	-.049843	.076992	-.384012	-.145552	.181004	1.493647	0.000000
1975	.051933	.532520	-.031100	-.028537	.136627	-.721907	-.095519	.300010	2.409940	0.000000
1976	.065109	.546704	-.028892	-.020890	.125185	-.598553	-.082819	.355786	2.569176	0.000000
9 TOTAL	.47965	3.43681	-.21180	-.22549	.98229	-.76675	-.01982	1.54390	12.21800	0.00000

YEAR	GDPR	VI	GDCS	GDIS	POPTS	RCONV	DY
1961	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1962	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1963	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1964	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1965	.032026	0.000000	0.000000	0.000000	-.000262	-.147717	.147718
1966	-.385312	-.389628	-.693673	.008275	-.000744	-.087795	-.318914
1967	-.958715	-.964356	-1.728401	.004514	-.001654	.022225	-.958299
1968	.326260	.316566	-.451931	-.035489	-.002006	.243088	.168852
1969	2.376193	2.354662	1.909625	-.090958	-.001944	.383998	1.947318
1970	4.246614	4.205143	4.050100	-.142434	-.001437	.585065	3.393986
1971	3.919244	3.855017	3.140406	-.160139	-.002025	.873042	2.582100
1972	4.680247	4.591162	3.397839	-.207979	-.002698	1.320378	2.937546
1973	7.445384	7.325832	6.034407	-.275176	-.002337	2.126997	4.826815
1974	7.500328	7.347103	5.837642	-.287927	-.003845	2.206038	4.560876
1975	9.439382	9.291566	7.324947	-.330106	-.004885	3.187588	5.488959
1976	8.682548	8.465157	6.231935	-.232234	-.006676	3.294433	4.493907
10 TOTAL	47.27416	46.35822	35.05290	-1.74965	-.03051	14.00734	29.27086

FOOTNOTES

Chapter 6

1. See, for instance, Suits (1962).

2. For a more detailed description of this method, especially on computation of multipliers, see Evans (1969), Helliwell et.al., (1969), Choudhury et.al., (1972), Wynn and Holden (1974), pp. 178-185, Parhi Zgari (1976), pp. 122-126, and Palma-Carrillo (1976), pp. 209-211.

3. Labour employment as well as value-addeds in the water and power and petroleum sectors remain unchanged. This is because their corresponding value-addeds are unchanged (see Chapter 3, equations 3.3.22 and 3.3.23).

4. As the model is a fixed exchange regime open economy model, the money supply falls as foreign exchange reserves (FEXRA) decline. Thus, to finance its deficit, government must rely on either selling bonds to the central bank, other banks or the private sector, or borrowing from abroad or a combination of all. However, as the model allows only sales of government bonds to the central bank (BCBA) to be endogenous, BCBA finances the additional deficit in each period.

5. Changes in the real sectoral government investment can be seen in changes in their respective capital stocks reported in the table.

6. Government investment in water and power (IWPG) is not affected by this policy.

7. IT and MK stand for total gross investment and imports of capital goods, respectively.

8. The coefficient attached to VA in the supply of consumer goods (CA) is large. (See appendix to Chapter 4, Table A4-3.)

9. See the earlier discussion of the possible instability of these variables in Section 6-2.

10. IT and MK stand for total gross investment and imports of capital goods.

11. Value-added in agriculture (VA) is affected by the lagged total capital stock in agriculture. Therefore, it remains unchanged in the first period.

CHAPTER 7

SUMMARY AND CONCLUSION

This study aimed to construct a macroeconometric and input-output model for the Iranian economy as a case study of a petroleum-oriented economy, particularly one with a relatively high population. The current macroeconomic models constructed for Iran are mainly demand-oriented. That is, demand, which is heavily influenced by the petroleum sector, is the main driving force in determining the level of output. However, the present study overcomes this drawback. Hence in this, unlike the other models, supply is the main constraint in the production of goods and services, and the development of the Iranian economy. Significant needs for skilled labour force, appropriate machinery and equipment, efficient managerial systems, and adequate means of transportation were important factors that prevented supply from moving along with demand, especially in the 1970s, and hence prices begain to escalate.

The special nature of the model is that prices, of domestically-produced consumer and investment goods, are determined by the respective demand and supply forces. In both cases, demand is considered to be price-sensitive, while the corresponding supply is perfectly price inelastic (in the short-run). As time series information on the supply side is limited, the 1973 Iranian input-output table is used to derive the supply of consumer and investment goods and services originating in the seven sectors of the economy, namely agriculture, construction, manufacturing and mining, transportation and communication, services, oil and gas, and water and power (see the appendix to Chapter 4). The variables involved in the supply side are: i) value-added, ii) labour employment, iii) wages, and iv) capital stocks in the seven sectors.

As far as the availability of data permitted, the model is highly disaggregated. The demand for consumer goods is disaggregated into three categories: urban, rural, and government consumption. Demand for investment goods arises in the seven different sectors of the economy. Apart from the oil, and water and power sectors, which are owned and operated by the government, investment demand in each sector is further broken down into private and government investment; government investment demand is considered to be exogenous in nominal terms. Private investment in each

sector is explained using behavioural relationships. The purpose of this fairly detailed breakdown of investment demand is to analyse the behaviour of the economy with respect to different government investment policies in the various sectors.

The existence of a monetary sector in the model provides a direct channel for implementation of the government's fiscal and monetary policies. Fiscal policies, which can be financed by either domestic or foreign sources or a combination of both, is operated through an explicit budget constraint identity. The government, depending on the means of financing its deficit, and variation of foreign exchange reserves, can influence the monetary sector which, in turn, through consumption and investment credits, affects the real sector of the economy.

Chapter 2 provided a detailed description and analysis of the Iranian economy. The government, by receiving significant income from its petroleum sector, plays important roles in changing the flow of economic activity. Government consumption and investment tended to outweigh that of the private sector in some periods of the study (1959-1976).

The model consists of 107 equations and identities, of which 42 are stochastic. These equations are estimated by both ordinary least squares (OLS) and two-stage least-squares (TSLS) methods, using principal components of

the predetermined variables in the first stage. The theoretical underpinning and analysis of the estimated equations in the model were presented in Chapters 3 and 4. These equations, on a one-by-one basis, generally satisfy both theoretical and statistical requirements.

To test the performance of the model in a simultaneous system, the model was simulated dynamically as described in Chapter 5. Statistical measures such as the main absolute percentage error (MAPE), the root mean squared percentage error (RMSPE), and the Theil inequality coefficient (TIC) suggest that the overall performance of the model is good in the sample period (1959-1976). The model generally replicates turning points in the actual data, especially in cases where the magnitude of changes in downturns or upturns are reasonably large (more than 10 percent). Although the model is used to forecast the historical data, it can also easily be applied to ex-ante forecasting.

Chapter 6 investigated responses of the model to some autonomous shocks and seven different policy simulations. The first policy, increasing government nominal investment in the agriculture sector (a one-period shock), was designed to analyse the dynamic stability of the model. It is found that the model generally has an oscillatory nature, and some variables such as capital stock

in manufacturing and mining, transportation and communication, and construction, appear to be marginally unstable. This is mainly due to the assumption of low depreciation rates for these sectors. There is also a possibility that the slope dummies which are introduced in a later period (1973-1975) may have changed the structure of the model, making it unstable. These possibilities can only be investigated when a much longer simulation period is considered. Examination of this feature of the model will be reserved for future work. The remaining policy simulations were formulated on the basis of the effects of government investment in the agriculture or non-agriculture sectors on socio-economic activities; that is, the influence of government investment on prices, gross national product, imports, sectoral value-added, wages employment and so forth. As the distribution of income between rural and urban areas, and wage earners and profit makers witness significant changes during socio-economic development, the effects of the different policies on these variables were also investigated.

Given the nature of policy simulation, two types of policies can be recognized. One is increasing government investment in the agriculture or non-agriculture sectors. Here, total government investment is allowed to increase and the government deficit generated is financed solely by

selling bonds to the central bank. The second type of policy deals with changes in the distribution of government investment among the seven sectors. Here, while holding "total government investment" constant, government investment in one sector (agriculture) is allowed to increase, while simultaneously investment in other sectors (such as construction) is allowed to fall by equal amounts.

A sustained increase in government investment in agriculture (policy simulation two) generated a significant improvement in activity variables in this sector, along with a moderate increase in total consumption and gross national product. The price of consumer goods increased moderately. The income distribution indexes, that is, ratios of per capita consumption in urban and rural areas (ROCUR) and total profit to wage bill (DISTOY) showed downward movements. On the other hand, increasing government investment in a non-agriculture sector (i.e. construction, policy simulation six generated much higher economic activity than in the agriculture sector. However, price increases were higher and the gaps between per capita consumption in rural and urban areas, and wage-earners and profit-makers become wider.

The second type of policy in which an increase in government investment in agriculture is associated with an equal decline in government investment in non-agriculture

sectors (i.e. construction, manufacturing and mining), is considered to be economically unsuitable. In spite of improvements in agricultural activities, this sector is not able to absorb the resources released by the other non-agricultural sectors. Hence, employment, value-added investment at the aggregate level, along with gross national product declined, and prices rose sharply.

In order to resolve the unbalanced economic activities of agriculture and non-agriculture sectors, and to prevent the widening of gaps between the total wage bill and profits, and per capita consumption between rural and urban areas, a mix of policies was found to be most appropriate (policy seven). This type of policy suggests that any increase in government investment in the non-agriculture sectors should be accompanied by appropriate government investment in the agriculture sector.

THE DATA APPENDIX

Data Analysis and its Sources

Although development planning started in 1948 in Iran availability of data of economic variables is extremely limited for those years prior to 1959. Hence, the historical data which is used in the model covers only the period of 1959-1976.

Sources of Data

(1) Bank Markazi Iran. Annual Report and Balance Sheet, Bank Melli Iran Press, Various Issues, Tehran, Iran

(2) Bank Markazi Iran (1969) National Income of Iran: 1959-1965, Bank Melli Iran Press, Tehran, Iran

(3) Bank Markazi Iran (1968) National Income of Iran 1962-1967, Bank Melli Iran Press, Tehran, Iran

(4) Bank Markazi Iran (1974) National Income of Iran 1959-1972, Bank Melli Iran Press, Tehran, Iran

(5) Bank Markazi Iran — Bulletin Various Issues (1967-1977) Bank Melli Iran Press

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(7) Plan and Budget Organization (1976) — Economic Statistics Trends of Iran, 3rd Edition, Informetric Division, Tehran, Iran

(8) Plan and Budget Organization (1977) — Quarterly Statistics of Iran, 2nd Edition, Informetric Division, Tehran, Iran

(9) Plan and Budget Organization (1976) — Decomposition of Quarterly Economic Statistics of Iran, 1st Edition, Statistic Research Unit, Tehran, Iran

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(11) Plan and Budget Organization (1977) — The Main Economic Indicators for Iran, Informetric Division, Tehran, Iran

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(13) Statistical Centre of Iran (1977) — Iran's Input-Output Table for 2532 (1973), Methodology and Tentative Estimates, Dept. of Financial Statistics and National Accounts in Cooperation with Yekon Consultants

(14) International Financial Statistics (1979-1981) — International Monetary Fund

(15) Amuzegar, J., and Fekrat, A. (1971) — Iran: Economic Development Under Dualistic Conditions, Chicago, University of Chicago Press

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(19) Loony, R.E. (1977) — A Development Strategy for Iran Through the 1980s, New York, Praeger Publishers

(20) Amouzegar, J. (1977) — Iran: an Economic Profile, Washington, D.C., The Middle East Institute

(21) Fesharaki, F. (1976) — Development of the Iranian Oil Industry: International and Domestic Aspects, New York, Praeger Publishers

The Data Condition: A General View

Empirical studies of many developing countries are constrained by the unavailability of a consistent and detailed data series over a sufficiently long period of time. The Iranian economy is not free from this problem. The scarcity, unrealiability, and inadequacy of the relevant statistical data will introduce a considerable margin of error in any quantitative estimation of the structure of the economy, which leads to errors in aggregates and coefficients in economic models. This is, however, the best situation and should not induce us to abandon quantitative studies. Since the exercise not only gives us orders of magnitude relative to level, direction, and speed of changes of major economic variables, it also highlights the area in which the data collection efforts need to be strengthened.

Despite the considerable improvement in the Iranian national accounts in recent years, econometricians are faced with several data problems such as: (a) low quality of the available data; (b) the "infant" national account; and data limitation in terms of both number of observations and existence of the basic data.

Given the fact that the undergoing model requires data for a large number of variables which are not officially available, certain methods of derivation and

estimation have been adopted to derive these variables. Government investments in some sectors such as agriculture, manufacturing and mining, transportation and communication, construction, and services have not been specified in the official data. Figures for some variables such as total investment in each sector and the monetary base were not available for the early periods which are covered by this study (1959-1976). Hence, they had to be estimated.

The bulk of the data is from publications of the central bank (Bank Markazi Iran), (1) and in particular from references (6) through (13).[1]

The data covers the period of 1959-1976 (1338-1355 Iranian Solar Calendar). They are annual and based on 1959 constant prices. Units of measurements are billions of Rials for all variables, except population and labour employment which are in millions of people and wages, and the monetary variables such as monetary base, money supply and credits which are in current Rials. The quantity of oil exported is in million barrels per year, the price of exported oil is in terms of the U.S. dollar per barrel, and indexes are based on 1959=100, unless otherwise specified.

Some series such as capital stocks, disposable income, part of sectoral investment, and government and private investment were completely non-existent. Using the available information, these series were estimated.

The choice of sectors was primarily based on the availability of the data. A more detailed sectoral breakdown seemed practically impossible. These sectors and their definitions are:

1 - Agriculture (notation A): this sector includes farming, livestock, breeding, forestry, fishing and hunting sectors.

2 - Construction (CN): this sector includes government and private residential and nonresidential construction.

3 - Manufacturing and Mining (MM): this sector comprises all the industrial activities except construction, oil and gas, and water and power sectors.

4 - Oil (O): this sector incorporates both the domestic and foreign oil and gas industries.

5 - Transportation and Communication (TC): this sector includes services of trucks, buses, cars and taxis, postal, telegraph, telephone, and other communication systems.

6 - Services (S): this sector covers all the private and public services except transporation and communication. They are: banking, insurance, wholesale and retail trade and rentals.

7 - Water and Power (WP)

Two broader sectoral definitions may also be used. These are:

(a) Industries and Mining (IM), which includes the manufacturing and mining (MM), construction (CN), and water and power (WP) sectors.

(b) Total Services (ST) which comprises the transportation and communication (TC), and services (S) sector.

The variable names and their definitions have been mentioned in Chapter Three. The following explanation is

for derivation of those variables which are non-existent completely or partially and those whose basic sources are sporadic through the period 1959-1976.

Imports of intermediate goods (MINT): a separate figure for MINT in current prices for the period 1959-1976 is not available in (6). It is combined with the imports of capital goods (MK). However, its figure in terms of CIF is available in (6), p. 245. Hence, the proportion of MINT in the total imports of capital and intermediate goods (MK + MINT) in terms of CIF was first calculated and the result was applied to the total (MK + MINT) figure, which is given in the national accounts (6), p. 225.

Imports of capital goods (MK): the method which was adopted to calculate MINT was used to derive MK.

Export of intermediate goods (XINT): a separate figure for XINT in current prices is not available in the official data. This figure is included in the total non-oil exports (XG) which consists of the exports of consumer, capital, and intermediate goods (XC, XK and XINT respectively) in the national account data ((6), p. 211). However, a separate figure for XINT which is in terms of FOB is given in (6), p. 242. The share of XINT in XG, which is also in terms of FOB, was calculated and applied to the total non-oil export of goods (XG) which is given in the

national account ((6), p. 215). The price deflator of XG was used to derive XINT in 1959 prices.

Export of consumer and capital goods (XC and XK respectively): the method which was used to calculate XINT was adopted to derive the figures for XC and XK.

Total government investment in the budgetary account: this figure, which is given in (1), 1964, p. 40, for the period 1959-1961, was found to be unreasonable. Hence, it was projected backward by applying the average growth rate of its figure in the period 1962-1968. Therefore, the total government expenditure (current + capital expenditures) for the period 1959-1961 was adjusted accordingly.

Total government revenue (GRT): its figure for 1959-1962 was projected backward by applying the average growth rate of GRT for the period 1962-1968. The total other government revenue was adjusted respectively.

Monetary base (MBA): the data for the period 1959-1960 was estimated on the basis of information given in (14), 1979, p. 228, for the Central Bank's foreign and domestic assets.

Foreign exchange reserve (FEXR): the data for the period 1959-1960 were estimated by multiplying the exchange rate (US$ = 75.75 Rials) given in (14), 1979, p. 229, by the changes in the foreign reserves of the banking system (in

U.S. dollars) which is provided in (1), 1970, p. 134, and then the following approach is applied:

$$\Delta FEXR_t = FEXR_t - FEXR_{t-1}$$

$$FEXR_{t-1} = FEXR_t - \Delta FEXR_t$$

where (delta) stands for changes.

Net capital inflow (NIFOCA): this is derived as a residual:

NIFC = XT - MT - ΔFEXR

Reserves of all banks (RES): RES is defined as the summation of the legal deposits of all banks with the Central Bank plus their excess reserves, where the excess reserves are defined as the sight and time deposits of all banks with the Central Bank plus the notes and coins held by the banks.

Government Investment Expenditure Data

Obtaining the government investment in seven sectors required a careful investigation of the government annual budget. Distribution of the government development expenditures among the different sectors has been considered as the government investment in those sectors[2]. This task

was difficult because of the frequent changes in the government's sectoral classifications. For example, in some periods (i.e. 1959-1967), the agriculture sector included the water sector as well, while in other periods (1968-1976) the water sector became part of the water and power sector. For the period 1959-1967, oil and power (electricity) belonged to the fuel and electricity sector. However, later on, these two were separated, and oil and gas became a new sector, and water and power constituted another sector. Given this background, the following explanation provides some of the private and government investment data in the seven sectors.

Government investment in agriculture (IAG): for the period 1959-1967, government development expenditures in water (such as irrigation) was included in agriculture sector. This figure was subtracted from the agriculture sector and added to the water and power sector (WP).

Government investment in oil (IOG): for the period 1959-1967, the data for IOG which is the government development expenditure in oil sector, included investment for the electricity (power) sector (1). The figures for the power was subtracted from IOG for this period.

Government investment in construction (ICNG): this variable is defined as a summation of the government development expenditures in construction of the government

building and installation, and the provision of houses. The data is given in (1), especially, 1971-1977 issues. The data for the period 1960-1961 were taken from (1), 1964, p. 40, which is cited under the regional development categories. The data for 1959 was derived by applying the average share of ICNG in the total regional development expenditure figures in period 1960-1962 to that of 1959 figures.

Government investment in manufacturing and mining (IMMG): the data for the period 1959-1962 were combined with the government investment in the oil and power sectors. Hence, the data were derived by applying the average share of IMMG in the total investment in the manufacturing and mining, oil and power in the period 1963-1965 to that of the period 1959-1962[3].

Government investment in services (ISG): the data for ISG is calculated by the summations of the government development expenditures on the following items:
Education, urban and rural development, trade, tourism, culture and arts, research and statistics, manpower, health and social welfare, youth physical education, environmental control, multipurpose area expenditures and miscellaneous expenses.

Sectoral private investment: the data for the private investment in agriculture (IAP), construction

(ICNP), manufacturing and mining (IMMP), transportation and communication (ITCP), and services (ISP) were derived residually; that is, by subtracting government investment in each sector from its respective total investment.

Total sectoral investment: the total sectoral investment in agriculture (IAT), construction (ICNT), manufacturing and mining (IMMT), transportation and communication (ITCT), services (IST), oil (IOG), and water and power (IWPG) were taken from (6), 1978, p. 165. Their data for 1959-1964 were estimated by applying the average share of each variable in the total investment (IT) in the period 1965-1970 to that of 1959-1964.

The Sectoral Wage Data

With the exception of construction, manufacturing and mining, and to some extent oil (its data is available only for the period 1959-1969) sectors, there are no official wage data for the remaining sectors. Data for wages in manufacturing and mining is only available for selected industries (those which are fairly modern and whose number of employees are more than 50 persons[4]).

The general approach for deriving the annual sectoral wage level (except in agriculture, of which is described below) is to calculate sectoral wage level

benchmarks for 1973. This is done by taking the sectoral wage-bill which is given in the input-output table of Iran for 1973 (13) and by dividing them by their respective sectoral employment (given in (6), p. 249)[5]. The growth rates of the wage indexes for the period 1959-1976 were applied to their corresponding wage benchmark in order to generate time series data for the sectoral wage levels in current Rials. In the case of the agriculture sector, since its wage bill has not been provided in the 1973 input-output table, it was taken from the Iranian 1965 input-output table which is given in (18), p. 197.

Wages in agriculture (WAA): the growth rate of wages in the agriculture sector given in (17), p. 323 for the period 1959-1972 and that of manufacturing (as a proxy y) for the period 1973-1976 were applied to the benchmark wage level of 1965, (18), p. 197.

Wages in manufacturing and mining (WMMA): the growth rate of indexes for WMMA which are given in the following sources: (16), p. 323 for 1959-1962, (10), p. 216 for 1963-1973, and (1), p. 143 for 1974-1976, were applied to the 1973 WMMA benchmark.

Wages in construction (WCNA): the growth rate of indexes of WCNA given in (11) pp. 223, 224 were applied to the benchmark wages in construction given in the 1973 input-output table, (13).

Wages in the oil sector (WOA): the data for the period 1959-1969 were taken from (15), p. 65 and 68. Since the figures are in British pounds, the exchange rate taken from (14), 1979, p. 229 was applied to convert them to Rials. Then the growth of this data was applied to the wage benchmark taken from the 1973 input-output table to arrive at time series data of WOA for the period 1959-1969. Data for the period 1970-1975 was derived by applying the growth rate of the general wage indexes given in (13), 1979, p. 224, on the wage benchmark of 1973.

Wages in water and power (WWPA): data for WWPA was derived by applying the growth rates of wages in manufacturing and mining (WMMA) in the period 1959-1970 and that of the general wage index in the period 1971-1976 (16), p. 229, to the wage benchmark in 1973 for WWPA.

Wages in transportation and communication (WTCA): the growth rate of wages in the manufacturing and mining (WMMA) were applied to the wage benchmark of 1973 for WTCA.

Wages in services (WSA): the data for WSA was derived by applying the growth rate of wages in the manufacturing and mining sector to the wage benchmark of 1973 for the services.

The Banking Systems Credits Allocated to the Different Sectors of the Economy (in billion Rials)[6]

As the oil and water and power sectors are owned and run by the government, total banking system credits to private activities (CTPA) are distributed among the five private sectors of the economy, namely, agriculture (CTAA), construction (CTCNA), manufacturing and mining (CTMMA), transportation and communication (CTTCA), and services (CTSA). The data for these variables are taken from (1), various issues.

Total banking system credits to the private sector (CTPA): the data for the period 1959-1960 were estimated by applying the average growth rate of CTPA in the period 1961-1970 to the 1961 figure. The data for CTAA, CTMMA, CTCNA and CTSA for the period 1959-1966 are obtained by applying their respective average share in CTPA in the period 1967-1976 to the figure of CTPA for the period 1959-1966. The data for the private credit in the transportation and communication sectors (CTTCA) were derived residually.

Construction of the Sectoral Capital Stocks

The sectoral capital stocks were assumed to be zero in 1958. By obtaining the sectoral depreciation rates from (17), pp. 66-67, the following formulation was used to

derive the capital stock data in the seven sectors of the economy:

$$K^i_t = (1 - D_i) * K^i_{t-1} + I^i_t$$

where

I^i_t = gross investment in sector i in period t

K^i_t = capital stock in sector i in period t

K^i_{t-1} = capital stock in sector i in period t-1

D_i = rate of depreciation in sector i

The rates of depreciation (D) in the seven sectors which are taken from (17) are as follows:
Agriculture 0.03, construction 0.06, manufacturing and mining 0.06, transportation and communication 0.15, services 0.03, oil 0.03, and water and power 0.065.

Quantity of oil export (XOA): the data is taken from (1). The figures for 1959-1966 were available in million metric tons which were converted to million barrels per year by multiplying by 7.3 (it is assumed that one metric ton of oil is equivalent to 7.3 barrels of oil).

The oil export price (XOP): the data are in U.S. dollars and are taken from (21), p. 118 for the period 1959-1970 and (11), p. 208 for the period 1971-1976.

Foreign exchange rate (EXR = Rials/$US): the data is taken from (14).

Disposable income (DY) calculated from the following relation of:

(1) $DY_1 = GNP - (DEP + GRIDT + GRDT + GRP + GRO - GSUBT)$

was found to be unrealistic. That is, the figure for DY_1 became smaller than the total private consumption expenditures (CPT = CRP + CUP). To replace DY_1, another approach was adopted. A proxy was found for government total saving (SG). It was assumed that SG is the accumulation of the government annual surplus (deficit) over the period of study (1959-1976). Then, given that the total national saving (ST) is provided in the national accounts data, the private saving (SP) can be calculated as a residual:

(2) $SP = ST - SG$

Hence, disposable income can be calculated as a summation of SP and total private consumption, that is

(3) $DY_2 = CPT + SP$

Disposable Income (DY) was set equal to DY_2.

Government budget discrepancy (GBDISA): to define the government budget constraint, the national account figures were used. However, it was found that there is a discrepancy between these figures and the corresponding figures given in the government annual budgetary accounts. This discrepancy is treated as an exogenous variable in the model.

FOOTNOTES TO DATA APPENDIX

1. Other sources are used whenever necessary data were not found in sources (6) through (13).

2. To avoid double counting, credits of government to private sector (which in some sectors are included in the funds devoted to these sectors) have been subtracted since these credits are indirectly included in the private investment.

3. For the period 1959-1962, items of working capital, other payments, and returns from projects were added to the figures of industry and mining, given in (1), 1964, p. 40. This information was obtained from (1), 1965-1969, (sections related to the industrial development banks).

4. Hand-made carpet and handicrafts industries, which employ more than one-third of the total labour force employed in industry and mining (800,000 in 1978; see (20), p. 83), are not included in the selected industries. These industries have relatively low wages compared to other industries; even lower than the minimum wage which is assigned by the government (19), p. 45.

5. In the case of the oil sector, the number of contractors which are included in the official employment figures for the oil sector were subtracted.

6. The figures exclude investment and direct participation of the banking and non-banking financial institutions in these sectors.

	ACLBA	ANCLBA	ANCLGBA	ANFBA	ANFA	ANCLGA	ΔBCBA	BDFBA	BUFA	ΔBDBA	ΔBPA
1959	2.700000	-3.000000	15.600000	-8.200000	9.600000	15.600000	0.0	-0.800000	-0.800000	0.0	0.0
1960	2.800000	-3.000000	17.800000	0.600000	10.100000	17.800000	0.0	-0.600000	2.800000	0.0	0.0
1961	4.600000	-2.500000	15.800000	-1.400000	12.700000	15.800000	0.0	0.0	1.800000	0.0	0.0
1962	4.500000	-3.800000	15.400000	-0.200000	16.900000	15.400000	0.0	-1.200000	-1.200000	0.0	0.0
1963	5.100000	-3.900000	17.200000	-1.400000	18.400000	17.200000	0.0	-1.792000	7.300000	0.773200	1.066000
1964	10.100000	-8.100000	9.100000	-1.200000	26.200000	9.100000	0.0	0.228000	11.900000	0.787000	1.065000
1965	8.700000	-11.300000	24.299000	-1.300000	21.700000	28.900000	0.601000	-1.820000	7.500000	1.294000	1.120000
1966	11.200000	-13.700000	31.058000	-1.100000	19.400000	31.100000	0.842000	-8.165000	11.700000	-0.293000	5.616000
1967	7.600000	-17.300000	40.870000	2.700000	20.900000	43.600000	2.730000	0.0	36.900000	1.656000	7.816000
1968	11.200000	-16.600000	51.833000	1.500000	14.000000	57.700000	5.864000	0.0	63.800000	-0.598000	2.822000
1969	15.000000	-19.500000	66.200000	0.0	7.100000	72.500000	6.500000	0.0	69.400000	-5.900000	-2.200000
1970	15.300000	-21.700000	96.400000	5.800000	-8.800000	106.800000	10.400000	0.0	79.000000	-3.600000	-2.900000
1971	14.500000	-29.300000	95.700000	8.100000	29.600000	93.900000	-1.800000	-5.000000	81.100000	9.800000	6.100000
1972	20.200000	-45.600000	75.900000	10.900000	70.300000	96.500000	20.600000	0.0	67.700000	10.500000	5.800000
1973	44.000000	-81.600000	12.700000	35.600000	102.700000	82.600000	69.900000	-42.600000	10.500000	15.100000	6.900000
1974	37.200000	-283.800000	124.000000	49.700000	508.000000	49.100000	-79.900000	77.800000	-350.200000	70.800000	1.900000
1975	90.700000	-244.800000	30.100000	47.900000	506.500000	50.200000	29.100000	177.700000	-193.100000	62.000000	6.900000
1976	149.100000	-287.600000	11.600000	164.600000	677.700000	27.700000	16.100000	144.800000	-50.300000	90.800000	8.300000

	CHPA	CHBA	CTAGA	CTAA	CTCNA	CTMMA	CTTCA	ΔCTBSGA	DBDFA	DISO	DSCTAGA
1959	14.300000	2.900000	0.650000	3.700000	4.800000	5.600000	7.200000	0.0	-0.800000	-1.255884	0.0
1960	15.700000	3.200000	0.411100	4.300000	5.700000	6.600000	8.500000	0.0	1.100000	-2.896414	0.0
1961	17.100000	3.800000	0.334300	5.100000	6.700000	7.800000	10.100000	0.0	0.900000	-6.750864	0.0
1962	19.800000	3.700000	0.655600	6.200000	8.100000	9.400000	12.300000	0.0	-1.200000	-5.744113	0.0
1963	22.600000	4.100000	1.098000	7.400000	9.700000	11.200000	14.400000	5.100000	4.200000	-8.368113	0.0
1964	24.100000	4.800000	2.698000	8.900000	11.700000	13.500000	17.400000	8.300000	11.100000	-10.675117	0.0
1965	25.400000	5.800000	1.387000	10.300000	13.500000	15.700000	20.300000	6.100000	7.400000	-13.844889	0.0
1966	27.400000	6.800000	0.497000	12.200000	16.000000	18.600000	24.100000	5.500000	9.200000	-16.500887	0.0
1967	30.600000	7.300000	0.731000	15.000000	19.800000	22.200000	25.800000	12.300000	28.300000	-25.562709	0.0
1968	34.100000	8.500000	1.011000	18.900000	22.900000	25.200000	30.900000	11.300000	41.400000	-23.564577	0.0
1969	37.100000	10.300000	0.899000	20.300000	26.300000	30.500000	37.700000	18.800000	48.100000	-32.086664	0.0
1970	40.900000	11.900000	1.284000	18.400000	29.000000	34.600000	57.200000	29.300000	50.500000	-30.597998	0.0
1971	49.500000	12.900000	1.684000	17.400000	38.400000	42.600000	68.900000	2.000000	26.100000	-36.786668	0.0
1972	66.400000	15.500000	3.690000	28.900000	45.800000	63.800000	68.800000	9.400000	57.000000	-49.778889	0.0
1973	86.400000	18.800000	3.863000	37.300000	61.700000	90.800000	76.200000	-33.400000	13.200000	-30.797888	0.0
1974	131.200000	27.700000	12.695000	62.600000	85.400000	104.100000	91.700000	-5.000000	-140.000000	-17.185779	12.600000
1975	185.200000	48.100000	12.879000	94.000000	147.800000	190.300000	190.600000	-108.000000	-12.700000	8.797008	0.0
1976	249.200000	70.000000	13.154000	141.100000	242.800000	369.000000	192.200000	-134.100000	37.600000	14.729000	0.0

	DHCBA	EXR	FBDFA	FEXRA	GRUTSA	GRO	GSUBT	GTRANS	IAGA	IAG	ICNGA
1959	7.700000	75.7500	0.0	13.800000	7.450000	11.940000	0.400000	8.770000	2.595483	2.595483	1.629491
1960	8.800000	75.7500	1.700000	9.500000	-0.758440	14.333770	0.700000	10.430000	1.106558	1.055949	2.473126
1961	9.900000	75.7500	0.900000	14.100000	-7.418459	20.266800	0.767000	7.817115	1.037126	1.055167	3.164276
1962	9.500000	75.7500	0.0	17.100000	-8.551772	16.380900	0.653000	6.885280	1.756000	1.859000	1.146555
1963	10.100000	75.7500	1.100000	19.800000	0.728447	10.649010	0.842700	14.387460	1.755095	1.921107	0.973181
1964	8.400000	75.7500	0.400000	27.400000	0.100537	8.203485	0.967000	15.984970	2.312599	2.338117	1.617720
1965	12.800000	75.7500	0.100000	23.000000	2.649085	9.161114	0.753000	6.126046	4.470001	4.404651	3.635800
1966	14.200000	75.7500	2.500000	20.500000	0.640941	12.220220	0.980700	4.029465	4.402268	4.398210	2.640091
1967	10.700000	75.6250	8.600000	18.200000	17.968409	9.662641	1.277300	20.482370	5.155306	4.831946	3.646605
1968	23.700000	75.1030	22.400000	12.200000	20.770069	11.756650	0.822000	28.191720	6.121488	5.524860	4.447737
1969	27.700000	75.4130	21.300000	7.100000	25.072965	11.167110	1.248000	10.678550	5.346211	4.736857	5.117775
1970	36.400000	76.3800	19.500000	-14.600000	17.708409	13.550720	1.377300	17.510730	5.332554	4.236558	8.088706
1971	46.300000	76.3800	15.000000	21.500000	18.011571	17.981000	1.720000	4.709489	7.509558	6.157481	11.503500
1972	59.500000	76.3800	10.700000	55.400000	40.322422	17.000000	3.000000	-4.956062	8.584430	6.308818	20.045800
1973	85.100000	68.7200	-2.700000	107.100000	280.615990	18.057000	16.200000	130.193000	11.522200	7.436889	57.977730
1974	152.000000	67.6250	-210.200000	458.300000	157.595004	17.115720	9.600000	259.197000	17.302220	9.019077	77.311720
1975	189.300000	67.6390	-180.400000	406.600000	236.641881	32.540330	18.200000	262.679000	22.220880	9.833744	114.202000
1976	247.700000	70.2220	-87.900000	513.100000	633.877266	31.986480	38.600000	304.262000	24.806500	8.821090	173.430000

* Some portions of the Historical Data are reported in Chapter 2 and Chapter 5(Table 5-3)

	ICNG	IMMGA	IMMG	ITCGA	ITCG	IOGA	IOG	MCPD	MKPD	MTPU	NFYA	NIOCUA
1959	1.642491	0.13738	0.13739	6.919R0	6.91918	4.R0000	4.R0000	1.000000	1.00000	1.00000	-5.70000	3.53000
1960	2.30787	0.11653	0.11157	5.38266	5.31529	5.21R00	4.99210	1.00713	1.01215	1.01082	-8.05100	-0.88000
1961	3.26536	0.13572	0.13841	5.81823	5.93340	4.94100	5.03R0R	1.02007	1.02120	1.02056	-9.31100	5.48000
1962	1.21054	0.18333	0.19356	4.50009	4.75219	4.31300	4.55371	1.00722	1.01124	1.01047	-11.35900	-4.90000
1963	1.01943	0.24641	0.26958	5.87747	6.43036	4.68700	5.12773	1.01878	1.02128	1.02103	-13.00500	-7.90000
1964	1.63509	0.54764	0.55370	5.19562	5.25309	5.75100	5.81461	1.04197	1.04170	1.04168	-14.42600	-8.30000
1965	3.56336	2.56631	2.52985	11.13660	10.97840	9.30000	9.16789	1.04943	1.05256	1.05171	-20.53000	-10.00000
1966	2.57172	3.92112	3.78969	11.74530	11.35160	7.20000	6.95867	1.08062	1.08401	1.08322	-18.50800	-7.50000
1967	3.41910	6.41157	6.01100	16.78420	15.69810	11.80000	10.68700	1.08150	1.08316	1.08277	-20.86400	-8.90000
1968	4.01373	17.37060	15.67690	17.30080	15.61550	13.50000	12.18370	1.07024	1.07303	1.07279	-20.49500	-22.30000
1969	4.23091	28.10690	22.96710	22.07910	18.04160	14.70000	12.01190	1.11375	1.11423	1.11301	-15.14000	-20.80000
1970	6.43291	32.64600	25.96720	25.23260	20.07050	10.60000	8.43143	1.17202	1.17390	1.17348	-37.92080	-36.50000
1971	9.39559	22.82770	18.48370	30.79930	24.93830	16.70000	13.52200	1.23345	1.23606	1.23506	-35.94500	-20.20000
1972	14.79960	19.37000	14.30070	25.20620	18.60950	28.90000	21.33660	1.33700	1.33812	1.33849	-30.33500	-28.30000
1973	37.42090	30.22200	19.50700	25.83910	16.67760	32.00000	20.65810	1.48004	1.45078	1.44970	-14.09500	-241.90000
1974	40.04440	47.75630	24.76490	54.23180	28.12520	63.90000	33.13920	2.05970	2.06360	2.06181	4.99500	-241.70000
1975	48.75970	79.38590	33.70360	78.72430	35.42280	155.90000	57.69700	2.26490	2.27023	2.27219	0.96000	-173.00000
1976	61.74460	98.39120	34.98750	107.10900	38.08750	172.50000	61.34030	2.41620	2.42078	2.41841	5.53100	-316.00000

	NIOCA	SP	ST	T	VO	XC	XK	XNFS	XOQBP	XOPD	XOP	XO
1959	3.530000	39.5000	40.5000	1.00000	35.0000	3.01900	0.0	0.80000	0.23510	1.00000	1.00000	30.80000
1960	1.300000	42.2200	41.1970	2.00000	36.9047	3.81300	0.00000000	1.06000	0.26900	0.97747	1.00000	34.66400
1961	6.300000	43.8092	42.9310	3.00000	44.6286	4.38000	0.0	0.97100	0.30370	0.90897	1.00000	39.00700
1962	-4.900000	45.7778	44.9882	4.00000	50.1207	4.14100	0.01R00000	0.91400	0.34000	0.91959	1.00000	44.80200
1963	-12.800000	62.5366	50.1596	5.00000	55.5063	3.90500	0.0	0.91400	0.39350	0.92698	1.00000	49.51600
1964	0.500000	65.0067	54.2490	6.00000	58.8360	4.10500	0.0	1.06000	0.47000	0.96357	1.00000	55.88600
1965	-10.800000	75.0095	60.0098	7.00000	70.1370	5.01000	0.0	1.04300	0.53400	0.92699	1.00000	64.83300
1966	-5.000000	77.7217	69.1784	8.00000	79.8399	4.40400	0.0	2.74300	0.61910	0.95817	1.00000	73.86200
1967	-0.500000	112.6180	87.1210	9.00000	90.2470	5.77200	0.0	2.85700	0.78340	0.95618	1.00000	85.97400
1968	0.100000	122.5960	87.0781	10.00000	104.6730	6.48500	0.013R0000	3.71400	0.85980	0.95600	1.00000	98.00400
1969	1.300000	123.9850	87.6657	11.00000	125.8220	7.19600	0.01400000	3.71400	1.03980	0.98887	1.00000	116.66500
1970	-17.000000	136.9850	92.3243	12.00000	144.9190	7.67100	0.09500000	3.54300	1.20770	0.97073	1.00000	131.48800
1971	-5.200000	188.3150	157.6620	13.00000	160.0230	9.52600	0.27600000	6.85700	1.45200	1.32838	2.27000	153.12300
1972	-13.600000	271.8990	228.4710	14.00000	182.6520	9.69200	0.15900000	5.77100	1.72900	1.85770	2.89700	176.48200
1973	-208.600000	439.3600	430.2690	15.00000	198.7290	7.80300	0.48000000	10.34300	1.94200	2.96021	5.25000	196.78700
1974	-451.900000	619.7170	691.1310	16.00000	197.5810	6.74900	0.87300000	18.80000	1.91800	3.29870	11.87500	193.40400
1975	-358.300000	596.2270	691.5550	17.00000	173.2370	6.98200	1.05000000	19.25700	1.68600	3.03491	11.42000	171.79800
1976	-403.900000	749.1650	734.6490	18.00000	197.3700	8.58000	1.16900000	21.80600	1.92700	3.81312	11.42000	193.14400

	XT	XTPD
1959	41.5000	1.00000
1960	44.4800	0.99186
1961	49.5200	0.93094
1962	54.0220	0.90867
1963	59.7730	0.95663
1964	66.8970	1.00084
1965	76.2660	0.96977
1966	86.1870	0.97340
1967	99.8040	0.99295
1968	114.5600	0.99773
1969	133.7750	0.99570
1970	150.7750	1.01940
1971	179.3420	1.54157
1972	201.9330	1.47871
1973	225.5380	2.88608
1974	225.7900	6.59860
1975	206.9590	6.96032
1976	226.9580	7.87723

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