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University of Wollongong

Ghassemi, Ahmad, An analysis of the determinants of investment in developing countries a case study of Iran (1970-93), Doctor of Philosophy thesis, Department of Economics, University of Wollongong, 1996. <http://ro.uow.edu.au/theses/1310>

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AN ANALYSIS OF THE DETERMINANTS OF INVESTMENT IN DEVELOPING COUNTRIES A CASE STUDY OF IRAN (1970-93)

**A thesis submitted in fulfilment of the
requirements for the award of the degree**

**DOCTOR OF PHILOSOPHY
FROM
UNIVERSITY OF WOLLONGONG**



by
AHMAD GHASSEMI
(M. Economics, B. Economics)
University of Tehran, IRAN

**DEPARTMENT OF ECONOMICS
1996**

Declaration

I hereby certify that this thesis has not been submitted previously as part of the requirements of another degree and that it is the result of my own independent research.

Ahmad Ghassemi

ACKNOWLEDGMENTS

I would like to especially thank my supervisor Dr Charles Harvie, Associate Professor in the Department of Economics at the University of Wollongong for his contributions to this work. I am grateful for his sincere supervision, intellectual guidance, enthusiastic support and continuous academic assistance. This study has also benefited from the econometric advice received from my co-supervisor Dr Khorshed Chowdhury Senior Lecturer of Economics at University of Wollongong. I received invaluable suggestions and comments from Associate Professor Robert G. Castle, the Head of the Economics Department and academic support from Professor Don Lewis the Acting Head of the Economics Department of the Wollongong University. I am grateful for their academic understanding and for the opportunity that this thesis be considered by them. I wish to express my thanks for all of the academic facilities provided to me during my period of study.

I received valuable books, articles and suggestions from Dr Abbas Arabmazar Associate Professor of the University of Shahid Beheshti and Dr. Akbar Komidjani Senior Lecturer of Economics at the University of Tehran. Mr Wolfgang Brodesser provided me with computer assistance. Ms Sophie Abercrombie and Ms Julie Chin helped me with administrative needs. I would like to thank all of them.

I wish to express my gratitude to the Ministry of Industries and the Ministry of Culture and Higher Education of the Islamic Republic of Iran for their directions, encouragement and sponsorship of my study. In particular, I am grateful to his excellency M. R. Nematzadeh the Minister of Industries of the Islamic Republic of Iran for his generous support. This study opportunity could not have been achieved without his genuine administrative support. I also would like to gratefully acknowledge the support of Eng. A. N. Khamoushi Member of the Parliament in the Islamic Consultative Assembly and the Chairman of the Iran Chamber of Commerce, Industries and Mines for the periodicals and other useful information.

I owe a very large debt of gratitude to my wife, who provided the supportive environment for carrying out the work on this thesis. I would like to especially thank Mr H. Mirzazadeh for his endless help and support back at home in the last three years. Contributions of my colleagues and friends had a major role in completing this research. I am grateful to all of them. I would also like to thank the Iranian students at the University of Wollongong for their assistance in carrying out the work on this thesis. This study is dedicated to my beloved country Iran.

Ahmad Ghassemi

ABSTRACT

This study attempts to identify the major determinants of private investment , along with the effects of such investments on other macroeconomic factors, in developing countries, using Iran as a case study. In this regard we identify a number of macroeconomic variables which played a major role in enhancing private investment in developing countries, and Iran in particular, between 1970 and 1993. An empirical investment model, a simultaneous investment model by industry and a macroeconomic model are applied to study the investment behaviour in this country. Lack of economic data, differences in economic structure, and different economic concepts between developed and developing countries, were the major issues that made this study more complicated .

The adopted empirical investment model is based on the Blejer and Khan (1984) and the Greene and Villanueva (1990) approach, which are related to investment behaviour in developing countries. The model enables us to show the effects of public current and capital expenditure, funded by oil export revenue, on private investment and other macroeconomic factors. The simultaneous investment function for major economic activities, indicates that domestic investment was affected by output, capital stock, bank financing, oil exports and public investment rather than the official (fixed) or real exchange rate in the parallel market and/or interest rate. The Harvie and Kearney (1995) macroeconomic model is amended to study the crowding out, or crowding in, effects of public current and capital expenditure on private investment in developing countries, focusing upon Iran as a case study. This model also examines the effects of the interest rate, real exchange rate and world income on the behaviour of major macroeconomic variables in the product, money and asset markets, and especially private investment.

The estimation results indicate that private investment was negatively affected by an increase in the interest rate, but positively by the major components of aggregate demand such as private consumption and public current and capital expenditure. These results also suggest that both public current and capital expenditure crowd in private investment.

The simulation results suggest a number of alternative government policies for achieving economic development goals and enhancing private investment. The policies presented are: 1. A two tier interest rate policy should be administered by the government, a lower interest rate for investment purposes, accompanied with a higher interest rate for savings, term deposits and bank credits. 2. Allocation of a higher proportion of oil export revenues for public investment only in infrastructure fields and/or financing private investment. 3. Pursuing a unified floating exchange rate policy.

The experience of billions of petro-dollars investment in various public enterprises in the 1970s, and nationalisation of hundreds of large scale private industries after the revolution, centralised the economy, aimed at pursuing the strategic goal of economic development. Eventually, however, the government also realised that the contribution of private investment was a prerequisite for sustainable economic development. This experience implied the need for a number of microeconomic reforms. Liberalisation of the economy including that of trade, privatisation of nationalised industries, reform of public enterprises, floating the exchange rate and the attraction of foreign direct investment are a concise summary of these essential microeconomic reforms.

TABLE OF CONTENTS

AN ANALYSIS OF THE DETERMINANTS OF INVESTMENT IN DEVELOPING COUNTRIES A CASE STUDY OF IRAN (1970-93)

Acknowledgment	ii
Abstract	iii
Table of Contents	iv
List of Tables	vii
List of Figures	viii

CHAPTER 1: INTRODUCTION

1.1. Background	1
1.2. Objectives of the Study	4
1.3. Methodology of the Study	6
1.4. Data Sources	8
1.5. Outline of the Study	9

CHAPTER 2: AN OVERVIEW OF IRAN'S RECENT ECONOMIC DEVELOPMENT

2.1. Introduction	12
2.2. The Iranian Economy and Investment Before the Revolution	13
2.2.1. The Effects of Oil Price Rises on Investment	15
2.2.2. The Fifth Five-Year Plan and Its Revision	17
2.3. The Iranian Economy and Investment After the Revolution	19
2.3.1. The War and Investment	21
2.3.2. The Effects of the Oil Crises on Investment	23
2.3.3. The First Post-Revolution Five Year Plan	25
2.4. Conclusion	29
2.5. Appendix	33

CHAPTER 3: A REVIEW OF LITERATURE: FACTORS DETERMINING INVESTMENT

3.1. Introduction	37
3.2. Investment theory and developed countries	38
3.2.1. Classical Investment Approach	39
3.2.2. Keynes' Investment Approach	41
3.2.3. Neoclassical Investment Approach	44
3.2.4. Keynesian Investment Approach	45
3.3. A Theoretical Macroeconomic Model	50
3.4. Investment theory and developing countries	55
3.5. Summary of the Key Variables Affecting Private Investment	65
3.6. Conclusion	74
3.7. Appendix	76

CHAPTER 4: AN EMPIRICAL INVESTMENT MODEL FOR IRAN

4.1. Introduction	82
4.2. Theoretical framework - the Model	83
4.3. Predicting the Direction and Effects of Variables in the Model	87
4.4. Definition and Nature of the Data and Variables	90
4.5. Estimation Results	102
4.6. Conclusion	106
4.7. Appendix	108
4.7.1. Tables	109
4.7.2. Figures	111

CHAPTER 5: IRANIAN PRODUCTION AND INVESTMENT BY INDUSTRY

5.1. Introduction	118
5.2. Aggregate Production and Investment	120
5.2.1. Agriculture Sector	126
5.2.2. Oil Sector	128
5.2.3. Industries and Mines Group	131
5.2.3.1. Water and Electricity Industry	132
5.2.3.2. Mines	134
5.2.3.3. Industries Sector	134
5.2.3.4. Housing Industry	137
5.2.4. Services Sector	140

5.3. Investment in machinery	142
5.4. Foreign Direct Investment	144
5.5. Conclusion	150
5.6. Appendix	154
5.6.1. Tables	156
5.6.2. Figures	161
 CHAPTER 6: ECONOMIC POLICIES FOR ENHANCING INVESTMENT IN IRAN	
6.1. Introduction	165
6.2. A Macroeconomic Model for Iran	168
6.3. Empirical Estimation of the Model	174
6.4. Model Simulations and Policy Implications	180
6.5. Summary and Conclusions	184
6.6. Appendix	187
 CHAPTER 7: MICROECONOMIC REFORM	
7.1. Introduction	204
7.2. Foreign Trade Reform	207
7.3. Foreign Exchange Market Reform	211
7.4. Attraction of Foreign Direct Investment	214
7.5. Privatisation	215
7.6. Banking Deregulation	222
7.7. Public Enterprise Reform	225
7.8. Conclusion	231
 CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS	
8.1. Summary of the Study	236
8.2. Policy Implications from the Major Results	243
8.3. Suggestions for Future Study	246
 BIBLIOGRAPHY	 248

LIST OF TABLES

No.	Definition	Page
2.1	Composition of Iranian Exports	34
2.2	Composition of Iranian Imports	35
2.3	Composition of Government Revenue	36
3.1	Summary of Empirical Results from the Investment Studies in Developed Countries	77
3.2	Summary of Empirical Results from the Investment Studies in Developing Countries	79
4.1	The Result of the Investment Behaviour Model (2SLS)	109
4.2	The Result of the Investment Behaviour Model (3SLS)	110
5.1	Real Product by Economic Sectors (1982=100)	155
5.2	Real Investment by Economic Sectors (1982=100)	156
5.3	First Estimation of the Investment Function by Industry (OLS)	157
5.4	First Estimation of the Investment Function by Industry (SUR)	158
5.5	Second Estimation of the Investment Function by Industry (OLS)	159
5.6	Second Estimation of the Investment Function by Industry (SUR)	160
6.1	Parameter Values of the Macroeconomic Model	176

LIST OF FIGURES

No.	Definition	Page
4.1	Real Private Investment and Gross Domestic Investment at 1982 Prices	111
4.2	Real Private Consumption and Gross Domestic Investment at 1982 Prices	111
4.3	Real Private Investment and Public Investment at 1982 Prices	112
4.4	Real Private Investment and Public Current Expenditure at 1982 Prices	112
4.5	Real Private Investment and Non-oil Net Exports at 1982 Prices	113
4.6	Rate of Interest for One Year Term Deposit	113
4.7	Real Gross Domestic Investment and Product at 1982 Prices	114
4.8	Real Private Wealth at 1982 Prices	114
4.9	Oil And Gas Exports and Non-Oil Exports	115
4.10	Government Budget Deficits	115
4.11	Composition of Imports	116
4.12	Rials per US Dollar in the Parallel Market	116
4.13	Rate of Devaluation of the Rial	117
4.14	Real OECD Income at 1985 Prices	117
5.1	Real Gross Domestic Product and Investment at 1982 Prices	161
5.2	Real Product and Investment in the Agriculture Sector at 1982 Prices	161
5.3	Share of the Agriculture Sector in GDP and GDI	162
5.4	Share of the Oil and Gas Sector in GDP and GDI	162
5.5	Real Product and Investment in the Industries and Mines Sector at 1982 Prices	163
5.6	Real Product and Investment in the Housing Sector at 1982 Prices	163
5.7	Real Investment in Machinery and GDI at 1982 Prices	164
5.8	Real Product and Investment in the Services Sector at 1982 Prices	164
6.1	Actual and Simulation Values of Non-oil Aggregate Demand	188
6.2	Actual and Simulation Values of Private Investment	188
6.3	Actual and Simulation Values of Private Consumption	189
6.4	Actual and Simulation Values of Public Investment	189
6.5	Actual and Simulation Values of Public Current Expenditure	190
6.6	Actual and Simulation Values of Non-oil Net Exports	190
6.7	Actual and Simulation Level of Domestic Prices	191
6.8	Actual and Simulation Values of Non-oil Aggregate Supply	191

LIST OF FIGURES (continued)

No.	Definition	Page
6.9	The Interest Rate Effect on Private Investment	192
6.10	The Interest Rate Effect on Non-oil Aggregate Demand	192
6.11	The Interest Rate Effect on Real Money Demand	193
6.12	The Interest Rate Effect on the Domestic Price Level	193
6.13	The Interest Rate Effect on Non-oil Aggregate Supply	194
6.14	The Oil Export Revenue Effect on Non-oil Aggregate Demand	194
6.15	The Oil Export Revenue Effect on Public Investment	195
6.16	The Oil Export Revenue Effect on Public Current Expenditure	195
6.17	The Oil Export Revenue Effect on Private Investment	196
6.18	The Impact of OECD Income on Non-oil Net Exports	196
6.19	The Impact of OECD Income on Non-oil Aggregate Demand	197
6.20	The Impact of Domestic Currency Devaluation on Non-oil Net Exports	197
6.21	The Impact of Domestic Currency Devaluation on Private Investment	198
6.22	The Impact of Domestic Currency Devaluation on Non-oil Aggregate Demand	198
6.23	The Impact of Domestic Currency Devaluation on Real Money Balances	199
6.24	The Impact of a Wage Increase on Non-oil Aggregate Supply	199
6.25	The Impact of a Wage Increase on the Domestic Price Level	200
6.26	The Impact of a Wage Increase on Private Consumption	200
6.27	The Impact of a Wage Increase on Non-oil Aggregate Demand	201
6.28	The Effect of an Import Increase on Non-oil Aggregate Supply	201
6.29	The Effect of an Import Increase on Private Consumption	202
6.30	The Effect of an Import Increase on Private Investment	202
6.31	The Effect of an Import Increase on Non-oil Aggregate Demand	203
6.32	The Effect of an Import Increase on the Domestic Price Level	203

CHAPTER 1:

INTRODUCTION

1.1. Background

Investment patterns by oil exporting countries are one of the most intriguing areas in the study of developing economies. The general perception is that the substantial oil revenues of these countries provide for direct public and private investment and therefore essential capital accumulation. Although most of the oil exporters enjoy a steady stream of hard currency earnings, such earnings only enable these countries to import a part of the most needed capital goods and services and respond to the increasing demand for imported consumer and intermediate goods.

Members of the Organisation of Petroleum Exporting Countries (OPEC) have many of the characteristics of developing countries. They have a low level of industrialisation, insufficient infrastructure facilities, rapid population growth and a shortage of skilled labour. Economically speaking, they suffer from sub-average income per capita, a gap between aggregate demand and supply, lack of capital products and a high dependency on imported capital goods for most of their industrial investments. These factors together with non-economic factors such as political instability, regulations and non-tariff barriers often contribute toward investment risk in these countries. Simultaneously, the economies of these countries have a specific

character of their own; heavy dependency on the export of a primary product (crude oil) by the government which is the owner of this resource. As a result, the government through its claims to all oil revenues and the majority of exports, has the ultimate say in the economic development of these countries. A high proportion of the national product is spent by the government in its current and capital expenditure. In short, government intervention in the economy, and specifically in the share of public investment in gross domestic investment, is high in oil exporting countries.

The above economic characteristics do not undermine the importance of private investment as a major determining factor in the long term economic development of these countries. Consequently, the determinants of private investment in developing countries is an interesting and important study, particularly given the significance of capital accumulation to economic growth. The focus of this study will be upon the contribution of investment to the economic development of Iran as an oil exporting developing country, with a mixed economy. The Islamic Republic of Iran with 1648000 square kilometres in area is located in the Middle East. This country has a border measuring more than 5400 kilometres with Turkey, Armenia, Azerbaijan, Turkmenistan, Afghanistan, Pakistan and Iraq and a further 3000 kilometres of coastline and shore with the Persian Gulf and the Oman Sea in the south and the Caspian Sea in the north. Iran's population is over 61 million, with one of the highest population growth rates (3.5 percent in 1992) in the world. Iran has a variety of natural resources other than petroleum and natural gas. Coal, chromium, copper, iron ore, lead, manganese, zinc and sulphur are some of its resources. The country's major transportation facilities are basically highways, railways, ports and merchant marines, airports and aircraft. Iran has more than 140 thousand kilometres of roads of which at least one third are paved surface or highway. There are three overall one way railways, which are five thousand kilometres in length joining the four corners of the country.

In Iran the political body of the government is formed by a strong central government in the capital, Tehran, with affiliated bodies in each of the twenty four provinces. All provincial governors and other public authorities in the provinces are appointed by the central government. The provincial budget is funded through a central budgetary system. The terms "government", "state" and "public sector" are used interchangeably in this study¹.

Iran has a mixed economy, with a strong governmental role in most industries and services. Oil and other main minerals, large industries, service institutions and their affiliated enterprises incorporated within the central plan contain the public side of the economy, while widespread activities in rural agriculture, small and medium scale trading and service ventures as well as the new generation of modern industries indicate the economic activities of the private sector. Iran has exported crude and refined oil and gas products for almost a century. Iranian exports have been dominated by oil exports, which are the monopoly of the government. The major non-oil exports consist of handmade carpets and handicrafts, fresh and dried fruits and caviar, manufactured goods and mineral products which form 2 to 15 percent of total exports since the oil price increases in the early 1970s.

Oil exports provide the majority of Iran's exports and also the main part of government revenue, and therefore have a significant influence on the economy. The impact has been more tangible since the oil price changes in the early 1970s. From this point of view, the Iranian economy presents an interesting case for analysing the macroeconomic effects of oil price increases on the economy and investment patterns of an oil exporter over the last twenty years. The economic consequences arising from oil export revenue include sharply increased domestic income, government routine (current) expenditure and public investment expenditure, as well as private

¹ Similarly "government current expenditure" or "government capital expenditure" are used for public current or public capital expenditure in this study.

consumption and private investment. The latter was stimulated through government economic policies. The abrupt increase in oil export revenue generated strong government intervention in the economy and decreased the role of traditional non-oil exports, especially after the government intervened in the foreign currency market by persistently applying an unrealistic long term fixed exchange rate policy.

The foreign exchange rate policy decreased the competitive position of domestically produced non-oil goods against imported ones, and slowed down the growth of the main agricultural products such as wheat, barley, oil beans, rice, meat and poultry. On the other hand, the demand for these goods increased sharply due to population growth during the study period (1970-93).

1.2. Objectives of the Study

This study attempts to identify the major determinants of private investment along with the effects of such investment on other macroeconomic variables. In this regard, we pursue four main objectives to determine investment behaviour in both the public and private sectors in Iran:

1. The contribution of oil export revenue to investment; Iran as an oil exporter has an opportunity to allocate a part of the revenue from its valuable and limited natural resources (crude oil and gas) for investment. The government invests a considerable proportion of the oil revenue to achieve economic development. The government can continue this investment policy over the next two decades until the estimated oil resources are depleted in Iran. Billions of petro-dollars were invested in various public enterprises in the 1970s and about two thousand large scale private industries² were either nationalised or confiscated in the first years after the revolution. This economic centralisation contained the strategic goal of development. However, after

² Golestani (1994) says that about 1850 manufacturing and services enterprises were nominated for privatisation in the First five year plan (1989-1993)

two decades Iran is still a developing country and this experience demonstrated that the goal of economic development would not be achieved through centralisation of the economy. The government realised that the contribution of private investment is an essential prerequisite for sustainable economic development. This argument and the direct effects of oil export revenue on public current and capital expenditure and the crowding out, or crowding in, effects of such expenditure on private investment are examined in this study. These issues are considered in an empirical investment model, a simultaneous investment function by industry and a macroeconomic model in chapters 4, 5 and 6 respectively.

2. The effects of the foreign exchange rate policy on private investment; the exchange rate has always played a key role in the government's trial and error measures to control inflation and to stabilise the economy since the revolution. The effects of exchange rate fluctuations on non-oil exports, private wealth, the domestic price level and finally private investment are studied in chapters 4, 5, 6 and 7.

3. The influence of the interest rate on private investment; according to classical economics, a lower interest rate encourages private investment while it discourages savings. Keynes emphasises that the marginal efficiency of capital, relative to the market rate of interest, has a major effect upon private investment behaviour. The interest rate for capital investment and working capital and also term deposits and other forms of savings are determined by the Central Bank in Iran. These rates are often much lower than the market interest rate and even the inflation rate. The effects of this monetary tool on private investment is examined in chapters 4, 5 and 6.

4. The contribution of the government in encouraging private investment; besides the strong hand of the government through the spending of oil export revenue, the revolutionary upheaval resulted in the nationalisation of hundreds of private firms in its first year. Banks, insurance companies, airlines, shipping, and major trading

enterprises were other economic activities that were taken over by the government. The government interfered in the pricing and distribution of goods and services with the view to supplying public needs and slowing down the inflation rate during the war. These interferences in the economy and their effects on private investment are considered in chapters 2 and 7. This study also pursues this objective to recommend a number of microeconomic reforms for enhancing the investment behaviour of an oil-based developing country such as Iran's.

1.3. Methodology Of The Study

A classical investment model will not be a valid and relevant prescription for all developing countries. There are many differences in the allocation of the available financial resources and the share of private and public sectors in economic development. There are also social and cultural differences that will contribute to the diverging economic performance of each country, affecting the macroeconomic variables of the whole economy including investment behaviour. The influence of a number of other externalities; political, international and ideological phenomena cannot be ignored in analysing the theory of investment in developing countries. However, the acceptance or rejection of a theory should be based on an empirical study. This view leads us to examine three specific controversial issues relating to the theory and policy for investment in Iran; crowding in, or crowding out, effects of public current and capital expenditure, exchange rate and interest rate effects. These issues will be examined from the perspective of an econometric analysis of investment behaviour. The methodology of this study is primarily, therefore, a quantitative and statistical approach.

The study contains three separate econometric estimations. The first in chapter 4 is based on a flexible accelerator investment model. This model is based on the contributions of Blejer and Khan (1984), Greene and Villanueva (1990) as well as a number of other studies, related to investment behaviour in developing countries.

Special reference is made to investment behaviour in Iran. The investment model consists of five structural equations involving five endogenous variables, whose values are determined within the specified system. The estimations of the model are based upon the real values for both endogenous and exogenous variables; with an exception for the interest rate which is nominal. The model is overidentified, which means that more than one structural estimate is obtainable for this model. To avoid confusion, the two-stage least squares (2SLS) and the three-stage least squares (3SLS) methods are applied for estimation purposes. The estimation results from the model using the 2SLS and 3SLS methods are almost the same. The empirical results are quite encouraging and significant, with the model predicting the behaviour of the endogenous variables significantly well.

The investment function in different sectors of the economy is examined in chapter 5. This study develops the investment function for a macroeconomic model used by Noferesty and Arabmazar (1994). The investment functions for major economic activities are estimated by the ordinary least squares (OLS) and the seemingly unrelated regressions (SUR) methods. The SUR method is preferred for interpreting the investment function by industry, considering that the error terms across the equations may be correlated. These estimations analyse the effects of production, capital stock and bank financing by industry as well as public investment, oil export revenue and the real exchange rate in the parallel market on domestic investment in different industries.

In order to suggest an appropriate economic policy to enhance private investment, a macroeconomic model based on the Harvie and Kearney (1995) model is developed in Chapter 6. However, a number of amendments are required to make the model more applicable to the case of Iran. The specified macroeconomic model is a dynamic computable general equilibrium model linking production, assets and money markets of the economy in a quantitative manner. This model puts emphasis on the crowding.

out, or in, effects of public current and capital expenditures on private investment. The effects of the interest rate on private investment and real money balances are also studied in the model. The model also enables analysis of the impact of world income and the real parallel exchange rate on net exports, aggregate demand as well as on private investment. A comparison of the actual data with the simulated series of each endogenous variable can provide a useful test of the validity of the model. In this study a historical simulation of the model is performed to see whether the equations will reproduce the results which are close to the historical data, thereby enabling an evaluation of the goodness of the model as a whole. The model also simulates a number of domestic and international economic shocks, to identify appropriate economic policy responses to achieve continued economic development and enhancement of private investment. All estimations and simulations are computed using the Times Series Processor (TSP) Version 4.2 software.

1.4. Data Sources

Considering the objectives of the research, reliable data is a prerequisite to fulfil the purpose of the study. Most of the data applied in this dissertation was collected from published or internal Iranian government sources. Yet they were often based on the Iranian calender and had to be adjusted to the western calender. The Iranian calender starts from 21 March 621. In simple terms, the Iranian year is 621 years behind that of the Christian year. It should also be noted that the last 70 days of the Iranian year overlaps part of the next Christian year (from the first of January to the twentieth of March). Apart from these timely adjustments, shortage of data was a constant problem throughout the study. However, every effort was made to access the available data from major resources within the country such as the Plan and Budget Organisation, Central Bank of the Islamic Republic of Iran, Statistics Centre of Iran, Ministry of Economic and Finance Affairs, Ministry of Industries, Iran Customs and

other governmental bodies as well as international sources such as the International Monetary Fund, the World Bank and the United Nations organisations.

1.5. Outline of the Study

An overview of industrialisation of the Iranian economy is addressed in the next chapter. It contains a review of the five mid-term³ economic development plans launched in Iran before the revolution (1979). The focus is to address the major weaknesses of these plans. There have been a number of fluctuations in the oil price which have greatly influenced the Iranian economy. The effects of such oil price fluctuations on the main aggregate variables, and especially that of private investment, are considered in this chapter. The second half of chapter 2 considers the economic effects of the oil market crises, the Iran-Iraq war, the western countries' economic sanctions against Iran and finally the first five year plan after the revolution up to 1993.

Chapter 3 consists of a review of the theoretical literature on investment in both developed and developing countries. In this regard the classical and Keynesian investment approaches are reviewed briefly. Many studies in both developed and developing countries benefited from macroeconomic models for explaining economic development in recent years. These models systematically study the impact of the main macroeconomic variables and economic policies on the economy, and private investment. In this regard the Harvie and Kearney (1995) macroeconomic model is specifically reviewed in chapter 3. The emphasis of the above model is placed upon the contribution of government current and capital expenditure to the investment behaviour of the private sector in developed countries.

³ First Plan (1949-55), Second Plan (1956-62), Third Plan (1963-67), Fourth Plan (1968-72) and Fifth Plan (1973-77)

The second half of chapter 3 is allocated to a review of the investment studies relating to developing countries. This review is concerned with identifying how such models could be adapted for an analysis of private investment in developing economies. The key factors which are considered as influential variables on the investment function are summarised in the concluding section of this chapter. In addition, a concise summary of the above studies is presented in a comprehensive table in the appendix to this chapter.

Chapter 4 commences with a brief explanation of the structural characteristics of developing countries in general and the Iranian economy in particular. Then, based upon the review of literature in chapter 3, a flexible accelerator model for estimating investment behaviour in developing countries, and Iran as a case study, is introduced, and its economic aspects are explained. This model is comprised of estimations of the main components of aggregate demand; private consumption, public current and investment expenditures, and net non-oil exports (non-oil exports minus imports) by using Iranian economic data throughout the period 1970 to 1993. The estimation results from the empirical investment model are presented in this chapter.

Chapter 5 studies the trends of output and investment in major economic activities such as agriculture, oil and gas, industries and mines, housing and services in Iran during the study period. The effects of the government priority to provide basic needs⁴ for the public and government subsidies to slow down the inflation rate during the war, are also considered in this chapter. Then, an investment function is introduced in this chapter. The investment function studies the effects of production, capital stock, public investment, oil exports and finally the real exchange rate on investment in each industry. The estimation results of the investment function for each industry are also discussed. Finally, more comprehensive features and applications of investment functions for each sector will be concluded in this chapter.

⁴ Such as fuel, pharmaceutical, bread, vegetable oil, meat, soap and detergent

To suggest some economic policies for enhancing private investment, chapter 6 presents a macroeconomic model for the Iranian economy. This model analyses the fluctuations of production, assets and money markets, the domestic price level and aggregate supply during the study period. It also simulates the effects of a number of economic policies on aggregate demand, aggregate supply and especially on private investment. The interest rate, oil exports, foreign exchange rate, changes in nominal wages and foreign exchange allocations for imports are the major measures, the effect of which will be simulated in this chapter. The economic policies required for enhancing private investment can only succeed if a number of microeconomic reforms are applied. These reforms are discussed in chapter 7.

Chapter 7 reviews developments in the whole economy as well as private investment during the oil export booms in the early 1970s, the revolutionary turmoils in the late 1970s, the Iran-Iraq war (1980-88) and the "new economic adjustment" policy after the war. In particular, this chapter discusses a number of economic policies which were implemented after the war. The liberalisation of trade and the economy, the foreign exchange rate reforms, privatisation of nationalised industries, banking deregulation and public enterprise reform are major examples of the new measures of the government. These reform packages which were introduced after the war were rarely carried on to their completion. However, their short term effects on the economy and further government set backs will also be reviewed in this chapter.

Finally, the conclusion and recommendations of this study are presented in chapter 8. This chapter summarises the major points of the study and addresses the policy implications of the major results. This chapter is finalised with some suggestions for future study.

CHAPTER 2:
AN OVERVIEW OF IRAN'S RECENT
ECONOMIC DEVELOPMENT

2.1. Introduction

The Iranian economy experienced the first step towards industrialisation with the development of a few industrial plants at the beginning of this century. The first step did not stem from carefully planned and economically justified schemes. In the past four decades, moves toward development were planned and guided by government with specific targets and defined budgets. Mid-term (five or seven years) economic development Plans were the breakthrough for the economy to pave the way for industrialisation and development.

Since the introduction of development plans in Iran, there were two distinctive periods; five plans before 1979 (the revolution year) and the post-revolution first plan. The first plan before the revolution commenced in 1948. Until 1967 two more five-year plans were launched and completed. They included land reform and the formation of a new generation of investors. The fourth and fifth plans were implemented during the booming years of the economy with the unanticipated injection of oil revenues into the Iranian economy. These recent plans are considered more in the next section.

The post-revolution years in Iran were characterised by the Iran-Iraq war (1980-88) and the oil crises in the 1980s. Nonetheless, the first five-year plan bill and its revisions provided the framework for the government to administer economic development. The first five-year plan was started soon after the ceasefire in 1989. This chapter will review the performance of the Iranian economy before, during and after the launch of the plans. This analysis will particularly focus on the long term economic policy objectives of the government and their effects on private investment. This chapter will proceed as follows; the Iranian economy and investment before and after the revolution will be discussed in sections 2.2 and 2.3 respectively. The conclusions will be presented in sections 2.4.

2.2. The Iranian Economy and Investment Before the Revolution

The second stage of industrialisation in Iran began with the establishment of the first manufacturing plants in the 1930s. The plants included a few small power stations, sugar plants and weaving and spinning workshops. This industrial movement occurred in the Reza Pahlavi period (1921-41). Laws and regulations were designed to give the government the role of industrial initiator. In that period the first network of roads and railways were built and the composition of the investment program for industry was determined by the notion of becoming self-sufficient and replacing imports with local production.

By the end of the 1930s, the government owned about 100 factories that basically produced consumer goods such as sugar, cotton, silk and wool (Mofid, 1987, p.16). This phase was ended by World War II and the most important public projects (e.g. the steel mill in Karaj⁵) came to a halt with the outbreak of war. It is worth mentioning that these public investments were not derived from a systematic development plan and the resources allocated for these establishments were not based

⁵ A suburb in the west of Tehran.

on any obvious investment scheme and/or cost-benefit criteria. These projects were often funded through oil export revenues and indirect taxes.

After World War II, the first development plan was enacted in 1948. It was a four year plan and lasted until 1952. Between 1952 and 1967 two more development plans were implemented. During the second plan, which was launched after the Shah-American coup d'etat against the national government in 1952 in which the Shah regained his power, a number of laws and regulations were introduced to reform industrial investment regulations. The first issue of "The Attraction and Protection of Foreign Investments in Iran" was passed by parliament in this period. The third plan (1962-67) was the next stage of modernisation of the Iranian economy and westernisation of the society. The foundations of industrial development were erected during this plan. The new development policy in the 1960s was land reform and the establishment of a group of import substitution industries. The government enforced the land reform by purchasing agricultural land from landlords with cashable bonds, and sold the land to peasants through long-term instalments. The former landlords often cashed their bonds to invest in industrial projects. In this manner the landlord-class moved to a new social relationship. They provided capital and financed infant industries over the two decades from the mid 1950s to the mid 1970s. The land reform supplied manpower to the new industries, and the modern new industries created a new domestic market in the 1960s. This trend was expanded by the increase in oil export revenues in the first half of the 1970s.

In the late 1960s and early 1970s a considerable part of the infrastructure for Iran's industrialisation was acquired during the fourth plan (1968-72), using oil export revenues. The plan was aimed at increasing real GNP by 57 percent during the 1968-72 period. The major heavy industry development undertaken by the government was the construction of the first national steel mill which employed 60,000 workers with a production capacity of 600,000 metric tons per annum in the west of Isfahan, the

second largest city in Iran. Investment in every sector except agriculture rose in this period.

In 1973 the sharp increase in crude oil prices (see Table 2.1) coincided with the fifth development plan. Since the majority of the government's revenue originated from oil exports, this hike in price had robust effects on the country's economy. The revenues from oil exports were also the main source of foreign exchange. Hence, government expenditure -and at the same time aggregate demand- and eventually the import of goods rose sharply. The investment trends will be looked at in more detail in chapter five. However, quantitatively speaking, real gross domestic investment tripled from Rials 421 billion to Rials 1118 billion from the third plan to the fourth plan. Again gross domestic investment sharply rose to Rials 4289 billion in the fifth plan which showed a 284 percent increase from the same figure in the previous plan. The effects of this huge investment during such a short time will be discussed in the next section.

2.2.1. The Effects of Oil Price Rises on Investment

The most significant and tangible outcome of the oil price rises in the 1970s was a jump in revenue for the government, which provoked the government's ambitious desires for rapid expansion in economic activity. Real gross national product (GNP) doubled from Rials 13191 billion in 1970 to Rials 25557 billion in 1977 (World Tables 1992). The average growth rate of real GNP was 10 percent per annum in that period. At the same time the sum of exports and imports of goods jumped from Rials 369 to 2684 billion (24.7 percent annual growth), while Iran often had a positive trade balance. The increasing demand generated high inflation. The consumer price index (1974=100) increased from 77 in 1970 to 200 in 1979 with an 11.2 percent average annual inflation rate for consumer goods. The Plan and Budget Organisation became alarmed, warning the government to slow down the economy, but the

government went for a massive increase in public sector expenditures (Razavi and Vakil 1984).

After the sharp increase in oil prices in 1973, the rise in inflation was a destructive element in the economy that the government ignored and failed to deal with. On the other hand the oil price did not increase by as much as anticipated in subsequent years. With a shortfall in projected oil export revenues, while public expenditures were rising, the state budget plunged into an ascending deficit. Between 1975 to 1978 an amount of Rials 259 billion was borrowed from the money markets. It also resulted in an almost 30 percent increase in the money supply in 1976 and 1977 (Mofid, 1987, p.118).

As far as investment was concerned, the injection of huge capital expenditure into the economy within a short period generated absorption problems. The doubling of the fifth plan's expenditure created several bottlenecks in the economy. The first one was a bottleneck in the ports which could not unload the queues of foreign cargo vessels. The second bottleneck was shortages of electricity. High demand for industrial and domestic electricity could not be met by the existing capacities of power stations, and there were regular blackouts in electrical supply. The shortage of manpower was the next bottleneck. Manpower and especially expertise gaps resulted in wage increases followed by an inflow of foreign workers into the country. The expansion of domestic demand was beyond the country's capacities either to produce or to import goods and services, which resulted in price rises and inflation. In such circumstances, all organisations including government bodies were not prepared for such large expenditure extensions. These economic conditions rarely happened in other developing countries, where increased investment will normally result in an increase in output. In Iran, the size of investment should have been reduced in this period in order to optimise efficiency (Pesaran 1992).

2.2.2. The Fifth Five-Year Plan and Its Revision

The original fifth five-year plan (1973-1978) projected a total investment of Rials 2,424 billion. It was anticipated that 62.9 percent of this fixed investment would be the public sector's share and the remaining 37.1 percent would be accounted for by private sector investment. Due to changes in economic circumstances (a sharp rise in oil prices), this Plan was revised one year later and total investment was altered to an ambitious budget of Rials 4699 billion. The initial forecast was that 60 percent of this investment would be funded by the public sector. The average annual expansion rate was set at 26.6 percent. The highest share belonged to the oil sector with 51.5 percent, followed by industry (17 percent) and services (16.4 percent). Investment in oil and gas amounted to Rials 334 billion in the plan (Pick's Currency Yearbook, 1980).

In 1975 existing controls on most foreign exchange dealings were lifted. It was due to the massive government foreign revenues gained from oil exports with the new oil prices. The liberalisation of foreign currency transactions brought about a return of the previous capital flight (Pick's Currency Yearbook, 1980, page 321). As a result, land and housing prices rose abruptly. It also triggered inflation (25-30 percent per annum) and fostered the growth of various black markets coupled with corruption at every level of the highly centralised bureaucracy. Soon, there was a shortage of material and manpower all over the economy.

The year 1974 was a year of exceptional expansion for Iran. Oil prices rose to about US\$ 11.55 per barrel. The aftermath was a fall off in demand for Iranian oil and domestic price inflation, as well as anxiety about the future of oil revenues and overspending in the public sector. It led to the revision of plan allocations. Public investment projects were quietly postponed. Every effort was made to slow down the economy by reducing construction and welfare contracts as well as cutting production targets. An anti-profiteering campaign, limiting profit margins to 15 percent and

requiring businesses to turn over 20 percent of profits to workers, caused further delays in landing and processing imported goods and completing investment projects.

At this stage the capital flight resumed, at an estimated rate of US\$ 2 billion in 1974/75 (Pick's Currency Yearbook 1980, p.322). The government undertook severe actions to confine inflation and was successful in reducing the official rate to 8 percent. The budget for the year 1976-77 showed a deficit for the first time in six years. Despite adversities, Iran's economy in that fiscal year showed strong performance by all sectors except agriculture (see Table 2.3). The non-military spending of the government was oriented towards infrastructure investments, such as 20 nuclear power stations with a capacity of 23,000 megawatts to be completed by 1994.

The best year in the fifth Plan period was 1974. Some opposing factors contributed to make 1977 the worst year of the period. The shortage of power supplies and reduction in oil demand created an unsatisfactory 1977. This year saw a real decline in economic activity. Crude oil production declined 3.7 percent. There was a production growth of 9 percent in industrial output but the agricultural sector suffered most and there was a reduction in almost all agricultural products. In 1978, foreign exchange holdings rose fractionally to US\$ 10907 million (Pick's Currency Yearbook 1980, p. 323). Foreign trade showed exports down 7.4 percent to US\$ 22449 million, while imports jumped almost 30 percent to US\$ 17822 million. In the first ten months of the year oil production averaged 6.1 million bpd⁶ dropping to 0.3 million bpd at the year-end, which did not even meet domestic demand because of a strike in the oil industry.

The results of the fifth five-year plan, which ended in March 1978, were not at all promising. Total capital investment came to Rials 2625 billion or 92 percent of the

⁶ Barrels per day

original amount. Only Rials 908 billion out of Rials 1490 billion (less than 70 percent) of the projects were completed. The next development plan (1978-83) was to stress infrastructure rather than industrial projects, but was not enacted. No investment totals or targets were announced in the sixth plan.

The expansionary policy which was the theme and purpose of the revision of the fifth plan, increased aggregate demand and caused shortages in goods and services supply. These shortages were due to infrastructure weaknesses and a lack of production elements. A good example is that of hundreds of cargo ships waiting in the Iranian ports to unload their goods, with an average waiting time of five to six months (Pick's Currency Yearbook, 1980). Other examples are electricity and manpower bottlenecks. The aftermaths of these shortcomings were unavoidable inflation and incomplete projects on their deadlines. In short the idea of "great civilisation" by the Shah through the petro-dollar was ended with the end of his regime. In the next section the Iranian economy and investment behaviour after the revolution will be discussed.

2.3. The Iranian Economy and Investment After the Revolution

After months of strikes in the public sector and most other enterprises and industries, the Islamic revolution achieved victory in February 1979. The revolutionary government called for all managers and workers to come back to their work. At that time many managers abandoned their positions and a number of them had already left the country. Therefore, many factories faced serious managerial and financial problems as well as shortages of inputs. Exports of petroleum were resumed in early March after having been suspended since December 1978. Oil production in early 1979 amounted to 2.5 million bpd, with exports of 1.8 million bpd - about 33 percent of pre-revolution levels (Table 2.1). By midyear, the banking system, insurance, shipping and airline enterprises were nationalised, followed later by various segments

of the economy including metal-producing industries, automobile products and many other large scale industries.

As a result hundreds of private factories and companies were brought under the control of the government or new revolutionary organisations. In addition to nationalisation of banks and industries, infant foreign enterprises were also confiscated. This issue will be considered in chapter seven. The main government policies for reorganising industries and the production sector at that time were:

- selecting the government managers for many former private industries.
- Allocating an easy credit line to meet the requirements of industries, especially the publicly-managed enterprises.
- Nationalisation of industries which were identified as "basic" or "mother" industries, as well as industries which belonged to the former regime's family and supporters.

The widespread industrial nationalisation has had aftermaths on the country's industries since 1980. There were restrictions on the import and export of money with definite measures against foreign capital. Once again the main resource for financing projects, was oil export revenues.

Iran had to earn foreign exchange by exporting crude oil. Export earnings in 1979, the first year after the revolution, were Rials 1762 billion, which was the highest level of oil export revenues until 1988. After the oil crisis (price depressions) in 1980 and 1981, export earnings halved and ran to about Rials 880 billion (see Table 2.1 in the appendix). This detrimental situation was ended in 1982 for a short period only, but the long-term oil crisis began in 1983 with further declines in world oil prices. This again adversely affected the whole economy including gross domestic investment. Real private investment, and in particular public investment, were sharply diminished (see Table 6.2 in the appendix of chapter six) after 1983.

2.3.1. The War and Investment

The Iranian economy was devastated by the Iraqi invasion in 1980. Iraq occupied the largest Iranian port (Khorramshahr) and destroyed the largest Iranian oil refinery in Abadan on the Persian Gulf coastline. These two events as well as the economic sanctions by western countries, caused a shortage of foreign exchange as well as difficulties in obtaining raw materials, intermediate and capital goods. These happenings diminished the domestic product and severely reduced investment. The invasion dictated a war economy in the country for at least eight years. Iraqi warplanes bombed Iran's oil refineries, depot stations and Khark island, the main oil export port, repeatedly. Many qualified workers, engineers and managers left work in the production sector and went to the battlefields. Production lines switched from their normal activities to manufacturing armaments and other war equipment. The first priority was often to maintain the level of supply of essential goods regardless of their quality during the war. For a decade the price mechanism and economic competition were in the shadows in the Iranian economy. By the end of 1985, the cost of the war, as estimated by The World Currency Yearbook (1988-89), had reached US\$ 20.5 billion in lost oil revenues and US\$ 220 billion in military expenses.

In short, heavy bombardment of the oil fields and Khark Island, Iran's main oil export port, accompanied by the western countries' economic sanctions against Iran and the oil price crises in the 1980s, sharply reduced Iranian foreign revenues and depleted its foreign assets. In addition to all these casualties, the high population growth (3.7 percent) in the first decade after the revolution -which is continuing- created a big demand for goods without enough supply of resources. This situation, as well as the government's monopolistic domination of the economy, decreased production. The high rate of inflation and depreciation of the Iranian currency were evidence of these economic problems.

During the war period government expenditure increased and the gap between government expenditure and government revenue was compensated for by an increase in the money supply. In that period(1980-88), the volume of money (M1) increased from Rials 2203 billion to Rials 7758 billion and quasi money from Rials 2305 to 7930 billion (ICCIM 1992). Simultaneously, private liquidity tripled from Rials 4508 to 15688 billion while GDP increased only 12 percent (from Rial 9461 to 10594 billion) in real terms. The boost in liquidity was one the most important elements to generate a high inflation rate (between 14.8 percent to 20 percent annually) in the war period (CBIRI 1989).

The main reasons for escalating prices and the depreciation of the domestic currency since the revolution are:

- Reduction in oil exports and oil export revenues.
- Increases in government military expenditure during the war.
- Inflexible monetary policy, such as the official fixed foreign exchange rate policy, and a low interest rate policy for savings and bank credits.
- Increases in demand for basic foodstuffs such as wheat, rice, meat, dairy and many other basic edibles which were subsidised by the government.
- Increase in the share of consumer goods (mostly basic foodstuffs) in total imports, while capital goods were the major loser in this competition.

The war shifted a large proportion of foreign exchange and other resources to support military needs or capital and intermediate goods for the production of military requirements. Nevertheless, the foreign exchange bottleneck stopped, or slowed down, a number of giant projects like the Iran-Japan Petrochemical complex, Boushehr Nuclear Generators and Mobarakeh Steel complex which were incomplete from before the revolution and also slowed down more than fifty thousand large or mid scale industrial projects (MOI 1994).

Although the 1986 official statistics showed improvements in the economy, stagnant money incomes, high inflation and unemployment, coupled with shortages of goods at official prices brought living standards down. Shortages stimulated a flourishing black market for almost all goods and many services. In 1987 the government began to repair the war damages to the oil refineries. As a result their capacity was increased to about 0.5 million bpd. Total oil output was raised to 2.2 million bpd and oil exports increased to 1.75 million bpd (Pick's Currency Yearbook 1989). In mid-1988 the costly and lengthy war ended. Its economic cost for Iran was US\$ 1000 billion, equal to 80 years of Iran's revenue from oil exports (Nateq-Nouri 1995). Moreover, the war caused uncertainty and insecurity in the economy which will be considered in chapter 7.

2.3.2. The Effects of the Oil Crises on Investment

After the revolution Iran's economy was, by and large, struck by fluctuations in the oil price. Although other elements such as economic sanctions and the Iran-Iraq war increased the complexity of the economic performance, the principal player in the country's economy and investment remained oil export revenues. The government relied, almost exclusively, on a policy of import compression whereby imports were programmed annually in a foreign exchange budget to match the government's expected annual foreign exchange revenues from oil and the narrow non-oil exports. The import compression policy had important consequences for commodity composition and real investment in equipment and machinery. The share of primary and intermediate goods increased while the share of capital goods declined in the post-revolution years (see Table 2.2). This was because the government's priority in imports was for "essential" goods. As a result the decline in capital goods imports had important implications for the country's production potential, especially in the industrial sector. In 1985-88 when the compression policy was strictly applied, real investment fell on average by 16.1 percent per annum (Pesaran, 1992, p. 7).

Another remarkable effect of the oil crisis was the sharp depreciation of the real exchange rate in the black (parallel) market. The official exchange rate was fixed at Rials 92.3 per one SDR (Special Drawing Right) from May 1980. Besides this basic rate, the government introduced a "preferential" rate (Rials 420 = US\$ 1) and a "competitive" rate (Rials 800 = US\$ 1) that applied to a list of commodities and a "service" rate (Rials 845 = US\$ 1) that applied to certain services such as air travelling fares, education and medical services.

Although the official exchange rates had been depreciated by a multiple exchange rate policy (more than 20 different rates) during the 1980s, the introduction of preferential and competitive exchange rates was a major step towards a floating exchange rate policy at the beginning of the first five-year plan (1989-1993). This policy dramatically increased government expenditure, since a large proportion of government income was obtained from oil exports. This dependency of government income and expenditure on oil export revenues together with a weak fiscal policy, created several economic problems.

Fluctuations in the real exchange rate in the parallel market generated an instability in the market, causing high inflation and forcing the government to use monetary tools rather than fiscal policy for stabilisation purposes. The foreign exchange allocations to industry and business, bank credits and interest rates had a powerful role in influencing economic functions and determined investment behaviour. The official exchange rates set by the government did not reflect real market values. Hence, foreign exchange transactions, even between government agencies, expanded to obtain cheap funds.

The fixed exchange rate policy decreased government oil revenue and caused an increasing budget deficit, which was compensated through borrowing from the

Central Bank. The other means, such as issuing of bonds and foreign debt, were not employed to compensate for the budget deficits.

2.3.3. The First Post-Revolution Five-year Plan

It was in 1983 that the government submitted the first post revolutionary economic and development plan to parliament. It was at the time that the war with Iraq was enduring and the economic situation of the country was still under pressure from the revolutionary upheavals. The priorities of the Plan were as follows (PBO 1989):

- Emphasis on investment and the prevention of a consumerism culture.
- The integration of the oil industry with regard to the requirements of the country's economy.
- Increase in productivity and the capacity of industries.
- Expansion of non-oil exports.
- Preventing the expansion of large cities.
- Development of the agricultural sector as the main economic objective.

The annual growth envisaged in the Plan for various sectors was 15.9 percent for the oil sector, 14.4 percent for industries and mines, 7 percent for agriculture and 3.6 percent for services. The population growth was projected at an annual average rate of 3.1 percent.

The government's revenue was estimated to be Rials 2917 billion in 1983 and was projected to rise to Rials 5019 billion in 1987 or an annual rise of 14.5 percent. The main source of revenue was oil exports with a 58 percent share during the plan period. It was anticipated that oil exports would rise from 1.73 million bpd in 1983 to 2.97 million bpd in 1987. These figures indicated that oil export revenue was estimated to rise 71.7 percent during the plan or 14.4 percent annually.

This plan also contained a comprehensive section on projected investment by the public and private sectors. However, the first version of the plan could not pass in the parliament. The reasons for its rejection included the war and the government priority for military spending, the government's preoccupation with procurement and fair distribution of basic foods, the Iranian assets freeze by the USA, Western economic sanctions, uncertainty about the oil revenues and capacity utilisation problems of the plan. The government attempted on several occasions to submit and pass a new version of the plan from 1984 to 1987. These efforts also remained unsuccessful.

The economy faced noticeable changes following the cease-fire in the Iran-Iraq war in 1987. Many economic controls and government interventions were gradually eliminated, and the economy experienced a degree of liberalisation. The government attempted to redesign the first five-year plan to harmonise its policies, attain economic equilibrium and eventually reconstruct the country. Production, investment and in general the whole economy was in a declining position. The share of non-productive activities and services in the country increased more than 50 percent in the 1980s. The proportion of investment to GDP which was 27.4 percent in 1977, decreased to 15 percent in 1988. Evaluations by economic experts were that despite the efforts of the government, the trends in all economic indices were unfavourable (PBO, 1989, p. 1-1).

The revision of the plan in 1988 was a major attempt to reverse the performance of the economy, to enable it to recover from recession and high inflation. It sought to reduce government expenditure and decrease the long term budget deficit. Its objectives included the encouragement of private sector investment for maximising economic growth and to privatise some of the public activities, encourage savings for investment and reduce consumer goods demand. Most of the infrastructure facilities, such as oil, water, power, transportation and a number of factories, were run down

after the long running war. Without sizeable investment, economic improvement and economic growth could not be possible. The dominating policies which were outlined in this plan (1989-93) included:

- Reform in foreign exchange policy and reduction in the application of multi-rates to a unique floating rate.
- Liberalisation of foreign trade by eliminating severe restrictions on imports and exports of goods.
- Elimination of government controls on production, distribution and pricing.
- Undertaking a balanced budget through reducing public expenditure and transfer of public-corporation ownership to the private sector.
- Reforms in the banking system and rationalisation of profit rates of deposits and bank credits.
- Elimination of the existing restrictions, attraction and protection of foreign direct investments.
- Improvement of the capital market and promotion of the Tehran Stock Exchange activities.
- Revising public goods and services prices and transferring the cost of them to the consumer of these goods and services.
- Increasing productivity of the existing industries.

The macroeconomic objectives set in the plan were to obtain an average growth of 8.1 percent in real GDP, 7.9 percent in GDP without the oil sector, 4.9 percent in real GDP per capita and 11.6 percent growth in real gross domestic investment. The growth in different sectors of the economy was planned to be 6.1 percent in agriculture, 8.7 percent in oil, 14.2 percent in industry, 19.5 percent in mining, 9.1 percent in water, electricity and gas, 14.5 percent in construction and 6.7 percent in services in real terms.

Concerning investment, a Rials 26452 billion (in fixed 1989 prices) was planned both by the public and private sectors. The above investment was divided into Rials 8189 billion for public agencies, Rials 5667 billion for public enterprises and the rest for the private sector and banking system. It was another step towards a larger share for private investment in the economy. This investment was mostly planned for unfinished projects, intermediate goods production plants and supplementary projects. The government was allowed to finance the above projects up to US\$ 7.5 billion from foreign lenders. Also, the plan supported any export oriented project. The Central Bank was allowed to guarantee buy back contracts for promoting the export of manufactured goods. According to these contracts, the Iranian producers could import machinery, know-how and semifinished products and compensate the principal and interest of the imported goods and services in the form of their future export products. The plan predicted and allowed the Central Bank to guarantee up to US\$ 20 billion foreign borrowing in this regard.

The plan forecast US\$ 120 billion in foreign exchange resources. Oil exports were forecast at US\$ 83 billions, US\$ 18 billion from non-oil exports, US\$ 7.5 billion foreign borrowing for financing projects and the rest from other sources during 1989-93. Total imports were composed of US\$ 52 billion in imports of raw material and intermediate goods and US\$ 62 billion for capital goods and US\$ 6 billion for the import of services. Over estimation of oil exports as well as non-oil exports and underestimating imports caused an unpredicted external debt burden during the plan. The amount of this external debt is estimated between US\$ 20 and 40 billion at the end of the plan (RCICA 1993, no. 4).

2.4. Conclusion

Modernisation of the Iranian economy started with medium term plans after the second world war. From 1948 to 1979 five plans were launched to fulfil the development objectives of the Iranian government. The common mission among these plans was industrialisation and westernisation of the society. However, the first three plans focused on land reform to pave the way for industrial investment and creating infant industries and foreign investment attraction, whilst the next two plans, before the Islamic revolution, aimed at using huge oil revenues to create widespread industries and infrastructure investment for industrialisation. The Shah's fifth plan was halted by rising inflation, mismanagement and finally by the revolution in 1979 with many unfulfilled objectives.

After the revolution the political and social environment of the country changed dramatically, and a plan was introduced after a decade. In the immediate years after the revolution a strong incentive existed among policy makers to pursue a centralised and controlled economy. In other words, there was a forceful tendency against private sector activities as well as foreign direct investment. A great number of industries were handed over to be managed by the public sector. Eight years of the war (1980-88) accelerated this trend. As a result the private sector was not adequately involved in the economy, and especially was not sufficiently encouraged to invest in manufacturing industries.

The public sector -which managed most important parts of production- implemented its own priorities in monetary and financial policies, as well as allocation of foreign exchange to different sectors. These priorities were set to meet the demands of public and nationalised industries where basic goods were produced. The major inflows of foreign currencies were obtained from crude oil exports that also belonged to the government.

The principle forms of government intervention in this period were in pricing, rationing goods, exchange allocation, obtaining bonds to guarantee the return of export revenue by exporters, and import replacement. The absence of growth in production as well as falling oil prices forced the government to change some of its economic policies. Although real GNP increased in 1983-85, it had a steep decline to Rials 10577 billion in 1988 which was 25 percent lower than in 1976 (PBO 1994). In the meantime, the Iranian population increased more than 50 percent (from 34.3 million in 1976 to 51.8 million in 1988) during the same period. As a result, real GNP per capita decreased from US\$ 950 to US\$ 490 (World Tables 1992) between 1970 and 1989. The major adjustment to the loss of oil revenue was to lower expenditures.

For several reasons, including the war, the major cut backs in the government's spending were in the development budget. The essential explanation for the limited development spending was the shortfall in oil revenue which was also partly caused by the overvalued domestic currency. The overvalued domestic currency encouraged imports that were divided into three categories: consumer goods, intermediate goods and capital goods. Imports of capital goods were largely determined by the government's development budget. The projects that were funded by the government were highly import-intensive, and showed the close match between the development budget and the capital goods imported. Simultaneously, imports of primary goods, intermediate and consumer goods rose 7 percent from 1978 to 1982 while real GDP fell 23 percent (See Table 2.2).

The exchange rate was obviously one important factor in the increasing level of imports. The overvalued Rial made imported goods cheaper compared to domestically produced goods. The inflation of 20 percent or more raised the prices of the goods made in Iran, and the depressed official exchange rate, which had changed less than 5 percent per annum, made imported goods more attractive to Iranian

buyers. The cost of this policy was the loss of one third of the Iranian industry market share by domestic producers (Launtnschlager, 1986, p. 42-3).

Modern large scale industries experienced a rapid growth in the period 1973-77 while they suffered in the post revolution period. The decline in industrial production was partly due to the general economic deterioration as well as instabilities inside the factories after the revolution. It was also government policy to curtail development spending (Launtnschlager, 1986, p.43). The progress of many large projects such as the Mobarakee Steel Mill, Sarcheshmeh Copper Complex (the second largest copper production complex after Chile) and Ahvaz Steel Mill were slowed down or completely stopped. Some observers such as Launtnschlager (1986) and Pesaran (1992) believe that among all the factors contributing to serious macroeconomic imbalances and decline in development investment, the overvalued Rial was dominant.

The investment direction in Iran could be divided into two distinctive periods; the former Shah's era and the post revolution years. Nonetheless, both these periods have one common characteristic: the investment trends were by and large affected by oil prices in the world markets and revenues from oil exports.

After the revolution, Iranian statesmen and policy makers favoured a highly regulated and centralised economy. Besides the turmoil resulting from the revolution, regional and international factors, such as the Iran-Iraq war and oil crises, required strict regulations and encouraged the intervention of government to manage the economy. Shortfalls in oil revenues and increased expenditures curtailed investment and development expenditures.

In addition to external elements, the domestic policies of the government played a dominant part in diminishing investment. Keeping the exchange rate overvalued made imports more cost efficient compared to locally produced goods. The unstable

monetary policy and long run unrealistic official exchange rates aggravated uncertainty inside the economy.

In any situation, a high level of uncertainty reduces the propensity to invest. Uncertainty increases the possibility that highly productive capacity installed today will be of no use tomorrow, if economic conditions deteriorate sharply. As a result, managers prefer to wait for the uncertainty to end rather than invest today. In these circumstances, low investment occurs today and it increases the probability of economic deterioration tomorrow. This framework is convenient for investigating whether variables such as the real exchange rate, foreign exchange availability, the external debt burden and finally public investment should have a significant bearing on the investment decision. One reason which caused the aims of the first plan to remain partially unfilled is economic uncertainty- that also continued after the war. This factor discouraged private investors.

The next chapter reviews a number of investment studies in developed and developing countries. These studies identify economic variables which influence private investment. They also recommend a number of alternative economic policies towards an open market economy. These policies can promote certainty and stability of the economy as well as increase the attractiveness of investment decisions.

2.5. Appendix

Table 2.1. Composition of Iranian Exports 1970-1992

Million US\$

Year	Oil & Gas Exports		Non-oil Exports		Total Exports
	Amount	Percent	Amount	Percent	Amount
1970	1662	63.4	961	36.6	2623
1971	1873	49.0	1952	51.0	3825
1972	3364	88.4	440	11.6	3804
1973	5454	89.6	635	10.4	6089
1974	20999	97.3	581	2.7	21580
1975	19520	97.1	592	2.9	20112
1976	22041	97.6	540	2.4	22581
1977	25319	97.6	625	2.4	25944
1978	20159	97.4	543	2.6	20702
1979	17765	95.6	812	4.4	18577
1980	11870	94.8	645	5.2	12515
1981	9179	96.4	340	3.6	9519
1982	16656	98.3	284	1.7	16940
1983	17381	98.0	357	2.0	17738
1984	11141	96.9	361	3.1	11502
1985	11954	96.3	465	3.7	12419
1986	7464	89.1	916	10.9	8380
1987	9898	89.5	1161	10.5	11059
1988	7313	87.6	1036	12.4	8349
1989	10189	90.7	1044	9.3	11233
1990	13739	90.7	1411	9.3	15150
1991	14275	84.5	2613	15.5	16888
1992	16376	89.8	1859	10.2	18235

Source: World Table, The World Bank, Year 1992-94

Table 2.2. Composition of Iranian Imports 1970-1992

Million US\$

	Intermediate Goods		Capital Goods		Consumer Goods		Total
Year	Amount	Percent	Amount	Percent	Amount	Percent	Amount
1970	1057.1	63.8	386.4	23.3	214.5	22.9	1658
1971	1341.6	64.8	484.8	23.4	242.6	11.7	2069
1972	1596	62.1	642	25.0	332	12.9	2570
1973	2274	60.9	906	24.2	557	24.9	3737
1974	4266	64.5	1331	20.1	1017	25.4	6614
1975	6212	53.1	3489	29.8	1995	17.1	11696
1976	6713	52.6	3803	29.8	2250	17.6	12766
1977	7910	54.1	4019	27.5	2697	19.4	14626
1978	5350	51.6	2908	28.0	2114	20.4	10372
1979	5301	54.7	1835	18.9	2559	27.4	9695
1980	6207	57.2	1738	16.0	2899	27.7	10844
1981	8225	60.9	2149	15.9	3141	23.2	13515
1982	6861	57.9	2308	19.5	2676	22.6	11845
1983	10840	59.9	4352	24.0	2911	16.1	18103
1984	8310	57.3	3867	26.7	2317	16.0	14494
1985	7411	65.0	2421	21.2	1576	13.8	11408
1986	5461	58.4	2199	23.5	1695	18.1	9355
1987	5498	58.7	2209	23.6	1662	17.7	9369
1988	4829	59.1	1869	22.9	1479	18.1	8177
1989	7548	58.9	2915	22.8	2344	18.3	12807
1990	11854	63.3	4363	23.3	2505	13.4	18722
1991	16325	55.0	9911	33.4	3441	11.6	29677
1992	14544	60.0	6545	27.0	3151	13.0	24240

BPO (1994)

Table 2.3. Composition of Government Revenue 1970-1992

Billion Rials

Year	Revenue			Expenditure	Deficit	Share	Share
	Oil export	Tax	Total	Total	or Surplus	of 1 in 3 Percent	of 5 in 4 Percent
	1	2	3	4	5	6	7
1970	85.6	70.6	182.4	221.1	-38.7	46.9	-17.5
1971	155.3	82.2	258.3	315.4	-57.1	60.1	-18.1
1972	178.2	102.6	302.1	401.5	-99.4	59.0	-24.8
1973	311.3	131.2	465	531.4	-66.4	66.9	-12.5
1974	1205.2	157.8	1394.9	1174.4	220.5	86.4	18.8
1975	1246.8	270.8	1582.1	1496.2	85.9	78.8	5.7
1976	1329	342.8	1743.8	1675.4	68.4	76.2	4.1
1977	1590.3	443.6	2126.7	2174.9	-48.2	74.8	-2.2
1978	1013.2	465.9	1699.3	2044.2	-344.9	59.6	-16.9
1979	1219.7	368.3	1791.8	2018.2	-226.4	68.1	-11.2
1980	888.8	340.4	1348.7	2249.3	-900.6	65.9	-40.0
1981	1056.4	554.1	1821.4	2707.1	-885.7	58.0	-32.7
1982	1689.5	613.9	2517.7	3166.3	-648.6	67.1	-20.5
1983	1779.4	796.5	2794.3	3671.7	-877.4	63.7	-23.9
1984	1373.2	898.7	2726.6	3353.6	-627	50.4	-18.7
1985	1188.7	1033.7	2691.4	3350.7	-659.3	44.2	-19.7
1986	416.8	1024.6	1781.9	3156.8	-1374.9	23.4	-43.6
1987	766.2	1030.2	2210.8	3640.6	-1429.8	34.7	-39.3
1988	667.9	986.5	2098.9	4210.6	-2111.7	31.8	-50.2
1989	770.8	1187.9	3181.4	4316.7	-1135.3	24.2	-26.3
1990	1118.3	1695	5638.5	6051.1	-412.6	19.8	-6.8
1991	1038.7	2765	7003.4	8121.9	-1118.5	14.8	-13.8
1992	5141.3	3773.4	9959.6	10976.4	-1016.8	51.6	-9.3

BPO (1994)

CHAPTER 3:
A REVIEW OF THE LITERATURE:
FACTORS DETERMINING INVESTMENT

3.1. Introduction

Investment expenditure plays a significant role in the economy. Investment is a component of aggregate demand and hence it is an important determinant of the general level of economic activity. A small change in the rate of investment expenditure can create much larger fluctuations in national income, employment and other aggregate economic data. These fluctuations in national economic activities have major implications for government economic policies. Investment and development have a strong relationship with each other (Dornbusch and Fischer 1994). Without investment or capital formation, progress and development are not possible. Investment spending provides the basis for economic growth and improves national capacity and productivity. The growth of economic productivity and capacity can produce more output for domestic needs and also promote the export of goods.

The above effects are even more important in the context of developing countries where the availability of finance emerges as one of the main economic bottlenecks. Aggregate investment usually results from the decisions of individual firms. This definition raises the question of whether the theories of investment should be related to individual firm's decisions or be treated as an aggregate economic variable. In

other words, the question is whether the focus of investment theories should be microeconomic or macroeconomic. Most of the investment theories which are reviewed in this study analyse the macroeconomic side of investment behaviour.

Many theories of investment have been developed to examine investment behaviour in developed and developing countries. The aim of this chapter is to review the main investment theories with special attention to the investment theories that focus on developing countries. Also, this chapter attempts to summarise the major private investment determinants which have been identified in the literature.

This chapter proceeds as follows. In the next section (section 3.2), investment theory in the context of developed countries is reviewed. In the following sections the classical, Keynesian and neoclassical approaches to investment behaviour in an open economy are discussed. Based on the IS-LM model, a theoretical macroeconomic model is reviewed in section 3.3. The contribution of private investment within the whole economy is explained in this section. Section 3.4 reviews investment studies conducted in the context of developing countries. This section presents, amongst others, the views of the International Monetary Fund and the World Bank regarding the investment function in developing countries. The role of public expenditure in encouraging or crowding out private investment spending in developing countries is also considered in this section. Section 3.5 summarises the main factors that have been found to influence the investment decision and finally section 3.6 presents the major conclusions to be derived from this chapter.

3.2. Investment theory and developed countries

Classical economists⁷ analysed how output, employment, prices and growth are determined in a modern market economy. They believed that market economies are

⁷ "Classical refers to writers such as Adam Smith, David Ricardo and Karl Marx who used largely non-marginalist methods of analysis (the so-called 'surplus approach'), as opposed to the Neoclassical writers

in equilibrium and work best if left to themselves. They argued that the price, wage, and interest rate mechanisms operate efficiently and economic agents, firms and households, respond to these mechanisms. This approach was criticised by Marx, Keynes and many others. Keynes argued that the economy is not always in equilibrium at full employment. "He advocated the use of government fiscal and monetary policies to influence effective demand in order to maintain full employment" (Taslim and Chowdhury 1995). The Neoclassical economists claim that individuals act rationally in their self-interest while government intervention will make things worse. They emphasised the potential efficiency of the price mechanism but conceded that it did not always operate at its full potential (Cobham 1987). We briefly consider the major determinants of investment from these different schools in the following section.

3.2.1. Classical Investment Approach

The foundations of capital theory were laid down by the classical economists. For the first time Adam Smith (1776) asserted that profit is the result of risk and is also related to the interest rate over a period of time. He argued that increased wealth is a result of savings and investment in fixed capital. Savings via changes in the rate of interest always translate into more or less investment spending. Peterson (1988) explained that the interest rate in the classical thought is the nexus that unites decisions to abstain from consumption (i.e. savings) with decisions to provide for future consumption (i.e. investment). This view is still the core of investment theory. The Ricardo labour theory of value, as a traditional classical assumption, argues that the value of commodities is determined by the labour hours required to make them. Ricardo explained the relationship between wages and profit in the context of the labour theory of value and claimed that wages and profit are often in conflict. He believed that the capital stock and technical progress are limited so that

who used marginalist methods and propounded marginal theories of value and distribution ..." (Cobham 1987).

when wages rise, profit must decrease and vice versa. He conducted a debate over the substitutability of labour and capital as factors of production.

Karl Marx (1954) criticised the traditional classical arguments. He argued that producers sell goods for their full labour value but pay labour subsistence wages. These wages can only pay for labour's essentials to survive. This surplus value provides the basis for capital accumulation in industrialised countries. He argued that the economies of the industrialised world are based on this accumulation of capital and calls this economic system, Capitalism. Marx also argued that an inevitable decline in the profit rate will require further cuts in wages in capitalist countries. Individual firms maximise their profits by greater investment in modern machinery. This profit maximisation increases output while it does not increase wage and/or employment rates. Consequently business cycles are inevitable in the capitalist economy.

Alfred Marshall (1890), the founder of marginalist economics, describes how each extra unit of capital increases output, but that increase is diminishing. In a perfectly competitive factor market for capital, Marshall asserts that capital should be increased in the production sector until the marginal cost of capital will be equal to the value of output which is yielded by a unit of extra capital investment. He also maintains that the demand for capital goods continues as long as the return on capital exceeds the market interest rate (Castle 1991, pp. 39-43). From the marginalist approach, in a perfectly competitive factor market for capital, investment is mainly determined by two factors. First, the cost of capital which is measured by the interest rate, and second the value of output which is increased by a unit of new capital investment.

In brief, the classical theory of investment and the marginalist approach primarily identified the optimum capital stock rather than its contribution to the economy. The

classical economists argue that aggregate income is equal to aggregate investment plus aggregate consumption. They believed that aggregate income is equal to output. Based on Say's law, the economy is always in equilibrium and full employment with investment equal to savings. Moreover, this equilibrium is stable. They believed that disturbances between saving and investment can deliberately be adjusted by the interest rate through the mechanism of market forces.

3.2.2. Keynes' Investment Approach

The effects of the Great Depression of the 1930s created a big challenge for the classical economists. Keynes (1936), in contrast to the classical theorists who believed that investment was a function of the interest rate, argued that entrepreneurial expectations or animal spirits can also raise or lower investment demand. He argued that a reduction in the interest rate cannot generate full employment while the economy is trapped in a less than full employment situation in the long term. He believed that a simple relationship between investment demand and the interest rate defies the importance of expectations. According to Keynes' theory, investment decisions depend on the gap between the marginal efficiency of capital and the current rate of interest. If the marginal efficiency of capital is higher than the market rate of interest, the demand for capital goods increases as the new investment is profitable. Therefore, the rate of investment is determined by the gap between the marginal efficiency of capital and the interest rate. When the marginal efficiency of capital (in general) is equal to the market rate of interest, the firms' capital stock is in equilibrium. We can also derive a relationship between the marginal efficiency of capital and the stock of capital. If firms are maximising profits, they will use more of a given factor as its price relative to other factors decreases. Holding other prices and output constant, this gives a negative relationship between the marginal efficiency of capital and the stock of capital (Evan 1969, p. 76).

From Keynes' point of view, the income of firms in the future, the main determinant of the marginal efficiency of capital, depends on a number of predicted factors. Price and potential demand for output are two important factors which affect the marginal efficiency of capital and demand for capital stock. An increase in aggregate demand raises the future expected return on investment and increases the marginal efficiency of capital. In this situation an excess demand for output, as well as expectations for an increase in demand, positively encourages investment decisions. Therefore, the expectations of future events have important effects on the marginal efficiency of capital and investment behaviour. Furthermore, the type and quantity of the stock of capital can change the marginal efficiency of capital during the lifetime of the capital asset. A large volume of capital stock requires a large quantity of replacement investment and therefore it diminishes net investment and vice versa. Finally, wage changes and psychological expectations are the other factors that affect the marginal efficiency of capital and demand for capital stock.

Keynes argued that the economy does not often operate at full employment and does not fully utilise resources and capacities. He advocated the use of government fiscal and/or monetary policies to intervene in the economy in recession periods, to increase aggregate demand and alleviate an economic depression. These policies are implemented through a government budget deficit which is funded by an increase in the money supply, bonds or other financing instruments including overseas borrowing. Keynes believed that income redistribution, as a part of fiscal policy, increases aggregate demand as well as investment expenditure. He claimed that monetary policy would tend to be weak, and the interest rate would not have a major role in changing the demand for investment during an economic depression. He believed that the most important factor in changing investment demand was the expectations of producers about the future. When investors are pessimistic about the future of the economy, i.e. the marginal efficiency of capital declines, a very low rate of interest is not sufficient to ensure that aggregate demand for investment will exceed

total savings. Producers who are not confident of selling their excess supplies of goods at reasonable prices will not speculate on any interest rate (Eatwell 1987, p. 981).

In brief, the demand for capital goods in an individual firm depends upon a number of other factors besides the interest rate. Individual firms maximise their expected profits from their capital assets. Expected profits depend upon present and future prices, sales and the cost of factors of production. Also, each level of technology determines a definite relationship between the input, and its influence on the organisation. Individual firms can demand excess capital as long as the average price of capital goods is less than the discounted value of their anticipated earning stream in the future (Klein 1966, pp. 62-3). Furthermore, an improvement in technology would increase the marginal efficiency of capital, therefore increase capital investment demand (Beardshaw 1992, pp. 316-20).

3.2.3. Neoclassical Investment Approach

The neoclassical theory of investment was introduced by Irving Fisher (1930) and developed by Hirschliefer (1958,1970), Bailey (1959), and Witte (1963). They assert that the demand for capital goods is based on profit maximisation and on the lag or lags of the capital stock. The most influential neoclassical approach to investment theory is presented by Jorgenson (1967 and 1971). He presents the theory of optimal capital accumulation. The optimal capital accumulation is achieved by maximising the utility of a stream of income.

In the above study Jorgenson assumes that any level of technological possibilities results in a quantity of production from the flow of labour, capital services and materials. The present value of a firm is defined as the integral of the discounted future revenues less discounted future costs in both fixed and current capital. This maximisation is subject to two conditions; the first condition is the production

function which depends on the flow of capital, labour services and the flow of output. The second condition of this maximisation depends on the rate of depreciation. He concludes that the desired capital stock results from changes in the interest rate while the prices and quantity of output are assumed to remain constant. The level of investment is negatively related to the rate of interest. Desired capital in the Jorgenson model is also a function of output, availability of finance (which could be divided into internal funds or liquidity and external funds or the cost of capital) and the price of capital services (which depends on the rate of return, rate of depreciation, rate of growth of capital prices and tax structure). The Jorgenson model is not concerned with the risks and uncertainties of future income on investment. It is assumed that a perfectly competitive capital market usually exists in any investment market. This assumed market is also free of tax and transactions costs. Furthermore, information in this market is available and it is equal for all members.

3.2.4. Keynesian Investment Approach

Keynes' investment approach was developed by Tobin and other followers. Tobin (1969) explains investment behaviour through the gap between the desired capital stock and the actual stock of capital in each period by a ratio which is known as Tobin's q . He argues that the desired capital stock depends on the ratio of the marginal efficiency of capital to the real interest rate. This ratio shows the market value of a unit of capital to its replacement cost. In other words Tobin's q ratio is the market value of a one dollar installed capital commodity to its cost of replacement. When Tobin's q ratio is greater than one, it promotes new investment incentive and when this ratio is less than one, purchasing second hand capital is preferred to buying a new machine. This is because in such circumstances the cost of installed capital stock is lower than the cost of similar new capital goods (Tobin 1969). We consider this approach once again in the next section.

Ott et al. (1975) describe another investment model. They argue that if net investment is the rate of change in the capital stock, the decision to invest (to change the capital stock) depends on changes in the desired stock of capital. Investment will be made when the actual stock of capital differs from the desired capital stock. Based on the theory of the firm they argue that the optimum capital stock, is determined in the process of maximising the present value of the firm. The present value of the firm is the gain from the present value of a stream of net proceeds (total revenue less labour cost, gross investment and tax) subject to two conditions; the first condition is the production function which depends on the flow of capital and labour and the second condition is related to the rate of capital depreciation. They conclude that gross business fixed investment (I) is a function of the real cost of capital (c/p), output (Y), rate of change of output (dY) and the existing stock of capital (K).

$$I = Y[d(\frac{Ap}{c})] + (\frac{Ap}{c})dY + \delta K$$

Where (δ) is the rate of depreciation and (A) is a constant. They conclude that gross investment is positively changed by output, the change of output and the existing stock of capital and negatively influenced by the real cost of capital (Ott et al. 1975, pp. 93-105)

Haines (1978) introduces a number of accelerator models of desired capital stock. These accelerator models state that gross investment is proportional to output changes (ΔY) or liquidity changes (ΔL) or changes in the stock market valuation (ΔV) of companies in the previous periods.

$$I_t = a_0 + a_1 \Delta Y_{t-n} + \delta K_{t-1} + a_2 i_t + u_1$$

$$\text{Or } I_t = b_0 + b_1 \Delta L_{t-n} + \delta K_{t-1} + b_2 i_t + u_2$$

$$\text{Or } I_t = c_0 + c_1 \Delta V_{t-n} + \delta K_{t-1} + c_2 i_t + u_3$$

$$n=0, 1, 2, \dots$$

He concludes that gross investment is related to the lag of output, capital stock and the interest rate (i). He also suggests that the consumer price index, or the index of capital stock prices is another variable which could explain fluctuations of gross investment. He used British annual data for 1955-70 to estimate the following investment equation.

$$I_t = a_0 + a_1 I_{t-1} + a_2 \Delta Y_{t-1} + a_3 Y_{t-2} + a_4 \Delta i_{t-1} + a_5 i_{t-2} + u_t$$

The results show that the coefficients of changes in output and capital stock are positive and they are significant at the 95 percent level. Also, another estimation (using the same data) shows that private investment is positively related to changes in liquidity and the capital stock but the coefficients are not statistically significant. He also presents the following investment equation for Britain using quarterly data for the period 1956-67. In this respect, private investment was a function of output in the last 3 and 4 periods, the interest rate and its changes in the seventh and sixth period before respectively, and the lag of private investment.

$$I_t = a_0 + a_1 I_{t-1} + a_2 \Delta Y_{t-3} + a_3 Y_{t-4} + a_4 \Delta i_{t-6} + a_5 i_{t-7} + u_t$$

The results show that the coefficients for the interest rate and its change have negative signs and the other coefficients are positive. The coefficients of lagged investment, output and change of output are not statistically significant (Haines 1978, pp. 126-140).

Wallis (1979) developed the Jorgenson theory of investment. He suggests an accumulation of capital model based on the firm's actions to maximise its net wealth which is the present value of all its future net cash flows. In this respect, gross investment is modified as:

$$I_t = \alpha_1 P_t^\# + \alpha_2 Y_t^\# + \gamma I_{t-1}$$

Where $P^\#$ and $Y^\#$ are components of current and lagged prices and output as follows:

$$P_t^\# = P_t - (1-\delta)P_{t-1}$$

And $Y_t^\# = Y_t - (1-\delta)Y_{t-1}$

From this point of view, investment expenditure is affected by the present and lagged values of prices and output and also the lag of investment expenditure.

Erenburg (1993) studied the effects of public investment on private investment in the USA. He uses a two-equation technique with non-linear parameter restrictions. He argues that private investment spending (PI) is crowded in by lags of public investment (GI) and crowded out by government budget deficits (GD) and it is also related to the lag of private investment and capacity utilisation (CU). He assumed that public investment is an endogenous variable and it is related to its lags and the lags of government deficits:

$$PI_t = a_0 + a_{1n}GI_{t-n} + a_{2m}GD_{t-m} + a_3PI_{t-1} + a_4CU_t + u_{1t}$$

$$GI_t = b_0 + b_{1n}GI_{t-n} + b_{2m}GD_{t-m} + u_{2t}$$

$$n=1,2,\dots \quad m=1,2,\dots$$

The above model was applied to USA annual data for the years 1947-85. The estimation shows that private investment in the USA is positively related to the first lag of public investment. This result does not accept the crowding out effect of public investment against private investment. This article shows that government deficits influence private investment but this relationship is not statistically significant.

Monadjemi (1993) considers the effects of government spending on private investment in Australia and the USA using quarterly data for the years 1974-87. This study is based on a single equation model. He argues that private investment (PI) is a function of the money stock (M), foreign output (Y^*), taxes (T), foreign interest rate (R^*), price level (P), potential output ($Y^\#$), public investment (GI), public current expenditure (GC) and lagged private investment.

$$PI = f[M, Y^*, T, R^*, P, Y^\#, GI, GC, PI_{-1}]$$

The results of this estimation are different for Australia and the USA. Private investment is crowded out by public investment but not by public current expenditure in Australia. In the USA, public current and capital expenditure crowd out private investment but the coefficient of public investment is weak and statistically insignificant.

The investment models considered above relate to developed countries, and can be summarised as follows. The classical economists believed that investment is a function of profit which is affected by the interest rate. Keynes advocates that the marginal efficiency of capital determines investment. He insists that government intervention increases aggregate demand and encourages investment while the economy does not operate at full employment and full capacity. He believes that the expectation of investors about the marginal efficiency of capital (or the capital rate of return) in the future is the key element in this regard. The neoclassical economists recognise that maximising profit is the most important determinant of investment. Tobin modifies the investment behaviour through the market value of installed capital. These economic studies investigate investment behaviour in investment models in developed countries. In the next section, a theoretical macroeconomic model is outlined to study the interactions of aggregate variables on private investment and vice versa. This study is based on a substantially expanded open economy IS-LM model

for a developed economy. The next section analyses investment behaviour in developed countries through a macroeconomic model. This recent study shows the crowding out, or in, effects of public current and capital expenditure on private investment.

3.3. A Theoretical Macroeconomic Model

Harvie and Kearney (1995) have developed a theoretical macroeconomic model based on a substantially expanded open economy IS-LM model. They designed their model for a developed economy to show the effects of macroeconomic variables and especially public current and capital expenditure on private investment. This section reviews this macroeconomic model. All variables of the model, except the domestic and foreign interest rates, are in logs.

The model is presented in Table (3.1) on the next page. Equation (3.1) shows a standard IS equation for an open economy. Equations (3.1)-(3.6) outline the goods market or aggregate demand (YD) and its components; private investment (PI), private consumption (PC), public investment expenditure (GI), public current expenditure (GC) and net exports (NX), which is exports minus imports, in the product market. According to equation (3.1) aggregate demand is affected by private investment, private consumption, public current and capital spending and net exports. Private investment is an important determinant of output and economic growth. This variable, in equation (3.2), is positively related to the market valuation relative to the replacement cost of capital goods which is known as Tobin's q . Tobin's q is a crucial component of this model which is affected by equity prices. As mentioned in section 3.2.4, Tobin's q ratio is the market value of a one dollar installed capital commodity to its cost of replacement. When Tobin's q ratio is greater than one, it promotes new investment incentive and when this ratio is less than one, it discourages new capital investment.

Private consumption, equation (3.3), depends upon output production or aggregate supply (YS) and is positively affected by private wealth (PW). The lag of private consumption on the right hand side of this equation and the lag of public current

Macroeconomic Model

Product Market

$$YD_t = a_{10} + a_{11}PI_t + a_{12}PC_t + a_{13}GI_t + a_{14}GC_t + a_{15}NX_t + u_{1t} \quad (3.1)$$

$$PI_t = a_{20} + a_{21}q_t + u_{2t} \quad (3.2)$$

$$PC_t = a_{30} + a_{31}YS_t + a_{32}PW_t + u_{3t} \quad (3.3)$$

$$GI_t = a_{50} + a_{51}(GK_t^* - GK_t) + u_{4t} \quad (3.4)$$

$$GC_t = \overline{GC}_t \quad (3.5)$$

$$NX_t = a_{60} + a_{61}YD_t + a_{62}YF_t + a_{63}(e_t - p_t) + u_{6t} \quad (3.6)$$

Money and Asset Market

$$m_t - p_t = b_{10} + b_{11}YD_t - b_{12}r_t + u_{7t} \quad (3.7)$$

$$R_t = b_{20} + b_{21}YS_t - b_{22}PK_t + b_{23}GK_t + u_{8t} \quad (3.8)$$

$$\overset{\circ}{q}_t = b_{30} + b_{31}q_t - b_{32}R_t + b_{33}(r_t - \pi_t) + u_{9t} \quad (3.9)$$

$$PW_t = b_{40} + b_{41}(PK_t + q_t) + b_{42}(f_t + e_t - p_t) + u_{10t} \quad (3.10)$$

$$\overset{\circ}{f}_t = b_{50} + b_{51}NX_t + b_{52}r_t^* f_t - b_{53}(e_t - p_t) + u_{11t} \quad (3.11)$$

Price, Wage and Aggregate Supply

$$p_t = c_{10} + c_{11}w_t + (1 - c_{11})e_t + u_{12t} \quad (3.12)$$

$$\overset{\circ}{w}_t = c_{20} + c_{21}(YD_t - YS_t) + c_{22}\pi_t + u_{13t} \quad (3.13)$$

$$YS_t = c_{30} + c_{31}PK_t + c_{32}GK_t - c_{33}(w_t - p_t) + u_{14t} \quad (3.14)$$

Definitions

$$\overset{\circ}{m}_t = \pi_t \quad (3.15)$$

$$\overset{\circ}{e}_t = r_t - r_t^* \quad (3.16)$$

$$c_t = e_t - w_t \quad (3.17)$$

$$l_t = m_t - w_t \quad (3.18)$$

A dot ($\overset{\circ}{}$) above a variable signifies its rate of change.

expenditure in the next equation can be added for a dynamic study of those aggregate elements. Public investment arises from a gradual adjustment of the actual public capital stock (GK) to its policy determined level (GK^*). Public current expenditure is an exogenous policy determined variable. Net exports are affected by aggregate demand, foreign income (YF) and the real exchange rate. The latter is the nominal exchange rate (e) deflated by the domestic price level (p).

Asset market equilibrium is assumed to hold continuously. That is the markets for domestic money, bonds, equities etc are in equilibrium throughout. The money and asset markets are explained by equations (3.7)-(3.11). The demand for real money balances, the nominal money stock (m) deflated by the domestic price level, is positively related to aggregate demand and negatively to the interest rate. The real return on private capital services (R) in equation (3.8) is positively influenced by aggregate supply and negatively related to the private capital stock (PK) because of diminishing marginal productivity. The public capital stock (GK) and private capital stock are assumed to be complementary in nature. Thus, more public investment (especially more infrastructure investment) enhances the productivity of the private capital stock and increases private capital returns. Changes in Tobin's q in equation 3.9 are related to the level of q , the real return on private capital services and the gap between the interest rate and the expected inflation rate (π). It is also negatively affected by the real return on private capital. Private wealth in equation (3.10) depends upon the market value of the private capital stock which is estimated by the physical capital stock multiplied by Tobin's q , and the real domestic currency value of domestically held foreign assets. Equation (3.11) shows that the current account depends on net exports, foreign interest income (r^*f) and the real exchange rate.

Price, wage and aggregate supply determination are given by equations (3.12)-(3.14). The domestic price level is a weighted average of nominal wages (w) and the nominal exchange rate. In equation (3.13), the gap between aggregate demand and aggregate

supply determines nominal wage dynamics (\dot{w}). Also, according to the augmented Phillips curve, the change of nominal wages is affected by inflationary expectations. Aggregate supply, in equation (3.14), depends positively on both the private and public capital stock and negatively upon the real wage.

Definitions used in the model are presented in equations (3.15)-(3.18). It is assumed that the monetary growth rate (\dot{m}) is equal to expected inflation. Also, changes in the nominal exchange rate depend upon the difference between the domestic and foreign interest rates so as to maintain the uncovered interest rate parity condition. Finally, the real exchange rate (c) and real money balances (l) are defined for expository purposes.

In brief, the above model shows that private investment contributes to aggregate demand and is affected by those factors which affect Tobin's q ratio. A higher Tobin's q ratio is reflective of higher equity prices which promotes private investment. Also higher aggregate supply and a higher level of wealth increase private consumption and create better opportunities in favour of private investment through a higher level of private consumption. The critical issue of the crowding out effect of public expenditure can be examined in this model. The effects of public current and investment expenditure on private investment are separately considered in the model. A higher level of public capital stock increases the return on private capital and causes a higher Tobin's q ratio and eventually increases private investment. This is because public investment and private investment are assumed to be complementary in nature. Expected capital investment by government through development plans determines public investment. Foreign income and the real exchange rate through net exports influence aggregate demand as well as private investment.

The demand for real money balances positively depends on aggregate demand and negatively to the interest rate. The return on private capital is increased when aggregate supply and/or the public capital stock increases, and it is negatively related to the private stock of capital because of its depreciation. Changes in Tobin's q comes from the difference between the interest rate and the expected inflation rate and also relates to the return on private capital. An increase in private wealth through Tobin's q ratio and the level of real money balances, increases private consumption and aggregate demand. In addition, the impact of nominal wage, domestic price level and money equilibrium on aggregate demand and private investment are considered in the model.

The aforementioned model can be adopted for developed countries, whilst there are a number of deficiencies in the characteristics of and the literature about developing countries which deters the adaptation of the model in its entirety. In particular, regarding the factors influencing investment, the absence of perfect asset and money markets is a major factor. There is rarely an active stock exchange centre in developing countries. Free exchange of domestic currency and foreign currencies is usually banned and domestic currency is kept overvalued by the government to slow down the inflation rate.

The strong role of government in the economy is another deficiency in developing countries. The interest rate for investment in manufacturing is maintained much lower than the market rate in order to encourage private investment in these countries. Economic data such as for international debt, capital stock, nominal wages, the market rate of capital stock or Tobin's q ratio and many other data and information does not exist, or the existing data is irrelevant or difficult to calculate. There are many conceptual difficulties between the economies of developed and developing countries; e.g. many economic activities and big enterprises belonging to the government in Iran are managed by separate foundations and organisations. These

associations widely operate between public and private sectors and it is difficult to classify them as public or private. In the next section empirical results relating to investment behaviour in developing countries will be reviewed.

3.4. Investment theory and developing countries

The International Monetary Fund (IMF) and the World Bank (WB) have considered the determinants of private investment in developing countries more than others in the last two decades. They raise a number of questions: "How does private investment respond to changes in government policy, not only in designing longer-term development strategies, but also in implementing shorter -term stabilisation programs?" (Blejer and Khan 1984a). Also, if it can be assumed that increasing private investment will increase output, what factor or factors influence private investment in developing countries? The IMF and WB economists have also studied the restrictions in these countries on investment and recommended several economic policies that will promote private investment in these countries. A number of the IMF and WB studies, [e.g. Sundararajan and Thakur (1980), Tun Wai and Wong (1982), Blejer and Khan (1984), Khan and Reinhart (1990), Faini and Melo (1990), Greene and Villanueva (1990,1991), Pfeffermann and Madarassy (1991), and Serven and Solimano (1992)] adapt a number of empirical investment models for developing countries. The main issues arising from the above studies and also those of Vernardakis (1978), Love (1989), Vaez-Zadeh (1991), Noferesty and Arabmazar (1994), and Cardoso (1993) are considered in this part. This review is presented in order of the publication year of each article.

Vernardakis (1978) attempts to describe the development of the Greek economy during the period 1953-66. He presents investment functions in five separate sectors; namely manufacturing, mining, dwelling, services and agriculture. He argues that private investment in manufacturing (IM) is affected by the stock of capital (KM) and

output (YM), foreign investment (FIM), and the lag of private investment in that sector.

$$IM_t = f(KM_t, YM_t, FIM_t, IM_{t-1})$$

The results of this study show that, except for the sectoral capital stock, the above mentioned factors positively affect private investment but the coefficients of capital stock and output are not statistically significant.

Sundararajan and Thakur (1980) analyse the role of public investment on private investment, saving and economic growth in India and the Republic of Korea. They present a functional relationship between private investment with aggregate savings, output, public investment and several definitional identities. They attempt to show that private investment depends on the capital stock in the public sector and funds available to private investment. These variables capture important channels of influence from public investment to private investment. Private investment behaviour in India and the Republic of Korea are formulated by the following equations respectively:

$$PI_t = f[PY_t, PY_{t-1}, (\frac{S_t - GI_t}{P_t}), (\frac{U}{W})_{t-1}, (\frac{U}{W})_{t-2}, PK_{t-1}, GK_{t-1}]$$

$$PI_t = f[Y_t, (\frac{S_t - GI_t}{P_t}), PK_{t-1}, GK_{t-1}]$$

Where (PI) is the real gross fixed investment by the private sector, (Y) and (PY) are the real GDP and real private sector GDP. (S) is nominal aggregate savings, (GI) is public investment at current prices, (P) is the deflator for public fixed investment, (U) is user cost of capital (interest rate plus depreciation), (W) is the real wage rate, (PK) and (GK) are the real capital stock in the private and public sectors respectively. He argues that the differences between the above models arise from dissimilarities in economic structure and lack of data.

They estimate the above single equation models with data for India for the years 1960-76 and the Republic of Korea for the years 1958-76. The results support the view that public investment crowds out private investment because it constrains the availability of financial resources to the private sector. This crowding out effect is much larger in India than in the Republic of Korea. The latter result supports the view that where the availability of finance is lower (in this case India compared to South Korea), the crowding out effect of public investment on private investment is higher. They conclude that public investment does not raise total investment in these countries. The response of private investment to changes in output is strong in both countries and the relative cost of capital has a strong positive effect on private investment in South Korea but a weak negative effect in India. These models have at least two shortcomings. Firstly, both models are single equation models and secondly, real and current data are shared in the models at the same time.

Tun Wai and Wong (1982) define an empirical flexible accelerator theory of investment related to five developing countries¹⁰ based on data during the 1960s up to the middle of the 1970s. Two different single equation models are estimated for all these countries. These are:

$$PI_t = a_0 + a_1 PY_t + a_2 \Delta PDC_t + a_3 PCM_t + a_4 PK_{t-1} + u_{1t}$$

$$PI_t = b_0 + b_1 GI_t + b_2 \Delta PDC_t + b_3 PCM_t + b_4 PK_{t-1} + u_{2t}$$

Also, the functions below are estimated for Greece and the Republic of Korea:

$$PI_t = c_0 + c_1 PY_t + c_2 RE_t + c_3 PK_{t-1} + u_{3t}$$

$$PI_t = d_0 + d_1 GI_t + d_2 RE_t + d_3 PK_{t-1} + u_{4t}$$

¹⁰ Greece period (1960-76), Korea Rep. period (1960-75), Malaysia period (1960-76), Mexico period (1965-75) and Thailand period (1961-75).

Where (PI), (PK) and (PY) are investment, capital stock and output in the private sector respectively. (Δ PCD) is the change in bank credit to the private sector. (PCM) is net capital inflow to the private sector. (RE) is private earnings and finally (GI) is public investment.

The results show that public investment and the change in bank credit to the private sector, have an important role and positively affect private investment in the sample.

Blejer and Khan (1984a and b) believe that because of institutional and structural factors present in most developing countries -such as the absence of well-functioning financial markets, the relatively strong role of government in capital formation, foreign exchange constraints and other market imperfections- the assumption underlying the standard optimising investment models are not satisfied in developing countries. Therefore, they develop a flexible accelerator model of investment by adding several other macroeconomic variables. This model of investment is estimated by using annual data for 24 developing countries¹¹ over the period 1971-79. They argue that net private investment (PI) is a function of changes in real output (ΔY), a cyclical factor (GAP), changes in the rate of real bank credit to net private capital flows (Δ DCR) and a lag of net private investment:

$$PI_t = f[\Delta Y_{t-1}, GAP_t, \Delta DCR_t, PI_{t-1}]$$

The effects of public investment on private investment are tested in each of the equations below:

$$PI_t = a_0(Y_{t-1} - bY_{t-2}) + a_1GAP_t + a_2\Delta DCR_t + a_3PI_{t-1} + a_4GIR_t$$

¹¹ The countries in the sample are Argentina, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Haiti, Honduras, Mexico, Panama, Venezuela, Barbados, Trinidad, Turkey, Singapore, The Republic of Korea, Sri Lanka, Malaysia, Indonesia and Thailand.

$$PI_t = a_0(Y_{t-1} - bY_{t-2}) + a_1GAP_t + a_2\Delta DCR_t + a_3PI_{t-1} + a_4GIR_t + a_5\Delta GIR_t$$

$$PI_t = a_0(Y_{t-1} - bY_{t-2}) + a_1GAP_t + a_2\Delta DCR_t + a_3PI_{t-1} + a_4TGIR_t + a_5(GIR_t - TGIR_t)$$

$$PI_t = a_0(Y_{t-1} - bY_{t-2}) + a_1GAP_t + a_2\Delta DCR_t + a_3PI_{t-1} + a_4EGIR_t + a_5(GIR_t - EGIR_t)$$

Where (b) is assumed equal to 0.95, (GIR) is real public sector investment, (ΔGIR) is the change of GIR, (TGIR) is the trend of real public investment and finally (EGIR) is expected real gross public investment. They argue that the neoclassical investment theory is increasingly supported in developing economies. Secondly, the availability of finance and monetary policy directly changes private investment. Thirdly, an expected growing public investment, on average, should increase the rate of private investment. In other words, the traditional belief that public investment crowds out private investment is not proven from these estimations. They assert that a direct empirical link exists between government policy variables and private capital formation. Private investment in developing countries is constrained by the availability of finance, monetary policy and the flow of credit to the private sector. In contrast to neoclassical studies, they conclude that public investment has positive effects on private capital formation in the sample. They recommend that a tightening of monetary policy could reduce the level of private investment, unless the authorities take precautions to allocate sufficient credit to the private sector.

Love (1989) studied the impact of export instability on the domestic economies of twelve developing countries¹² during the 1960s to 1980s. He argues that domestic investment and capital good imports are affected by the export of goods and services and total international reserves (foreign assets) in developing countries. The estimation shows that, except in Colombia and Ethiopia, there is a positive and statistically significant relationship between exports and private investment. Also, the

¹² The countries in the sample are Brazil, Colombia, Costa Rica, El Salvador, Ethiopia, Ghana, Guatemala, Honduras, Mexico, Morocco, Nicaragua and The Philippines.

coefficient sign of foreign assets is different from one country to another; except in Guatemala and Mexico where it is not statistically significant.

Khan and Reinhart (1990) estimate from a cross-section sample of twenty four developing countries¹³ over the 1970s, the relation between private investment and growth in developing countries. They argue that economic growth is a function of the ratio of private investment (PI) and public investment (GI) to output (Y) and growth rates of the labour force (L), exports (X) or imports (IM).

$$\begin{aligned} \frac{\Delta y_t}{y_{t-1}} &= a_0 + a_1 \frac{PI_t}{y_{t-1}} + a_2 \frac{GI_t}{y_{t-1}} + a_3 \frac{\Delta L_t}{L_{t-1}} + a_4 \frac{\Delta X_t}{X_{t-1}} \\ \text{or} \quad \frac{\Delta y_t}{y_{t-1}} &= b_0 + b_1 \frac{PI_t}{y_{t-1}} + b_2 \frac{GI_t}{y_{t-1}} + b_3 \frac{\Delta L_t}{L_{t-1}} + b_4 \frac{\Delta IM_t}{IM_{t-1}} \end{aligned}$$

The estimation results show private investment and domestic investment, growth of the labour force and growth of exports or imports have a positive effect on economic growth while public investment does not have a significant effect on growth. They conclude that private investment plays a dominant role in economic growth compared to gross domestic investment or public investment in developing countries. The results support the notion that private investment has a larger direct effect on economic growth than public investment. They also argue that "despite the growing support for market-oriented strategies, and for a greater role of private investment, empirical growth models for developing countries typically make no distinction between the private and public components of investment." (Khan and Reinhart 1990). In other words, they argue that public investment and private investment are complementary in nature rather than competing with each other.

¹³ The countries in the sample are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Haiti, Honduras, Mexico, Panama, Venezuela, Barbados, Trinidad, Tobago, Turkey, Singapore, The Republic of Korea, Sri Lanka, Malaysia, Indonesia and Thailand.

Faini and Melo (1990) study the debt crisis of developing countries since 1982. This study widely considers the role of exchange rate depreciation and its effect on the growth of output, through its impact on investment. They focus on the effects of the terms of trade, real interest rate, external debt and especially real exchange rate on investment. The data used is for twenty manufacturing exporters, eleven fuel exporters and eighteen primary exporters among developing countries during 1970-86. They estimate an accelerator model in which the real GDP growth (RY), lag of the cost of capital (CK) and lag of the investment ratio are the main determinants of the ratio of private investment to GDP. The models for manufacturing exporters and primary exporters are shown below respectively:

$$PI_t = f[RY_t + CK_{t-1} + D_t + PI_{t-1}]$$

$$PI_t = f[RY_t + RY_{t-1} + CK_{t-1} + D_t + FE_t + PI_{t-1}]$$

Where (D) is the rate of depreciation of capital goods and (FE) is foreign reserve assets to GDP. They argue that the cost of capital in this model is affected by the real interest rate and the real price of capital goods. They also consider the impact of foreign exchange availability, public investment and exchange rate appreciation on private investment. They argue that private investment is positively related to real GDP growth and negatively related to the cost of capital. Foreign exchange availability exerts a positive but statistically weak influence on the rate of private investment. They also assert that public investment does not have any significant effect on private investment, and this result may be because the data does not distinguish between investment in infrastructure and investment by public enterprises. Therefore, they conclude that a relatively small fraction of the fall in private investment is attributable to increases in the cost of capital. The final conclusion is that the output and depreciation rate of the capital stock has a strong effect on private investment. This model assumes that the real exchange rate is an exogenous variable

under government control while in reality, the real exchange rate depends on many macroeconomic factors in developing countries.

Greene and Villanueva (1990,1991) in an empirical study show the most influential factors on private investment in twenty three developing countries¹⁴ over the period 1975-87. The rate of investment to GDP in the sample varied from 26.3 percent in Singapore and 22.2 percent in the Republic of Korea to 5.6 and 5.9 percent in Bolivia and Pakistan respectively. The average rate of private investment in the sample in 1975-81 was 13.2 percent and it decreased to 11 percent during 1981-87.

They argue that the neoclassical flexible-accelerator model which has been widely accepted as a general theory of investment for industrialised countries is by and large hard to test in developing countries. They claim that the main assumption of this theory, such as perfect capital markets and little or no government economic intervention, are not applicable in these countries. Also data and certain variables such as capital stock, real wage, real financing rate for debt and equity are unavailable or inadequate. They postulate that the real interest rate (i), lag of real per capita growth rate (GR), public investment rate (GI), domestic inflation rate (P), lag of the level of per capita income in current US dollar (INC), lag of the debt-service payment to export ratio (DS), and the lag of external debt to GDP ratio (DT) could theoretically affect the ratio of private investment to GDP. They examine the above assumptions in the following model:

$$PI_t = f[i_t, GR_{t-1}, GI_t, P_t, INC_{t-1}, DS_{t-1}, DT_{t-1}, Z_t]$$

Where (Z) is a vector of country dummy variables for each country in the sample.

They argue that their analysis shows, except for public investment, all the above

¹⁴ The countries in the sample are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, India, Kenya, The Republic of Korea, Mexico, Pakistan, Peru, The Philippines, Singapore, Sri Lanka, Thailand, Tunisia, Turkey, Uruguay, Venezuela and Zimbabwe.

variables have a significant effect on private investment. They estimate that the change in the real effective exchange rate has no strong effect on private investment. The real interest rate, domestic inflation and both external debt indicators have negative effects on private investment. The real growth rate and the level of per capita income have a positive relationship with private investment. The real interest rate, GDP per capita and domestic inflation effects on private investment are greater than public investment, debt-services payment and external debt.

They conclude that economic policies, nevertheless, promote and sustain private investment in developing countries. This model has some shortcomings. Some of the variables in this model have a correlation with each other; for example, inflation and external debt. Most of the countries in the sample are relatively more advanced (in terms of economic development) than most developing countries. Therefore the results are biased and could not be extended to all developing countries. The model is ad hoc and there is insufficient theoretical explanation to support it. It is a single equation model of investment which could not be extended to all developing countries. If a single equation model could elaborate private investment in developing countries, we can add some other variables, like the real wage rate and the export of goods and services, which influence private investment in these countries.

Pfeffermann and Madarassy (1991) published the annual private investment data of forty developing countries for the period 1970-89. They showed that on average, private investment increased in developing countries in the first half of the 1980s. Private investment's share of total investment increased in thirty-four of the forty countries in this period. The average share of private investment to total investment increased from 52 percent in 1985 to over 60 percent in 1989. They argue that the increased share of private investment in gross domestic investment, and reduced activity of the public sector, are a reflection of the world crisis and government policy to curb inflation by reducing public deficits.

Vaez-Zadeh (1991) studied the oil wealth and economic behaviour of Venezuela during 1965-81 in an multi-equation model for the whole economy. He argues that real private investment (PI) is a function of real non-oil GDP (NOY), real expected oil wealth (OIL), lag of the real stock of capital (PK) and the opportunity cost of capital (q).

$$PI_t = f[NOY_t, OIL_t, PK_{t-1}, q_t]$$

The estimation shows that real non-oil GDP positively, and other factors negatively, affect private investment. The coefficient of the lagged capital stock is not statistically significant.

Serven and Solimano (1992) reviewed investment studies with emphasis on the application of these studies to developing countries. The effects of exchange rate policy and the relation between public investment and private investment are considered in this study. This study also analyses the importance of financial constraints, imperfection of capital markets and the effect of political instability on irreversible investment decisions. They argue that aggregate economic activity, business cycles and macroeconomic instability affect investment. Finally, they argue that income distribution plays a role in private sector investment.

Noferesty and Arabmazar (1994) present a multi-equation model for the Iranian economy. They present separate investment functions for each economic activity (agriculture, oil, industry and mines, and services) and also each sector (private and public) using data for the period 1959-90. They argue that private investment is a function of GNP, the long term deposit interest rate, government revenue from oil exports in US dollar and lagged capital stock. The estimations show that private investment is positively related to GNP, government oil revenue and negatively

affected by the interest rate and lagged capital stock. The coefficients of GNP and lagged capital stock are not statistically significant.

Latin America's investment share in GDP was 24 percent in the late 1970s falling to 17 percent in the mid-1980s. Cardoso (1993) studied this economic event in Argentina, Brazil, Chile, Colombia, Mexico and Venezuela using data for the years 1970-1981. He believes that the share of private investment to GDP (PI) depends on the growth rate of GDP (y), share of public investment to GDP (GI) and one of: the terms of trade (TT), index of the real exchange rate (EI) or rate of appreciation of the real exchange rate (EA).

$$\begin{aligned} PI &= f(y, GI, TT) \\ \text{or } PI &= f(y, GI, EI) \\ \text{or } PI &= f(y, GI, EA) \end{aligned}$$

The results show that the growth rate of GDP and share of public investment to GDP, have strong positive effects on the share of private investment to GDP. Also, the terms of trade affects private investment negatively but the index of the real exchange rate or rate of appreciation of the real exchange rate do not have a significant relationship to private investment.

3.5. Summary of the Key Variables Affecting Private Investment

This chapter has reviewed a number of investment theories and models that have studied the impact of government policy, public current expenditure, public investment and many other fiscal and monetary policies on private capital formation in developed and developing countries. The stabilisation policy and the effect of economic uncertainty on investment was another aspect which was considered in this chapter. The most influential factors on private investment in both developed and developing countries are summarised below and also shown in Tables 3.1 and 3.2 in the appendix:

a- Real Interest Rate

Most investment decisions involve borrowing money. There is a relationship between the cost of borrowing and demand for investment. When the rate of interest decreases the volume of investment increases. Interest rates reflect the opportunity cost of investment. Raising the real cost of bank credit affects private investment (Blejer and Khan 1984 and Greene and Villanueva 1991). A high real interest rate increases the real cost of capital and dampens the level of private investment. On the other hand, a high real interest rate encourages saving which is the main financial source of investment. Therefore, private investment should be affected by real interest rates. All the above studies support the view that the interest rate is one of the most influential factors upon the private investment behaviour function, both in developed and developing countries.

b- Output

GDP, output, national income and its rate of growth affect private investment. A higher growth of GNP or national income promotes consumption and promises greater profit for producers. Changes in output, as the most important determinant of private investment, is considered in Blejer and Khan 1984a and 1984b, Faini and Melo 1990, Greene and Villanueva 1991 and also Serven and Solimano 1991 and many other studies. The decline in real income causes an unfavourable economic environment and contributes to a decline in private investment (Faini and Melo 1990). A review of the above literature often proved that output or aggregate demand is a key variable which positively affects private investment. Different forms of this factor are used in different investment models such as volume of output, change of output, relative change of output, lag of output, current or real GDP, real growth rate of GDP, non-oil GDP, capacity utilisation or potential output, income distribution level, private output, growth of aggregate demand or their lags. The

results from most of the studies support the view that an increase in output often increases private investment.

c- Income Per Capita

Income per capita is used to adjust for population change. There is a general agreement that income per capita and/or its growth would positively affect private investment. The level and growth of real income per capita would increase private investment activity if the relationship between the level of real output and the desired capital stock is relatively fixed (Greene and Villanueva 1990). Different forms of this factor are employed in various investment models such as per capita income (US\$), growth rate of real GDP per capita or their lags.

d- Availability of Finance

Financial constraints and a low level of savings leads to low investment and therefore low productivity and output in developing countries. The main sources of finance in developing countries are limited to bank credit, foreign borrowing and retained profits. The lump sum of these resources is not sufficient and often less than the expected investment in these countries (Blejer and Khan (1984b)). The rate of return on investment in these countries is typically high, whereas real interest rates on loanable funds are kept low by government for a variety of reasons. Indeed, because the total amount of financing is limited, private investment in developing countries is often restricted by the level of available bank financing (Blejer and Khan (1984b)). Therefore one of the most important factors in economic development is the availability of finance in the form of internal and external funds. Also, the institutional structure of financial markets in developing countries is important in determining the effect of monetary and credit policy on investment (Serven and Solimano 1992). A number of the above investment studies for developing countries nominate real bank credit to the private sector (and its changes, change in the rate of real bank credit, the real net private capital flows or net capital inflow to the private.

sector) as a determinant of the level of private investment in developing countries. Also real savings minus public investment and private earnings are the other sources of finance for private investment.

e- Inflation and Economic Instability

Business cycles and macroeconomic instability and high rates of inflation affect investment (Serven and Solimano 1992 and Greene and Villanueva 1990). High inflation rates are often considered as a sign of instability and inability of government to control the economy and will adversely influence private investment activity by increasing the riskiness of long-term investment projects. On the other hand, investment responds positively to a stable macroeconomic environment (Faini and Melo 1990).

A high level of uncertainty about the future will reduce the incentive to invest. Uncertainty is increased if economic conditions deteriorate. Under these circumstance, investors prefer to wait and watch rather than to invest today. The irreversible nature of investment, which makes private investment sensitive to risk, is affected by changes in economic incentives (Serven and Solimano 1992). Pindyck (1991), Rodrik (1989) and Dornbusch (1988) also emphasise that uncertainty plays a key role in investment decisions because investment is irreversible in the short run, and the irreversibility of investment creates negative incentives for private investment. Faini and Melo (1990), based on capital flight in Latin America, argue that uncertainty about the future leads investors to adopt a wait-and-see attitude. The rate of domestic inflation, consumer price index, GDP deflator, volume of money stock and cyclical factors are different variables that explain the stability or instability of an economy, which could change the level of private investment.

f- Cost of Capital

Investment behaviour depends on the user cost of capital (Jorgenson 1967 and Hall and Jorgenson 1971). The user cost of capital also depends on the price of capital goods, interest rate and rate of depreciation. A number of investment models [e.g. Ott et al. (1975), Sundararajan and Thakur (1980) and Faini and Melo (1990)] employ either the real price of capital goods or its growth rate or even the price index of capital goods for estimating private investment.

g- Stock of Capital

There is a strong argument that the capital stock is an influential factor on private investment in most investment studies [e.g. Ott et al. (1975), Vernardakis (1978), Noferesty and Arabmazar (1994)]. This is due to the fact that the difference of gross investment from net investment is depreciation which is a proportion of the capital stock. If the rate of depreciation is assumed fixed, the volume of depreciation is a function of the existing stock of capital. Domestic capital stock; private or public capital stock, growth, changes or the lagged capital stock are different forms of this variable which apply to determine private investment both in developed or developing countries.

h- Fiscal Policy

There was wide support for public investment in developing countries as being a main engine of development during the 1960s to 1980s. This view has gradually changed in recent years. There is some uncertainty about the effects of public investment as to whether it raises or decreases private investment. In broad terms, public sector investment crowds out private investment if it utilises scarce physical and financial resources that would otherwise be available to the private sector. It also crowds out private investment if its products compete with private output. Eventually, private investment is crowded out by public investment if financing of the public investment is formed by taxes and issuance of debt or creates inflationary pressure because of

shortcomings of resources. On the other hand, public investment that is related to the development of infrastructure and provision of public goods and services can be complementary to private investment. This kind of public investment enhances the productivity of the private sector, decreases the cost of capital and encourages private investment and private output. Therefore, the level and composition of public investment can affect private investment, providing a powerful instrument to encourage or discourage private investment.

This hypothesis has been tested in a number of investment models. These studies argue that the marginal productivity of public sector capital is often negative whereas it is positive for private sector investment. In other words, they argue that an increase in public investment decreases total economic productivity. Also some studies, e.g. Blejer and Khan (1984), argue that public investment is less efficient than private investment. This argument is not supported by many of the above empirical studies. Sundararajan and Thakur (1980) could not find a significant result and Blejer and Khan (1984) reject the crowding out effects of public investment on private investment.

Despite the above results which reject the crowding out effects of public investment on private investment, adjustment programmes involving replacing public investment by private sector investment have been utilised at least for manufacturing exporting countries in recent years (Faini and Melo 1990). Khan and Reinhart (1990) also show that despite the growing support for market-oriented strategies, and for a greater role of private investment, there is no distinction between the private and public components of investment. They argue that it is not possible to ascertain whether an increase in private investment matched by a cut in public investment will help or hurt the rate of growth of output. Public investment competes with the private sector for scarce physical and financial resources and it could have negative effects on private investment. Also, public investment complements private investment by creating

infrastructure and raising productivity and finally decreasing the cost of capital for private investment. Public investment increases aggregate output and compensates at least in part for the crowding out effect upon private investment. Therefore, the effects of public investment on private investment depend on the types, essence and composition of the public investment. Public investment, as an influential factor upon private investment, involves using current or real public investment, rate of public investment to GDP and its change in different investment models.

Also public current expenditure, government budget deficits and rate or lags of these factors are applied as effective variables in the investment approaches. There is an argument that a higher fiscal deficit pushes up interest rates and crowds out private investment. In contrast, a reduction of public current expenditure or government budget deficits expands private investment.

i- Real Exchange Rate

The real exchange rate in developing countries generates considerable economic and political debate. Devaluation policy works differently in developing countries due to the nature of their imports, and it is suitable only as part of a comprehensive policy package which promotes output and investment (Buffie 1986). The import of developing countries are mostly food and other primary needs and capital goods which are non-competitive and inelastic, therefore devaluation of the domestic currency may create only a higher rate of inflation. The import structure, current account problems, capital flight and foreign debt burden are the major sources of instability and devaluation of domestic currencies in developing countries. Risager (1988) believes that a real exchange rate devaluation increases both saving and investment in the short run, but in the long term all real variables are unaffected by the devaluation. A number of studies argue that a real exchange rate depreciation is expected to promote investment by increasing the availability of foreign exchange (Buffie 1984 and Faini and Melo 1990). Also a real exchange rate devaluation

switches spending towards domestic goods and it has significant consequences for investment, thus the real exchange rate has a strong influence on the volume and timing and composition of investment (Serven and Solimano 1992). In contrast a real exchange rate depreciation in developing countries, where most capital goods are imported, raises the cost of capital and affects private investment negatively [Chenery and Bruno (1962) and Buffie (1986) and Solimano (1989)]. A number of studies, such as Cardoso (1993), have shown that the real exchange rate has an insignificant effect on aggregate investment in developing countries. These studies assert that the net effect of a real depreciation is ambiguous; investment in tradeable goods increases while investment in domestic goods declines (Serven and Solimano 1991, Vergara 1991, Wijnbergen 1985 and Risager 1988). Uncertainty about the future of the real exchange rate discourages investors from entering the export market even if it is profitable. This circumstance has negative effects on output and private investment (Dixit 1987, Krugman 1988 and Solimano 1989). Some macroeconomic instabilities such as variability of the real exchange rate accompanied with a high inflation rate decreases private investment (Serven and Solimano 1991 and Vergara 1991). In conclusion, a real exchange rate devaluation, which is at the heart of the International Monetary Fund and the World Bank economic adjustment packages, may or may not promote private investment in developing countries.

j- Foreign trade and the Balance of Trade

There is an argument [e.g. Love (1989), Khan and Reinhart (1990) and Noferesty and Arabmazar (1994)] that exports of goods and services, oil export revenue in oil exporting countries and also growth rate of imports or import of capital goods or net exports (exports minus imports) determines private investment directly. These forms of foreign trade variables, or their lags or their growth rate, are used to estimate the effectiveness of the private investment function.

k- Foreign Debt Burden

The investment to GDP ratio has decreased in most debtor countries since the 1980s (Pfeffermann and Madarassy 1991). Among the macroeconomic factors, external debt overhang and debt-service payments are the most influential factors in this situation. The increasing debt-service payments reduce the investment return in these countries (Borensztein 1990). This situation diminishes the financial credibility of the debtor countries, and banks and other financiers are rationing credit allocations to these countries. This credit rationing creates an investment disincentive. Serven and Solimano (1992) believe that a complex relationship exists between the foreign debt overhang and private investment. The foreign debt burden is a source of instability as it acts as a tax on the proceeds of investment (Sachs 1989). The debt overhang acts like an anticipated foreign tax on investment, and a part of the return on investment should be allocated for foreign debt service payment (Serven and Solimano 1991). Therefore, the foreign debt burden can have an adverse effect on investment through increasing uncertainty. An increase in the debt-export ratio is associated with a lower propensity to invest, probably causing a higher risk premium (Faini and Melo 1990). This effect is significantly higher during a recession period. The debt-service payment ratio (debt-service payment to exports) and the ratio of external debt to GDP are two restricted variables for private investment in developing countries (Greene and Villanueva 1990). The high ratio of these factors may discourage private investment. This is because a significant part of the capital return must be paid as the debt-service payment. Also a heavy external debt reduces the potential credibility of the private sector and increases the cost of capital in a debtor country.

l- Other Factors:

In addition to the above factors, there are a number of other economic and social variables which could affect private investment. These variables are aggregate savings, taxes, market valuation of the firm, nominal or real wages, political instability, foreign direct investment, foreign interest rate, foreign price level,

business cycles, rational expectations and business predictions (Blejer and Khan 1984b). Furthermore, human capital, the education system, research and development (R&D) expenditure affect economic growth, capital efficiency and private investment (Otani and Villanueva 1989).

3.6. Conclusion

This chapter has reviewed a number of investment theories and models that study the impact of government policy, public current expenditure, public investment and other fiscal and monetary policies on private capital formation in developed and developing countries. The effect of economic uncertainty, through a higher inflation rate and devalued domestic currency, on private investment was another important aspect which was considered in this chapter. Investment adds to the physical stock of capital. The stock of capital is made up of improvements to soil, buildings and constructions, machinery and tools in the hands of the producers and inventories of goods. Investment expenditures expand the country's income and its production capacity. Investment spending can be affected by government policy. The aforementioned studies indicate that trade liberalisation and financial reform encourage the private sector, and have increased the share of private investment in gross domestic investment in developing countries in recent years (Pfeffermann and Madarassy 1991).

The International Monetary Fund and the World Bank typically support a rationalisation of the public sector and its investment expenditure in developing countries. These countries are restructuring their public enterprises as well as their trade, fiscal and credit policies. The IMF and WB believe that these adjustments should provide a neutral and transparent incentive economy. Since the 1970s, the private sector is being allowed to share in the economy more than ever before in developing countries. In this period the share of private sector investment has

increased. This also supposes that the private sector has become more motivated to invest and participate in capital formation since the 1970s (Blejer and Khan (1984b)).

In conclusion, output, capital stock, public investment and the availability of finance often positively affect private investment while the interest rate, volatility of inflation, devaluation of the domestic currency and increasing external debt have negative effects on private investment in developing countries. However, the effect of public current expenditure varied in the different studies. An empirical investment model for developing countries based on the above review, and using Iranian data for the period 1970-1993, will be investigated in the next chapter.

3.7. Appendix

3.7. Appendix

3.1. Summary of the Empirical Results from the Investment Studies in Developed Countries

No.	Resource	Area	Period	Methodology	Model	endogenous variables	Instrument variables ¹⁵	Result
1	Jorgenson (1967,71)	developed countries	—	profit maximising of individual firm Behaviour (neoclassical approach)	Flexible accelerator model	-desired capital stock - price of capital services	-output -availability of finance (internal, external fund) -price of capital services -rate of return -depreciation rate -growth rate of capital goods prices -tax structure	—
2	Ott et al (1975)	developed countries	—	maximising present value of firm (neo-classical approach)	accelerator model	gross investment	-output (+) ¹⁶ -Real user cost of capital (-) -output change (+) -capital stock (+)	—
3	Haines (1978)	UK	1956-67 ¹⁷	Keynesian investment theory	accelerator model	gross investment	-lags of output or -lags of liquidity or -lags of stock market valuation of firm -lag of gross investment -interest rate -lag of change of interest rate	(+) ¹⁸ (+) ¹⁹ (+) ²⁰ (+) (-) (-)

¹⁵ Exogenous and predetermined variables

¹⁶ The signs within the parentheses show the predicted direction of the variable in the model.

¹⁷ Quarterly

¹⁸ It is not statistically significant.

¹⁹ Ibid

²⁰ Ibid

4	Wallis, (1979)	developed countries	_____	Maximising present value of all future cash flows (neoclassical approach)	accumulation of capital model	gross investment	-relative prices -relative output -lag of gross investment	_____
5	Erenburg (1993)	USA	1947-85	empirical study	two equation model with non- linear parameter restrictions	private investment public investment	-lags of public investment -government deficits -lag of private investment -capacity utilisation -lags of public investment -lags of government deficits	_____
6	Monadjemi (1993)	Australia and USA	1976-87 ²¹	empirical study	one equation model	private investment	-money stock -domestic output -potential output -taxes -foreign rate of interest -foreign price level -public investment expenditure -public current expenditure -lag of private investment	(-)Aus (-)US

²¹ Quarterly

3.2. Summary of the Empirical Results from the Investment Studies in Developing Countries

No.	Resource	Area	Period	Methodology	Model	endogenous variables	Instrument variables ²²	Result
1	Vernar-dakis (1978)	Greece	1957-66	empirical study	sector investment function	total investment in manuf-acturing	-stock of capital in the sector -GDP in the sector -real foreign investment in the sector -lag of total investment in the sector	(-) ²³ (+) ²⁴ (+) ²⁵ (+) ²⁶
2	Sundara- rajan and Thakur (1980)	India Republic of Korea	1960-76 1958-76	empirical study	flexible accelerator model	gross private investment private output	-user cost of capital to nominal wage rate -private output and its lags -public capital -real savings minus public investment -lag private capital -private capital -public capital -user cost of capital to nominal wage rate or its lags	(-) ²⁷ (+) (+) (+) (-) (+) (+) (+)
3	Tun Wai and Wong (1982)	Malaysia Greece Thailand Mexico Republic of Korea	61-71 60-76 61-75 65-75 60-75	empirical study	flexible accelerator	gross investment	-private output -change in bank credit to private -net capital inflow to private -lag private capital -public investment ²⁸ -private earning ²⁹	(+) (+)
4	Blejer and Khan (1984)	²⁴ developing countries	1971-79	standard optimising investment	flexible accelerator model by adding a number of other macro- economic factors	net private investment	-relative change of output -cyclical factor -change in the rate of real bank credit to the real net private capital flows -lag private investment -real public investment -change in real public investment	(+) (+) (+) (+) (+)

²² Exogenous and predetermined variables²³ It is not statistically significant.²⁴ Ibid²⁵ Ibid²⁶ Ibid²⁷ Ibid²⁸ Public investment is replaced by private output in the model as an alternative estimation.²⁹ Private earning is replaced by change in bank credit to private sector and the net capital inflow to the private sector as an alternative estimation.

5	Love (1989)	12 developing countries		Harrod-Domar framework study	one equation model	-domestic investment expenditure or capital goods imports	-export -total international reserves (foreign asset)	(+) ³⁰ (+) ³¹
6	Khan and Reinhart (1990)	24 developing countries	1970-79	empirical study	growth model	GDP growth rate	-ratio of private investment to GDP -ratio of public investment to GDP -growth rate of labourforce -growth rate of export or growth rate of import	(+) ³² (+) ³³ (+) (+) (+)
7	Faini and Melo (1990)	20 manufacturing, 11 fuel and 18 primary exporters developing countries	1970-86	empirical study	standard accelerator model	-rate of private investment to GDP -cost of capital	-real GDP growth and its lag (+) -lag of cost of capital (-) -rate of depreciation -foreign asset to GDP (+) -rate of public investment to GDP -lag of rate of private investment to GDP -real interest rate -real price of capital	(+) (-) (-) (+) ³⁴ (-) ³⁵
8	Greene and Villanueva (1990)	23 developing countries	1975-87	empirical study	flexible accelerator model	private investment to GDP	-real GDP per capita growth rate (+) -real interest rate (-) -level of per capita income in US\$ (+) -public investment to GDP -rate of domestic inflation (-) -debt service payment to export of goods and services (-) -external debt to GDP (-) -real exchange rate -economic uncertainty (non economic factors)	(+) (-) (+) (+) ³⁶ (-) (-) (-) (-) (-) ³⁷

³⁰ Except in Colombia and Ethiopia. Also it is statistically significant.
³¹ Except in Guatemala and Mexico. The result is not statistically significant.
³² Private investment plays a dominant role in growth related to public investment or total investment.
³³ Statistically insignificant.
³⁴ This positive effect (of foreign availability on private investment) is weak.
³⁵ Statistically insignificant.
³⁶ Ibid
³⁷ The results show that the private investment suffers from economic uncertainty and political crisis.

9	Pfeffermann and Madarassy (1991)	40 developing countries	1970-89	present private investment data	—	private investment	-growth of demand (+) -availability of financing (+) -fiscal deficits (-) -inflation (-) -exchange rate (-) -public investment -real interest rates	—
10	Noferesty and Arabmazar (1994)	Iran	1959-90	empirical study	multi-equation model	investment in industry and mine sector	-sector value added -real bank credit to the sector -stock of capital of sector	(+) ³⁸ (+) ³⁹ (+) ⁴⁰
11	Vaez-Zadeh (1991)	Venezuela	1965-81	empirical study	multi equation model	real private investment	-real non-oil GDP -real expected oil wealth -lag of real stock of capital	(+) (-) ⁴¹ (-)
12	Serven and Solimano (1992)	developing countries	—	effects of monetary policy and fiscal policy on investment	—	private investment	-exchange rate policy -public investment -financial constrain -imperfection of capital market -political instability on irreversibly of investment decision -income distribution	—
13	Cardoso (1993)	Latin America	1970-81	empirical study	one equation model	share of private investment to GDP	-growth rate of GDP -share of public investment in GDP -lag of terms of trade or - index of the real exchange rate or - rate of appreciation of the real exchange rate	(+) (+) (-) (-) (-) ⁴²

³⁸ Statistically insignificant.³⁹ Ibid⁴⁰ Ibid⁴¹ Statistically weak.⁴² Statistically insignificant.

CHAPTER 4:

AN EMPIRICAL INVESTMENT MODEL FOR IRAN

4.1. Introduction

As mentioned in chapter three most investment functions for developed countries are modelled according to neoclassical investment theory, whilst investment functions for developing countries are based upon an empirical and more flexible approach to investment behaviour. This chapter contains an empirical investigation of the effects of macroeconomic factors on private investment in developing countries. According to the summary of the last chapter, it is apparent that private investment is a function directly or indirectly of several macroeconomic variables. These variables are the interest rate, output, the inflation rate or economic stability, stock of capital, public current and capital expenditure or government budget deficits, real exchange rate, non-oil net exports and many others. This chapter applies a number of the above variables in a model to explain investment behaviour in developing countries, and especially the Iranian economy during the period 1970-93.

The chapter proceeds as follows, section 4.2 presents the conceptual framework of investment for the Iranian economy. In section 4.3, the direction and sign of each variable in the equations of the model will be predicted. Definitions of variables and the nature of the data utilised are presented in section 4.4. Data on the main economic variables in the model are summarised in figure form in the appendix to this chapter. The estimation procedure and empirical results from the model will be discussed in

section 4.5. The major conclusions are presented in section 4.6 of the chapter. Tables and figures for the variables used in the model are shown in the appendix.

4.2. Theoretical framework - the Model

As discussed in the review of literature in the last chapter, the investment function is often explained from a neoclassical perspective by Jorgenson (1967, 1971), Ott et al (1975), Haines (1978) and Monadjemi (1993), based on accelerator models in developed countries. Also, Sundararajan and Thakur (1980), Tun Wai and Wong (1982), Blejer and Khan (1984), and Greene and Villanueva (1990) estimate investment functions based on flexible accelerator models in developing countries. Similarly, a flexible accelerator model is applied in this section to clarify investment behaviour in developing countries using Iran as a case study. The reasons for this preference were mentioned in detail in the last chapter. In brief, the traditional model of investment assumes enlightened government intervention and free market conditions which could hardly be applied to an oil exporting country like Iran. The absence of asset and money markets and a strong role of government in the economy through the huge oil export revenues, are other reasons for this selection. Also, the government often kept the rate of interest lower than the market rate, and overvalued the domestic currency in order to slow down the inflation rate. Other reasons for using a flexible accelerator model include a deficiency of data on wealth, assets, debt, nominal wages, the market rate of the capital stock (Tobin's q) and so on, and finally differences in economic concepts (e.g. public or private sector) in developed and developing countries. For these reasons, an accelerator model of investment is estimated to capture investment behaviour in developing countries, using Iran as a case study. The accelerator model assumes a fixed ratio (α) between the desired capital stock (K^*) and expected output (Y^*).

$$K_t^* = \alpha Y_t^* \quad (4.1)$$

The flexible accelerator also provides a generalisation in which actual net investment is a proportion of investment, required to achieve the desired capital stock.

$$\Delta K_t = \beta(K_t^* - K_{t-1}) \quad (4.2a)$$

$$K_t = \beta K_t^* + (1-\beta)KL_t \quad (4.2b)$$

Where K and KL are capital stock and its lag respectively. The next element of the accelerator model is gross investment. Gross investment (I) is equal to net investment plus replacement investment (D).

$$I_t = \Delta K_t + D_t \quad (4.3)$$

The standard assumption is that replacement investment or depreciation is a proportion of the existing capital stock. Therefore, it can be assumed:

$$\begin{aligned} I_t &= \Delta K_t + \delta K_{t-1} \\ I_t &= K_t - (1-\delta)K_{t-1} \\ I_t &= K_t - (1-\delta)KL_t \\ I_t &= [1-(1-\delta)L]K_t \\ \text{or } K_t &= \frac{I_t}{[1-(1-\delta)L]} \end{aligned} \quad (4.4)$$

Also, the stock of capital in the last period is:

$$K_{t-1} = \frac{I_{t-1}}{[1-(1-\delta)L]} \quad (4.5)$$

Where (δ) is the rate of depreciation of capital goods. If the capital stock and its lag from equations (4.4) and (4.5) are substituted in equation (4.2b) we obtain:

$$\frac{I_t}{[1-(1-\delta)L]} = \beta K_t^* + (1-\beta) \frac{I_{t-1}}{[1-(1-\delta)L]}$$

or $I_t = [1-(1-\delta)L] \beta K_t^* + (1-\beta) I_{t-1}$ (4.6)

If the expected capital stock in equation (4.1) is replaced in equation (4.6) we have:

$$I_t = [1-(1-\delta)L] \beta \alpha Y_t^* + (1-\beta) I_{t-1} \quad (4.7)$$

The above equation can be simplified in the equation below, which defines gross investment as a function of expected output and the lag of gross investment.

$$I_t = f(Y_t^*, I_{t-1})$$

If we assume that expected output is a proportion of actual output, we obtain:

$$I_t = f(Y_t, I_{t-1})$$

As is well known, output is equal to private consumption and investment plus public current and capital expenditure and net exports (exports minus imports). If output is replaced by its components, except investment, we will have:

$$I_t = f(PC_t, G_t, NX_t, I_{t-1})$$

Where (PC), (G) and (NX) are private consumption, public expenditure and net exports. According to classical economics, the rate of interest determines the demand for capital and investment. Thus, the model can be completed with the interest rate (r) variable.

$$I_t = f(C_t, G_t, NX_t, r_t, I_{t-1}) \quad (4.8)$$

The last change is that public expenditure is divided into public current (GC) and public investment (GI) expenditure in the above investment function. Therefore, the private investment (PI) function will be defined as:

$$PI_t = f_1(PC_t, GC_t, GI_t, r_t, NX_t, PI_{t-1}) \quad (4.9)$$

In the following, we investigate the impact of private consumption, public current and capital expenditure, the interest rate and lag of private investment on private investment expenditure in the Iranian economy during the period 1970-1993. We assume that private consumption, public current expenditure, public investment and net exports are endogenous variables. Private consumption is assumed to be a function of aggregate supply and private wealth. Current expenditures of the Iranian Government, as a member of OPEC, are a function of government revenue, which is replaced with oil export revenue and lagged government current expenditure. Public investment expenditure is also affected by government oil export revenues and public current expenditure. Finally, net exports are influenced by aggregate demand, foreign income and the real exchange rate. The above conceptual framework can be utilised in the model below. This model contains five endogenous variables, seven exogenous and four predetermined variables as follows. All variables are expressed in logarithmic form.

$$PI_t = a_0 + a_1 PC_t + a_2 GI_t + a_3 GC_t + a_4 NX_t + a_5 r_t + u_{1t} \quad (4.10)$$

$$PC_t = b_0 + b_1 YS_t + b_2 PW_t + u_{2t} \quad (4.11)$$

$$GI_t = c_0 + c_1 OX_t + c_2 GC_t + u_{3t} \quad (4.12)$$

$$GC_t = d_0 + d_1 OX_t + d_2 GC_{t-1} + u_{4t} \quad (4.13)$$

$$NX_t = e_0 + e_1 YD_t + e_2 YOECD_t + e_3 E_t + u_{5t} \quad (4.14)$$

Endogenous Variables are:

PI	Gross private investment	(local constant price, billion Rials)
PC	Private consumption	(local constant price, billion Rials)
GI	Public investment	(local constant price, billion Rials)
GC	Public current expenditure	(local constant price, billion Rials)
NX	Net exports	(local constant price, billion Rials)

Exogenous Variables

r	The interest rate for 1 year deposits	(percentage)
YS	Aggregate supply	(local constant price, billion Rials)
PW	Private wealth	(local constant price, billion Rials)
OX	Oil export revenues	(local constant price, billion Rials)
YD	Aggregate demand	(local constant price, billion Rials)
YOECD	OECD income	(local constant price, billion Rials)
E	Rials per US\$	(local constant, Rials)

In the next section the sign and direction of the above variables of the model, and specifically that of private investment, based on the most accepted macroeconomic theories, will be identified.

4.3. Predicting the Direction and Effect of Variables in the Model

The impact of private consumption, public current expenditure, public investment, net exports and the interest rate on private investment will be discussed in this section. Also an hypotheses about the possibility, nature, direction and relationship of the above factors will be presented in the following.

Private consumption is the most important motive for investment in the production sector. The quantity of private consumption will positively influence private investment. When consumption is high and with an ascending trend, this favourable market condition raises the demand for goods and could cause a shortage of goods in the

economy. Such an expansionary situation requires new capacity and capital investment to make it profitable. On the other hand, an increase in the proportion of income consumed decreases the proportion saved as well as the availability of finance for investment. Finally an expansionary condition, which increases aggregate income, increases the amount of saving. These different and contrasting effects of private consumption give an ambiguous result for private investment. Noferesty and Arabmazar (1994) and Amirahmadi (1992) claim that the demand for goods has often been more than its supply in the Iranian economy, and many other developing countries. It means an increase in aggregate demand could not positively affect private investment where the main bottleneck in the Iranian economy was the lack of supply. Changes in private consumption are often much less than changes in private investment. However, any change in private consumption, which is the biggest component of aggregate demand, changes other macroeconomic variables as well as private investment. Reducing private consumption can result in economic recession which severely affects private investment. Therefore, a higher level of private consumption can encourage private investment. It means the sign of the private consumption coefficient (a_1) in equation (4.10) in the aforementioned model should be positive. This argument will be examined in the next section.

The effects of public current and capital expenditure on private investment have been discussed by Sundararajan and Thakur (1980), Blejer and Khan (1984a and 1984b) and Monadjemi (1993). These empirical studies, both for developed and developing countries, test the hypothesis whether public current expenditure and/or public investment crowd out private investment. The empirical results of these studies show that private investment is often crowded out by public current expenditure, but not always by public investment in developed countries. Also, it is occasionally crowded out by public current expenditure but rarely by public investment in developing countries. The crowding out, or in, effects of public current expenditure and public

investment on private investment [the sign of a_2 and a_3 in equation (4.10) in the above model] will be examined in the next section.

The difference between exports and imports gives the balance of trade or net exports. Net exports is another component of aggregate demand which shows the effect of foreign demand on domestic products and domestic demand on foreign goods (Dornbusch and Fisher 1994). According to macroeconomic models if GDP, private consumption and public expenditure remain unchanged, an increase in the net exports increases private investment and vice versa. Thus, the coefficient of net exports (a_4) in equation (4.10) in the above model might be negative.

The relationship between the interest rate and private investment was discussed in detail in the last chapter. In brief, investment represents spending on additions to the capital stock. Such investment is conducted with the purpose of making profits in the future by operating machinery and factories. According to classical theory, investment behaviour is responsive to the interest rate. A higher interest rate means that investors have to pay out more interest each year from the earnings of their investments. Conversely, a lower interest rate makes investment more profitable. Thus, a high interest rate confines investment and a lower interest rate increases investment. Therefore, the sign of the interest rate coefficient (a_5) in equation (4.10) in the model should be negative.

"There is a close relationship in practice between consumption spending and disposable income." (Dornbusch and Fischer 1994). Private consumption increases along with the level of real income. If it is assumed that aggregate supply equals real income, the coefficient of aggregate supply (i.e. real income) in the consumption function (equation 4.11) is known as the marginal propensity to consume which is positive and less than one. Private consumption is also a function of private wealth in

the economy. Obviously, a higher level of wealth causes more consumption. Therefore, the sign of the coefficients of the aggregate supply (b_1) and private wealth (b_2) in equation (4.11) in the above model should be positive.

Public current spending and public investment are assumed as endogenous variables. Both of these variables in the Iranian economy depend on the oil export revenues, which formed the main part of government revenues during the sample period. Thus, the coefficient of oil exports (c_1) and (d_1) in equations (4.12) and (4.13) are likely to be positive. During the oil price increase in the first half of the 1970s both public current and capital expenditure increased rapidly, but during the Iran-Iraq war the government often decreased public investment to cope with its current expenditure. Different budget allocations for public investment before and after the revolution, and especially during the war, makes any prediction for the coefficient of public current expenditure (c_2) in equation (4.12) difficult.

Net exports are related to aggregate demand, OECD income and the real exchange rate. As aggregate demand decreases, net exports move negatively and vice versa. Similarly, OECD income will have a direct and positive effect on net exports. Finally, when the domestic currency is devalued, net exports will be encouraged. Therefore the coefficient of aggregate demand (e_1), OECD income (e_2) and the real exchange rate (e_3) in equation (4.14) in the above model, should be positive. The above hypotheses will be tested in the section 4.5.

4.4. Definition and Nature of the Data and Variables

The data applied to the model are annual data for 24 years covering the period 1970-1993. The data were collected from "The Information Package of National Accounts, Monetary and Fiscal Data" (PBO 1994), different issues of "Iran's national accounts", and "The Annual Report and Balance Sheet" (The Central Bank of the Islamic Republic of Iran), "The International Financial Statistics" and different issues of the

"World Tables". All data are real (1982=100 index). The principal features of the data are illustrated in the appendix.

i. Private Investment

Figure 4.1 in the appendix plots the share of private investment ^{IN} ~~and~~ gross domestic ~~investment~~ ^{PRODUCT} during 1970-1993. Gross domestic investment increased in the period 1970-1976, before suffering a set back during 1977-1979. Real gross domestic investment rose from Rials 887 billion in 1970 to a peak of Rials 3329 billion in 1976. This was because of the jump in oil export revenues in that period. Then gross domestic investment gradually declined to Rials 1724 billion in 1981 as a result of the strike in the National Iranian Oil Company (1978), the Islamic revolution (1979), and a new conservation policy in regard to oil exports after the revolution.

Private investment was Rials 434 billion in 1970 and increased to Rials 695 billion in 1974. This investment doubled in 1975 and gradually increased to Rials 1450 billion in 1977. Private investment declined after the revolution, falling to Rials 784 billion in 1982. It increased again to Rials 1484 billion in 1984 which was the highest level in the period under study. Since the second oil crisis in 1985, private investment has suffered a further fall followed by a similar decline in public investment. This event reduced gross domestic investment from Rials 2562 billion in 1984 to Rials 1144 billion in 1988, and led to a fall in public investment from Rials 1078 billion to only Rials 464 billion in the same years. At the same time, due to an accumulation of external debt, the Central Bank limited the allocation of foreign currency only to the import of basic foodstuffs and other essential needs but not capital goods. This limitation rose from the war and oil crisis. Private investment also began to decrease after 1984 with such investment being only Rials 679 billion in 1988. However it began to recover from 1989 as a result of the first five year plan (1989-93) and the adoption of a new

expansionary economic policy. By 1993 real private investment was recorded at Rials 1176 billion.

Before the revolution the private sector remained a consistently minor investor (averaging 44 percent of gross domestic investment), but after the revolution, except in 1982, the share of private investment to gross domestic investment increased from 50 up to 60 percent. Nevertheless, the average level of private investment to GDP was 8.2 percent before the revolution (1970-78), increasing to 9.2 percent after the revolution (1979-1993). This rate of private investment to GDP is much lower than the same rate in many other developing countries⁴¹.

ii. Private Consumption

Figure 4.2 in the appendix shows the share of private consumption in gross domestic product during 1970-1993. Real private consumption (except in 1980, 86 and 87) continuously increased from Rials 2248 billion in 1970 to Rials 8928 billion in 1993. The biggest growth of this variable belonged to 1972-1975 because of the oil price hikes in the same years, increasing by 26.3 percent during this period. Consumption increased from Rials 2248 in 1970 to Rials 5615 billion in 1979, while GDP, after a rapid increase from Rials 6484 billion in 1970 to Rials 13230 billion in 1976, decreased to Rials 10872 billion in 1979. Consumption gradually increased (4.5 percent growth) after 1981 and reached Rials 7291 billion in 1985. The oil crisis of 1986-88 temporarily diminished private consumption to Rials 6172 billion in 1988. Again, this factor increased by a rate of 7.7 percent because of the government's expansionary policy after the Iran-Iraq war, and the enactment of the first five year plan (1989-1993). The average share of private consumption in GDP before the revolution was 62.5 percent but decreased to 43.5 percent after it. The effect of changes in private consumption on private investment will be tested in the next section.

⁴¹ For example the share of private investment to GDP in the Republic of Korea, Singapore and Thailand was 23.3, 27.4 and 20 per cent respectively. Also this rate in Turkey and Kenya was 12.6 and 11.5 per cent respectively during the 1980s (Madarassy 1990).

iii. Public Investment

Figure 4.3 exhibits the share of public investment in gross domestic product between 1970 and 1993. During the period of rapid increase in oil prices (1970-76), the volume of the real government's development expenditure rose from Rials 98.8 billion in 1970 to Rials 863.7 billion in 1976. Public investment increased rapidly from Rials 453 billion in 1970 to Rials 1904 billion in 1975. Growth of public investment was 33.3 percent annually in this period. Public investment decreased due to a slow down in oil export revenues. Real public investment was Rials 1781 and 1750 billion in 1976 and 1977 respectively. However, with the revolution in 1979 it dropped to Rials 523.3 billion, and up to the ceasefire real public investment (except in 1982-1984) was slashed to a quarter of the level of earlier years (from Rials 1750 billion in 1976 to Rials 464 billion in 1988). Development expenditure doubled in 1983, reaching Rials 1149 billion. In the last year of the war in 1988 it fell to Rials 816 billion. With the enactment of the first five year plan after the war real public investment gradually increased four times during 1989-92 reaching Rials 3193 billion.

Public investment was often greater than private investment before the revolution. This gap increased after 1975 up to the revolution in early 1979. The share of Public investment in gross domestic investment decreased soon after the revolution. A number of projects such as large dams and highways, nuclear power plants and iron and steel mills, were stalled because the revolutionary government did not accept the former Shah's economic industrialisation model. Except in 1981 and 1982, public investment was lower than private investment after the revolution. This trend does not support the argument that public sector investment dominated private investment activities after the revolution. The critical issue of whether public sector expenditure crowds out private investment, will be examined in the next section.

iv. Public Current Expenditure

Real public current expenditure increased from Rials 590 billion in 1970 to Rials 2347 billion in 1976. Annual growth of this variable was high (26.2 percent) during this period. These expenditures again increased from Rials 1070 billion to Rials 1756 billion (64 percent growth) in 1976 alone. This increase shows the high dependency of government revenue and expenditure on crude oil exports which increased rapidly in the aforementioned years. Government current expenditure did not change significantly in the remaining years of the last regime. After the revolution, except in 1983-84, real government expenditure decreased and this lasted for a decade. The average annual rate of decrease was 5.9 percent. In 1979, real current expenditure was Rials 2177 billion which decreased to Rials 1189 billion in 1989. The first five year plan generated a 11.2 percent annual growth in this factor. Real government consumption expenditure rose to Rials 1820 billion in 1993.

Public current expenditure made up about 10 percent of GDP in 1970-71. This factor increased from 16 to 21 percent of GDP during the oil price hikes of 1974-1978. After the revolution the above ratio dropped from 20 to 10.7 percent between 1979 and 1991, then it increased to 12.8 percent in 1993 because of the new economic expansionary policy during the first five year plan. The average rate of government consumption to GDP was 14.7 percent before the revolution and it did not significantly change after it. Figure 4.4 in the appendix shows the share of public expenditure in gross domestic product during 1970-1993. Government current expenditure was 135 percent of private investment in 1970 and increased to 270 percent in 1978. The average growth rate of real government current expenditure was 8.9 percent during 1970-78. From the revolution in 1979 up to 1984, real public current expenditure gradually decreased from 242 to 122 percent of private investment. This rate again increased to 206 percent in 1988 decreasing to 155 percent at the end of the first five year plan in 1993. On average public current spending was 182 and 169 percent of private investment before and after

the revolution. This evidence shows that the contribution of the private sector from the restricted resources after the revolution was greater than before.

v. Non-oil Net exports

Foreign trade has significant effects on the Iranian economy. The total foreign trade (exports plus imports) ratio to GDP was more than 60 percent in the period 1970 to 1975. It decreased to 30 percent in 1993. Whilst it was never less than 20 percent during the revolution in 1978-1979, the western embargo and heavy bombardments of Iran's oil export ports in the last years of the Iran-Iraq war affected net exports badly.

Real non-oil net exports were Rials -496 billion in 1970 and worsened to Rials -2383 billion in 1976. This trend gradually improved and (except in 1982 and 83) changed to Rials -727 billion in 1987. Again, real non-oil net exports sharply decreased to about Rials -1793 Rials in 1993. The last improvement in net exports was mostly related to several steps taken in regard to the official devaluation of the exchange rate, which discouraged imports and encouraged non-oil exports. Real non-oil net exports is shown in Figure 4.5 in the appendix to this chapter.

vi. The Interest Rate

In the absence of a developed asset and money market in Iran, the interest rate on private deposits and credit for investment through the banking system, is likely to play an important role in the economy and affect private investment behaviour. The interest rate on bank credits in Iran, like many other developing countries, is determined by the authorities and is lower than the cost of money and the market interest rate to encourage investors and keep inflation low. This policy creates a greater demand than availability of financing in the economy.

Iran's banking system was changed according to the Islamic Law (Shari'a) soon after the revolution. In this regard, the interest rate was replaced by the "profit rate" or the

"minimum guaranteed profit", but under the new regulations the above policy (low interest rate policy) continued after the revolution. During the sample period up to 1988, the interest rate, or the guaranteed profit, was between 7 to 11 percent (see Figure 4.6 in the appendix). The interest rate was often around 9 percent which was kept lower than the market interest rate and even under the inflation rate. The government believed that higher interest rates negatively affected private investment and caused inflation. The above presumption and also the crucial argument that the interest rate is not sufficiently elastic towards the market (it does not influence private investment) will be tested in the following sections.

vii. Gross Domestic Product

Gross domestic product (GDP), which is shown in Figure 4.7 in the appendix, did not have a simple trend during the study period. GDP was Rials 6484 billion in 1970. It had a 12.6 percent average annual growth rate during 1970-76. Real GDP gradually decreased between 1977 to 1981 from Rials 12996 billion to Rials 9202 billion because of the wide-spread strikes before the revolution, the imposed war, reduction of exports and imports due to the western trade sanctions, capital flight before and after the revolution and economic uncertainty after the revolution. A temporary oil price increase improved GDP to Rials 12173 billion in 1985. The oil crisis again decreased GDP in the next three years. GDP was Rials 10577 billion in the last year of the war (1988) which was the lowest on record after 1982. A new "economic adjustment" policy was enacted by the first five year plan (1989-1993) one year after the ceasefire (1988). This economic expansionary policy led to a recovery of the economy from a deep recession and high inflation. Real GDP reached Rials 13817 billion in 1991 which was larger than the record figure before the revolution for the first time. The real GDP growth rate was 8 percent during the first five year plan. GDP was Rials 15072 billion in 1993.

viii. Private Wealth

There is no data about the stock of capital, wealth and other forms of private assets in official publications, therefore they must be calculated. We assume that private wealth is formed from private capital stock, cash, savings, deposits and foreign currency held by individuals. The private stock of capital is produced from private investment while the annual rate of depreciation is assumed to be either 2.5, 5 7.5 and 10 percent during the study period. Computation of the capital stock based on less than 5 percent depreciation rate shows a sharp increase in private wealth. If the depreciation rate of 7.5 or 10 percent is assumed, a sharp descending trend in volume of private wealth will be resulted. We prefer the calculation of the capital stock based on a 5 percent depreciation rate which shows that both private and public capital stock increased before and after the war and did not decrease during the war. It supports this belief that in spite of the war damage, the industrial capacity and the real private wealth in Iran did not decrease during the study period including the war time.

Cash, savings and deposits of the private sector is replaced by M3⁴². According to monetary regulations, the private sector was not often allowed to keep foreign currency. Therefore private wealth is formed by the private stock of capital plus M3. According to this calculation real private wealth was Rials 4450 billion in 1970, which tripled in less than one decade and reached Rials 15378 billion in 1979. It slowly increased after the revolution and during the war. Private wealth was Rials 20153 billion in the last year of the war (1988), increased to Rials 22384 billion in 1993. In brief, private wealth always increased during the study period, but its growth rate was 14.8 percent annually

⁴²M3 = currency + deposits in cheque accounts + all other deposits with trading banks + deposits with saving banks (Waud et al. 1989)

before the revolution and 2.7 percent after this event. Figure 4.8 in the appendix shows the stock of private wealth during the study period.

ix. Exports

During the sample period up to 1988, the main source of government revenue was from crude oil exports. The government's "Other revenues (except tax)" which was 445 billion Rials in 1988, increased to 1223, 2825 and 3200 billion Rials in 1989 to 1991 respectively. This rapid increase in the miscellaneous revenues of the government was the result of importers' payments to the Central Bank. The imports of goods and services were allocated foreign exchange with a special rate higher than that of the official rate, but the gap between these two rates was paid to the Central Bank by the importers. This income was kept in the "other government revenues" account. After the official devaluation of the Rial in 1993, the major part of government revenue was again the oil export revenues. In other words before and after the official Rial devaluation enacted in 1993, the main government revenue and government expenditure depended on oil export revenues.

In addition, the revenues obtained from the export of oil and gas provided the majority of Iranian foreign exchange earnings. This important macroeconomic factor has been the major fluctuating factor in the Iranian economy over the past twenty five years. The share of oil exports in total exports, except in 1970 and 1971, was more than 84 percent, and reached 98 percent during the sample period. Current oil export revenue was US\$ 1662 million in 1970 and increased to US\$ 5454 million in 1973. Annual growth of oil exports in this period (1970-1973) was 48.6 percent. Oil exports jumped about four times to US\$ 20999 million in the next year (1974) and, except in 1975, enjoyed an increasing trend to US\$ 25319 million in 1977 which has been the highest level to the present. The growth rate of oil exports in the years between 1973-1977 was 46.8 percent. The strikes in the oil industry before the revolution, the oil resource conservation policy adopted soon after the revolution and the western economic

embargo against Iran gradually decreased oil exports to US\$ 9170 million in 1981. The growth rate of oil exports during this period (1977-81) was negative and amounted to 18.4 percent per annum. The oil crisis since 1984, attacks on oil tankers in the Persian Gulf and heavy bombardment of the main Iranian oil export terminals in Khark island sharply reduced oil export revenues again in 1984-1988. Oil exports were increased after the ceasefire from US\$ 7313 million in 1988 (the lowest level since 1973) to US\$ 16376 million in 1992. The real growth rate of oil exports in this period was 22.3 percent annually.

In summary oil exports -which were the main source of government revenue, and more importantly dominated Iranian foreign exchange availability- were not a stable factor during the study period. This instability directly affected government expenditure and net exports and indirectly affected the real exchange rate, public and private investment. These issues will be examined in the next section. The trends in and comparison of oil and gas exports and non-oil exports are shown in Figure 4.9 in the appendix.

xi. Imports

Imports of goods and services were US\$ 1658 million in 1970 which sharply increased to US\$ 14626 million by 1977 due to the increase in Iranian oil export revenues. The growth rate of imports was 36.5 percent annually in this period. Strikes in the public sector and banking services, industries and distribution system reduced imports to US\$ 10372 million during the revolution in 1978-1979. After the revolution, except in 1982, imports gradually increased to US\$ 18103 million in 1983. The average growth rate of imports was 16.9 percent in this period.

The economics of war and the tightened foreign exchange allocation policy which was launched in 1982, as well as the oil crisis in 1984, decreased imports to US\$ 8177 million in the last year of the war. The imports in this year were the lowest since 1974. Imports rapidly increased in the following three years. Imports of goods and

services were US\$ 29677 million in 1991 which has been the highest on record to the present. The growth rate of imports was 38 percent between 1989 and 1991 which coincided with the first three years of the first five year plan. The government has limited imports because of decreasing oil export revenues and sharply built up external debt since 1992. In this year imports of goods and services was US\$ 24240 million.

Intermediate goods and services formed the majority of Iranian imports in the study period. More than 51.6 percent of the imports in 1978 (the lowest level) and 65 percent of imports in 1985 (the highest level) were intermediate goods and services. On average 58.1 percent of the imports were intermediate goods in the period under study. Capital goods were often the second largest component of Iranian imports. The largest capital imports belonged to the year 1991 with 33.4 percent, while the lowest figure was 18.1 percent of total imports in 1981. On average, 24.8 percent of imports were capital goods during the sample period. Both intermediate and capital imported goods were often more than 80 percent of total imports and they directly supported investment and the manufacturing sector. The above mentioned shows that the powerful import substitution policy before the revolution became significantly stronger after the revolution. During the times that imports of goods and services were easy, public and private investment was encouraged and vice versa. Figure 4.10 in the appendix shows the composition of imports during the study period. The effect of imports of goods and services through non-oil net exports on private investment will be considered in the next section.

xii. The Market Exchange Rate

The majority of Iran's foreign exchange revenue is obtained by the government through crude oil exports. This opportunity makes the role of government strong in the economy. The rate of exchange may be the biggest monetary and foreign trade policy issue in Iran, at least since 1980. The domestic currency (Rial) against the US

dollar improved about 12.7 percent in 1973 because of the US dollar devaluation at that time. The Rial was officially devalued 7.7 percent and each US dollar could be exchanged for 71.7 Rials in June 1979. The US dollar was between 66.6 to 78.8 Rials during 1970-78, and there was no black market for foreign exchange in that period. During and immediately after the revolution, capital flight accounted for an enormous amount. It is estimated that US\$ 1.5 billion was transferred from the country in the fourth quarter of 1978 alone (Pick's Currency Yearbook 1980, p. 323). The Rial in the black (parallel) market was devalued about 66 percent in the year after the revolution and each US dollar was exchanged for 121 Rials in June 1980. The next real devaluation of the Rial in the parallel market happened in 1982, when the government undertook a strong exchange allocation policy because of shortages in foreign currency. During 1982-1984, a US dollar was exchanged for between 150 to 550 Rials in the parallel market. The next shock to the Rial occurred during the oil crisis in 1987, where each US dollar was sold at 643 and 980 Rials in June 1986 and June 1987 respectively.

The ceasefire between Iran and Iraq led to a collapse of the parallel market in foreign exchange for a short time in 1988. At that time each US dollar could be exchanged for 800 Rials while it had been about 1200 Rials before this event. An expansionary policy and easier imports created a great demand for foreign exchange after the war. The government again devalued the Rial about 36.8 percent in 1989. Each US dollar exchanged for 1334 Rials in June 1989 in the parallel market. The Rial's devaluation was less than 5 percent in 1991 and 1992, whilst in 1993 it was 11.3 percent. The long run fixed exchange rate policy has changed since 1993 by an official devaluation of the domestic currency. Each US dollar was sold for 1610 Rials in the Iranian banking system which was close to its price in the parallel market (1810 Rials) in 1993. Figure 4.12 in the appendix shows the equivalent of each US dollar, and Figure 4.13 shows the depreciation of the Rial in the parallel market during the period under study. This is a crucial argument indicating that the Iranian economy has been

heavily influenced by an overvaluation of the domestic currency against foreign currencies since the revolution. This overvalued exchange rate policy generated a reduction in the government's expenditure, but did not stop the government's deficit. The rise in government deficits resulted in the printing of money, causing an increase in the inflation rate. This argument that the overvaluation of the Rial encouraged imports of goods and discouraged non-oil exports and therefore affected net exports and eventually contributed to a large capital flight after the revolution, will be tested in the next section.

4.5. Estimation Results

The investment model outlined in section 4.2 consists of five structural equations involving five endogenous variables, whose values are determined within the specified system. The value of each endogenous variable also depends on a number of exogenous variables whose values are specified outside the system, and also on the lagged values of variables known as predetermined variables. The model is overidentified which means more than one structural estimate is obtainable for this model. To avoid confusion, the two-stage least squares (2SLS) and three-stage least squares (3SLS) methods are applied for estimation purposes. The results of the estimation after replacing equation (4.14) by the equation below are summarised in Tables (4.1) and (4.2) in the appendix. In the equation below aggregate demand is divided into two variables; aggregate demand minus private investment (YD-PI) and private investment.

$$NX_t = e_0 + e_1(YD - PI)_t + e_2 PI_t + e_3 YOECD_t + e_4 E_t + u_{5t} \quad (4.15)$$

The estimation results of the model from 2SLS and 3SLS methods are the same. The 3SLS results are discussed below. The empirical results are quite encouraging and significant. The model predicts the behaviour of the endogenous variables well, as indicated by the relatively high values of R-squared (0.65 for the first equation and at

least 0.87 for the others), and significant t-values at the 95 percent level for most of the coefficients except non-oil net exports in equation 4.10.

Although the main bottlenecks of the Iranian economy have emerged from the supply side, the results do not support the Noferesty and Arabmazar (1994) argument. They argue that while the demand for consumer goods is much higher than their supply, private consumption cannot influence private investment. The results show that private consumption, the largest component of aggregate demand, has positively affected private investment. The elasticity of private investment with respect to private consumption is (2.02). The coefficient of private consumption is positive and significant at the 99 percent level.

The crucial argument that public current expenditure has crowded out private investment is supported by this estimation. The results show that a systematic and negative relationship between private investment and public current expenditure (but not with public investment) existed in the Iranian economy during 1970-1993. In other words our finding supports the notion that private investment was "crowded out" only by public current expenditure, but "crowded in" by public investment in Iran over two decades. Since the public sector captured a large part of aggregate demand, the result hardly supports the view that the public services were sufficiently productive during the study period. Increasing public current expenditure widened the gap between aggregate supply and aggregate demand, and often caused higher inflation rates during the study period. On the other hand the government often invested in infrastructure and complementary areas, rather than compete with the private sector in investment. For the private sector the cost of capital for investment could be reduced by public investment. Cheap fuel, electricity, water and transportation facilities are good examples in this regard. The elasticity of private investment with respect to government current expenditure is (-2.01). Private investment was positively affected by public investment. The above results are significant at the 95 percent level. The

elasticity of private investment with respect to public investment is (2.74). It means that a one percent increase in public investment increased private investment by 2.74 percent. It again supports the view that public investment in infrastructure enhances the productivity of the private capital stock, and decreases the cost of capital for private investment purposes. The positive effect of private consumption and public investment on private investment are almost the same. The above evidence supports the view that total public spending (current expenditure and investment) "crowded in" private investment during the study period.

The influence of non-oil net exports on private investment is positive but statistically insignificant. As expected, a decrease in the interest rate increases private investment and vice versa. In addition, the result indicates that the elasticity of private investment with respect to the interest rate (-0.30) is not high. The reason for this result is the interest rate applied through the banking system for investment in Iran. Like many other developing countries, it was always much lower than the market interest rate, and often lower than the inflation rate during the study period. Therefore, changes in the interest rate did not have a strong effect on private investment.

The second equation in the described model shows that aggregate supply and private wealth positively affect private consumption. The results are statistically significant at the 99 percent level. The elasticity of private consumption with respect to aggregate supply is 20 percent higher than private wealth during the study period. The result of the third equation in the above model shows that public investment is correlated to the export of crude oil and public current expenditure. This correlation is ($R^2 = 0.87$). Public investment is positively affected by both the above variables. An increase of 1 percent in oil exports is likely to raise the public investment level by 0.37 percent. A one percent increase in government current expenditure resulted in a 0.85 percent increase in public investment. In other words, public current expenditure often

increased faster than public investment. The government sharply cut public investment to compensate for the rapid increase in current expenditure after the revolution, and especially during the war to decrease the gap between aggregate demand and aggregate supply and finally to block the high inflation rate.

The correlation between public current expenditure and oil exports and the lag of public expenditure is strong ($R^2=0.92$). Public current expenditure is positively affected by both the above variables. The results are statistically significant. The elasticity of government expenditure with respect to oil exports is poor (0.14) in the short run, and is about one in the long term. In other words, public current expenditure was slightly affected by oil exports in the short term but not in the long term. The elasticity of government current expenditure to its lag is high (0.86). The sharp increase in government expenditure, which was related to the oil exports in the first half of the 1970s, did not reappear when oil exports decreased from US\$ 25.3 billion in 1977 to US\$ 7.5 billion in 1986. This sharp increase in public expenditure caused a high level of government intervention in the economy which never decreased after the 1970s. The results support the view that it is not possible or at least fairly difficult, to cut public expenditure in the short term. Finally, the results show that public current expenditure was not limited by the budget deficit. On average, one fourth of public current expenditure was compensated through the budget deficit during the study period.

The results indicate that non-oil net exports were positively affected by OECD income and the real exchange rate and negatively influenced by aggregate demand. The elasticity of aggregate demand minus private investment and OECD income are weak, while non-oil net exports is elastic with respect to private investment. The above results are statistically significant at the 95 percent level. Non-oil net exports is slightly elastic with respect to OECD income (0.04).

In short, this section has estimated the role and effects of certain economic variables in the product market on private investment behaviour in Iran during the study period. Obviously, private investment was also affected by other economic variables in the money and assets markets, and by the domestic price level and aggregate supply. A particular study on private investment behaviour requires a more detailed structural analysis. This issue will be addressed to provide a better view about how to promote private investment and economic growth in chapters 5, 6 and 7.

4.6. Conclusion

In this chapter we examined a model of private investment for the Iranian economy during 1970-1993. The model evaluated the impact of private consumption, public current and investment expenditure, non-oil net exports and the interest rate on private investment. The results confirm that an increase in private consumption and public investment significantly contributed to an increase in private investment. Also, the interest rate and public current expenditure negatively affected private investment. Except for non-oil net exports, other results are statistically significant at the 99 percent level. The positive effects of private consumption and/or public investment are higher than the negative effects of public current expenditure. It is found that public current and investment expenditure have different effects on private investment. Higher government current expenditure reduced private investment. This result supports the crowding out effect of public current expenditure on private investment in this study. Also, these results cannot support the crowding out effect of public investment on private investment. However, the net effects of total public current and investment spending was a crowding in of private investment during the sample period. The effect of non-oil net exports or the trade balance on private investment is weak and statistically insignificant. An increase of aggregate supply and/or private wealth promoted private investment through increasing private consumption. A decline in real gross national product caused by an unfavourable external environment (oil crisis), contributed to a decline in private consumption and diminished private investment.

Exports of oil promoted public expenditure and imports of goods and services. A reduction in oil export revenues and the oil crisis diminished government revenue and total public expenditure, and decreased the availability of financing for both private and public investment. Conversely, an increase in oil exports raised the imports of goods and services and contributed to an increase in public and private investment. Although this study supports the view that public investment crowded in private investment in the study period, private investment was gradually replaced by public investment after the revolution. This study could not support the crucial argument that the parallel exchange rate, which was up to thirty times higher than the official exchange rate between 1980 to 1993, had any effect on private investment during the study period. Finally private investment was affected by the revolutionary upheaval, the western countries economic sanctions against Iran, the Iran-Iraq war and other socioeconomic problems such as bottlenecks in exploiting resources will be discussed in chapter 7.

The policy implication of this study is that the crude oil revenues, which are the main foreign exchange source for imports of goods and services, should be allocated for capital goods as much as possible. In view of the problems in the oil market in the last ten years, the promotion of non-oil exports is essential to reduce reliance on oil exports and deliver financial resources for investment. The economy needs to develop industries and promote non-oil exports in the long term. Government expenditure should be limited to the level of taxes and other domestic revenues, and a large percentage of the oil export revenues should be allocated for infrastructure investment and in the form of bank credits for private investment.

For more than a decade, a decrease of oil export revenues struck the Iranian economy. As a result the economy has suffered from its aftermaths; high inflation, a low share of investment in GDP, a sharp depreciation in the real exchange rate and recently a rising external debt burden. However, the depreciation of the real

exchange rate was clearly at the heart of the economic adjustment packages which were supported by the IMF and the World Bank. This policy and the effect of its enactment since 1993 will be studied more closely in chapters 6 and 7.

4.7.1. Tables

Table 4.1. Result from the Investment Behaviour Model (2SLS)

Explanatory variables	dependent variables				
	PI	PC	GI	GC	NOX
Endogenous					
PI					-0.93 (6.20)
PC	0.95 (4.56)				
GI	0.91 (3.40)				
GC	-1.01 (3.10)		0.84 (6.71)		
NOX	0.30 (1.09)				
Predetermined					
r	-0.16 (3.53)				
YS		0.54 (2.34)			
PW		0.45 (2.66)			
OX			0.40 (5.30)	0.14 (3.35)	
GC(-1)				0.86 (15.14)	
YD					-0.09* (1.96)
YOECD					0.04 (1.38)
E					0.20 (3.51)
War or Revolution Dummy	0.31 ^r (2.28)	-0.21 ^{rn} (2.46)	0.28 ^w (2.34)		
Constant	-0.70 (0.62)	-0.43 (0.72)	-2.59 (2.83)	-0.06 (0.09)	-1.24 (1.33)

R-squared	0.84	0.97	0.87	0.92	0.90
Durbin- Watson	1.92	1.91	1.84	2.08	1.71

Sources: 1. PBO (1994), Iran National Accounts various years

2. International Financial statistics and World Tables 1992-1994

Sample 1970-1993

All data are real (1982=100), all dummies are intercept

* Aggregate demand is replaced by aggregate demand minus private investment

Figures in parentheses are t-values

r. Dummy for the revolution (1978-79)

rn. Dummy for the revolution and the end of the war (1978-79 and 1986-88)

w. Dummy for the revolution and the war (1978-88)

Table 4.2. Result from the Investment Model (3SLS)

Explanatory variables	dependent variables				
	PI	PC	GI	GC	NOX
Endogenous					
PI					-0.88 (6.91)
PC	2.02 (2.94)				
GI	2.25 (2.74)				
GC	-1.95 (2.03)		0.85 (7.48)		
NOX	0.51 (0.65)				
Predetermined					
r	-0.30 (2.57)				
YS		0.55 (2.68)			
PW		0.45 (3.00)			
OX			0.37 (5.63)	0.14 (3.56)	
GC(-1)				0.86 (16.24)	
YD					-0.10* (2.60)
YOECD					0.05 (1.69)
E					0.22 (4.22)
War or Revolution Dummy	0.68 ^r (1.44)	-0.25 ^{rn} (3.50)	0.26 ^w (2.41)		
Constant	-5.22 (1.15)	-0.54 (1.00)	-2.47 (2.98)	-0.04 (0.07)	1.55 (1.96)

R-squared	0.65	0.96	0.87	0.92	0.90
Durbin- Watson	2.19	1.83	1.78	2.07	1.66

Sources: 1. PBO (1994), Iran National Accounts various years

2. International Financial statistics and World Tables 1992-1994

Sample 1970-1993

All data are real (1982=100), all dummies are intercept

* Aggregate demand is replaced by aggregate demand minus private investment

Figures in parentheses are t-values

r. Dummy for the revolution (1978-79)

rn. Dummy for the revolution and the end of the war (1978-79 and 1986-88)

w. Dummy for the revolution and the war (1978-88)

4.7.2. Figures

Iran's Macroeconomic Figures (1970-1993) which are applied in the Model

Figure 4.1. Share of Private Investment in Gross Domestic Product

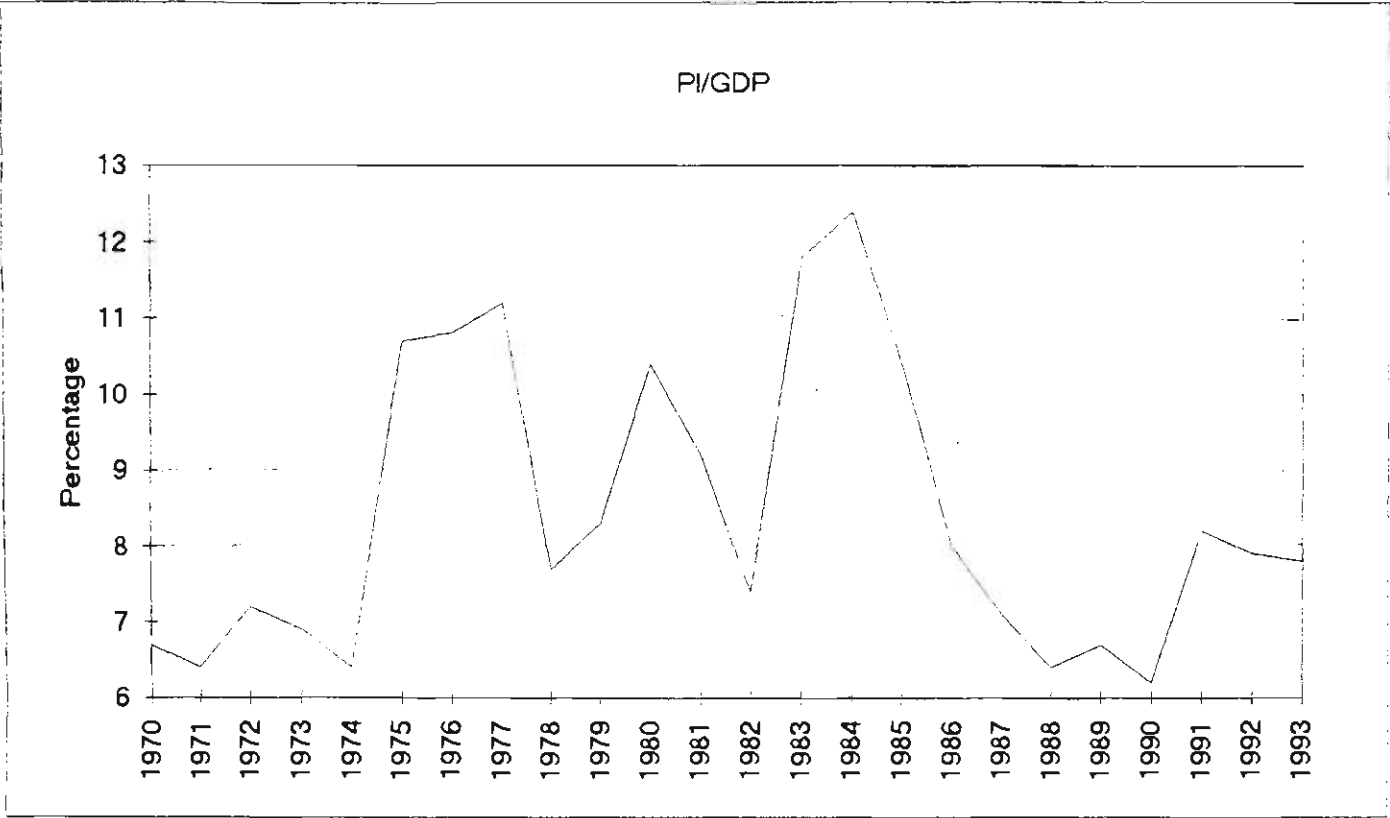


Figure 4.2. Share of Private Consumption in Gross Domestic Product

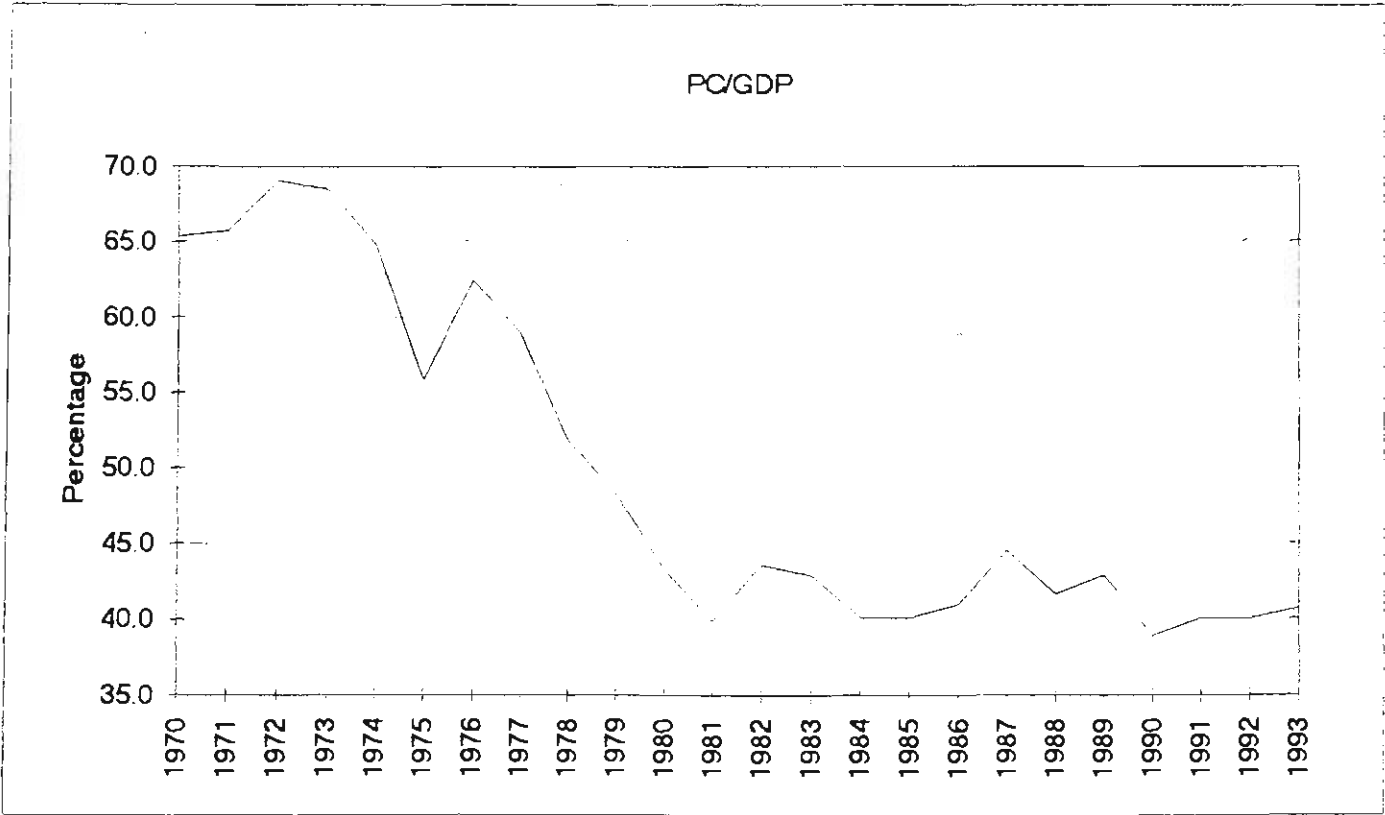


Figure 4.3. Share of Public Investment in Gross Domestic Product

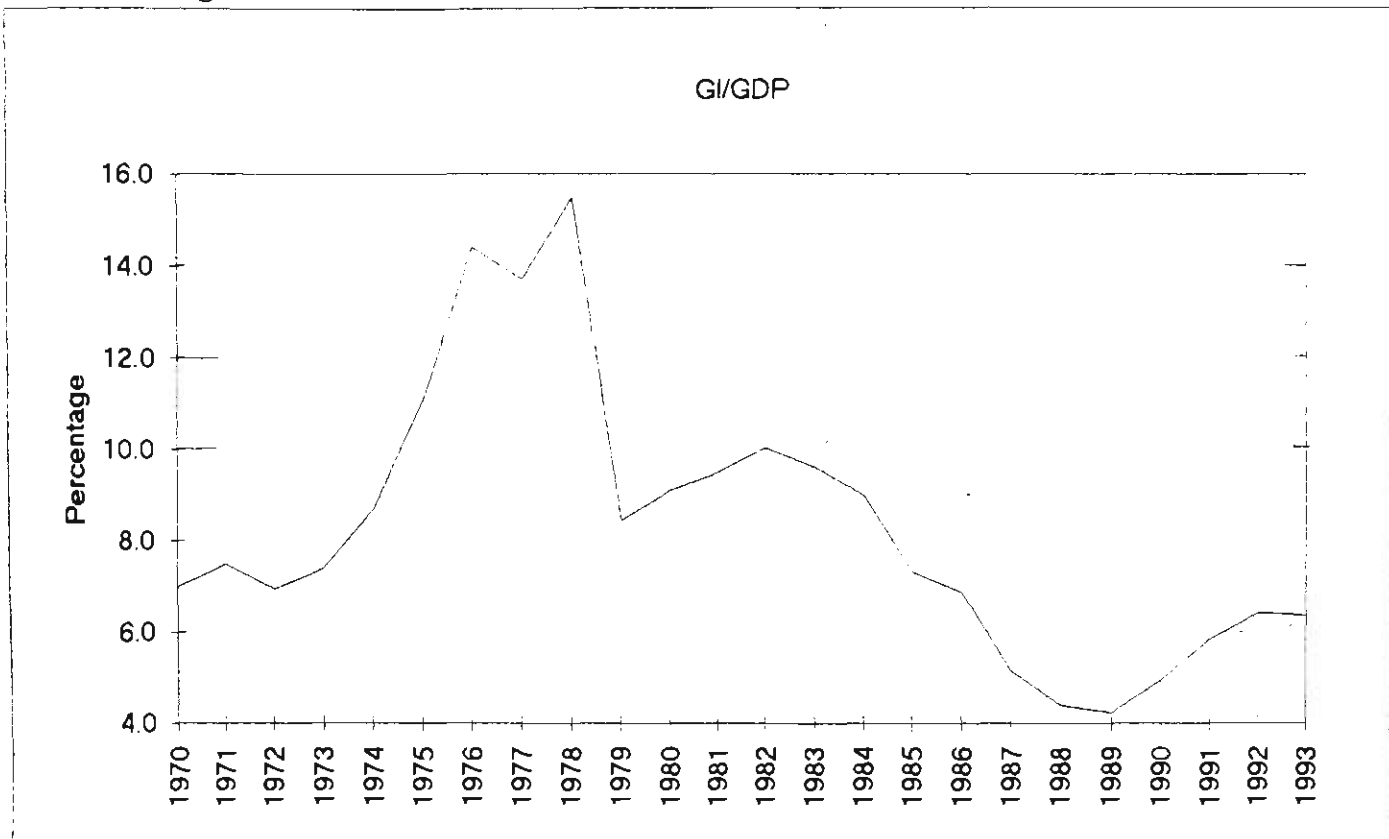


Figure 4.4. Share of Public Expenditure in Gross Domestic Product

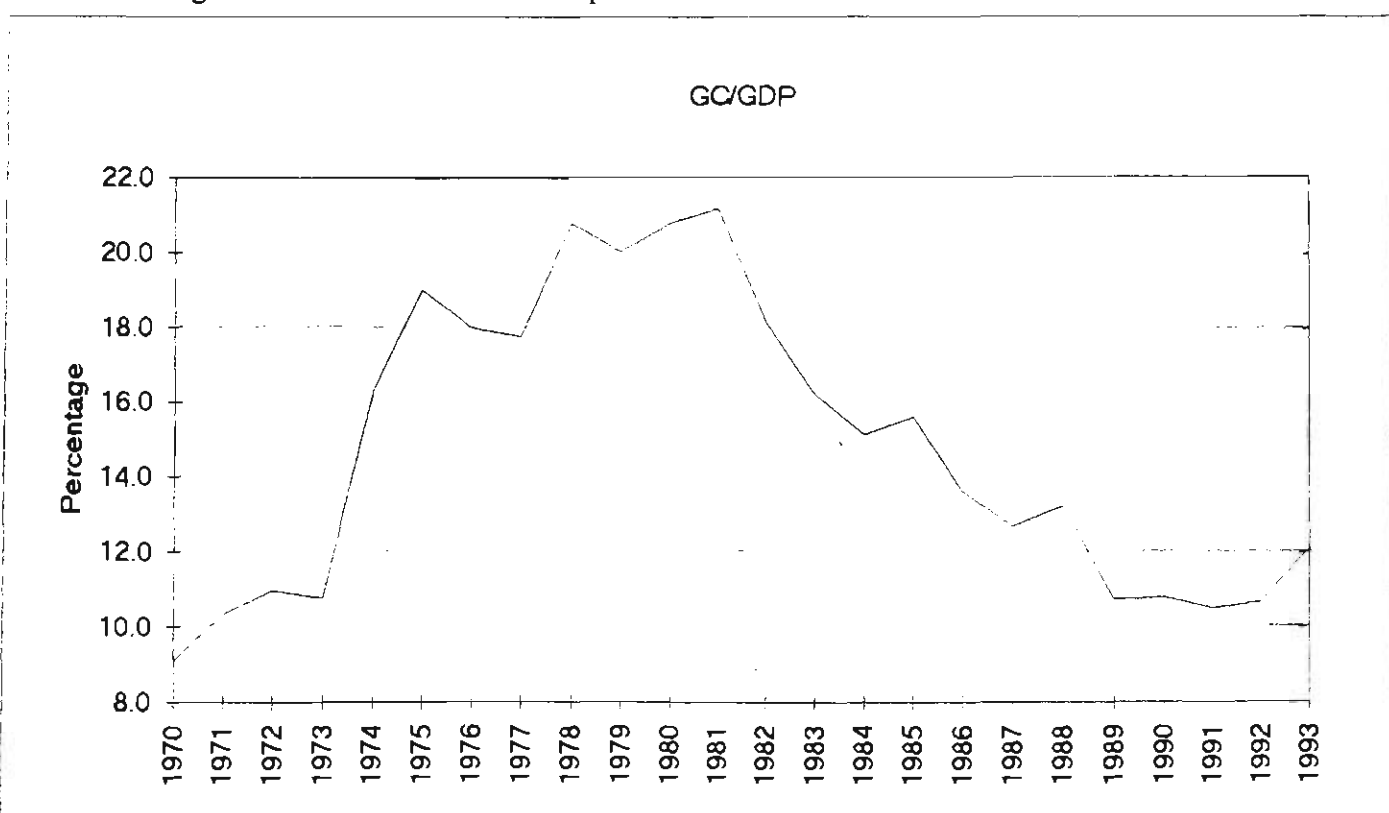


Figure 4.5. Real Non-Oil Net Export at 1982 Prices

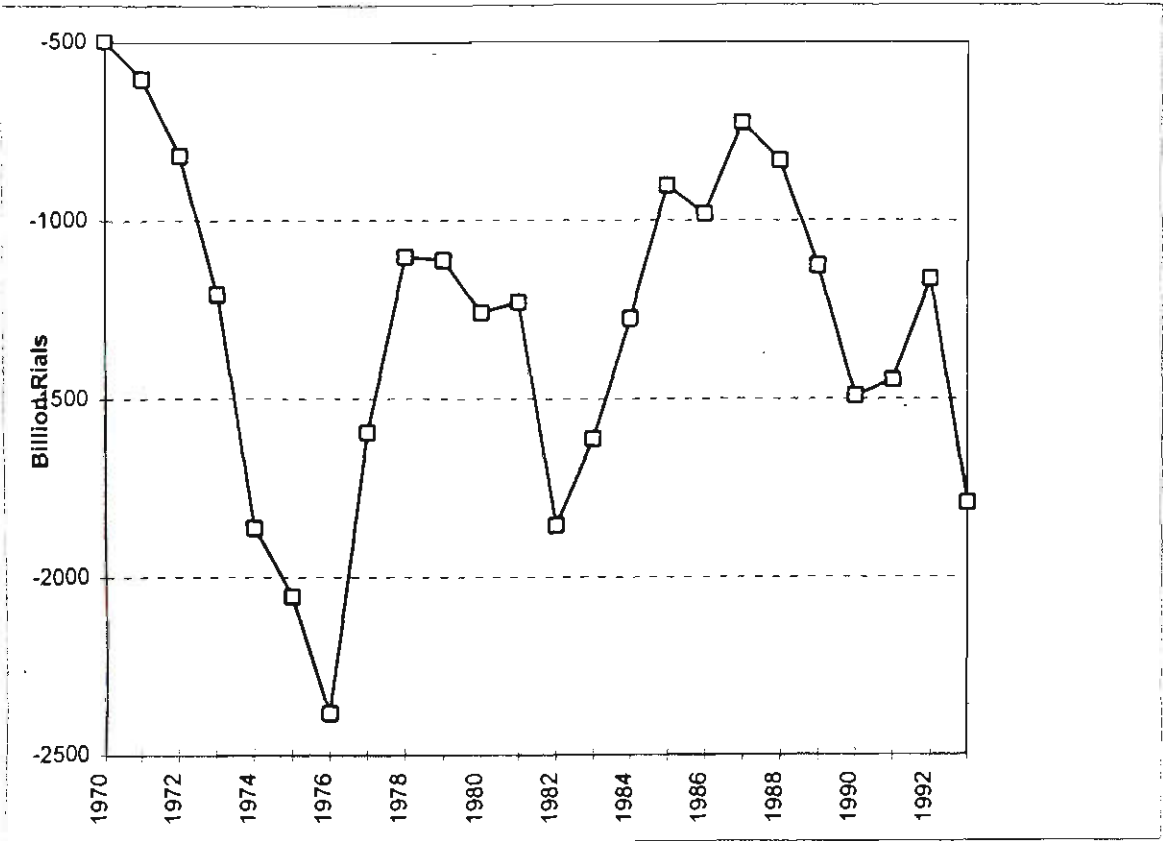


Figure 4.6. Rate of Interest for One Year Term Deposit

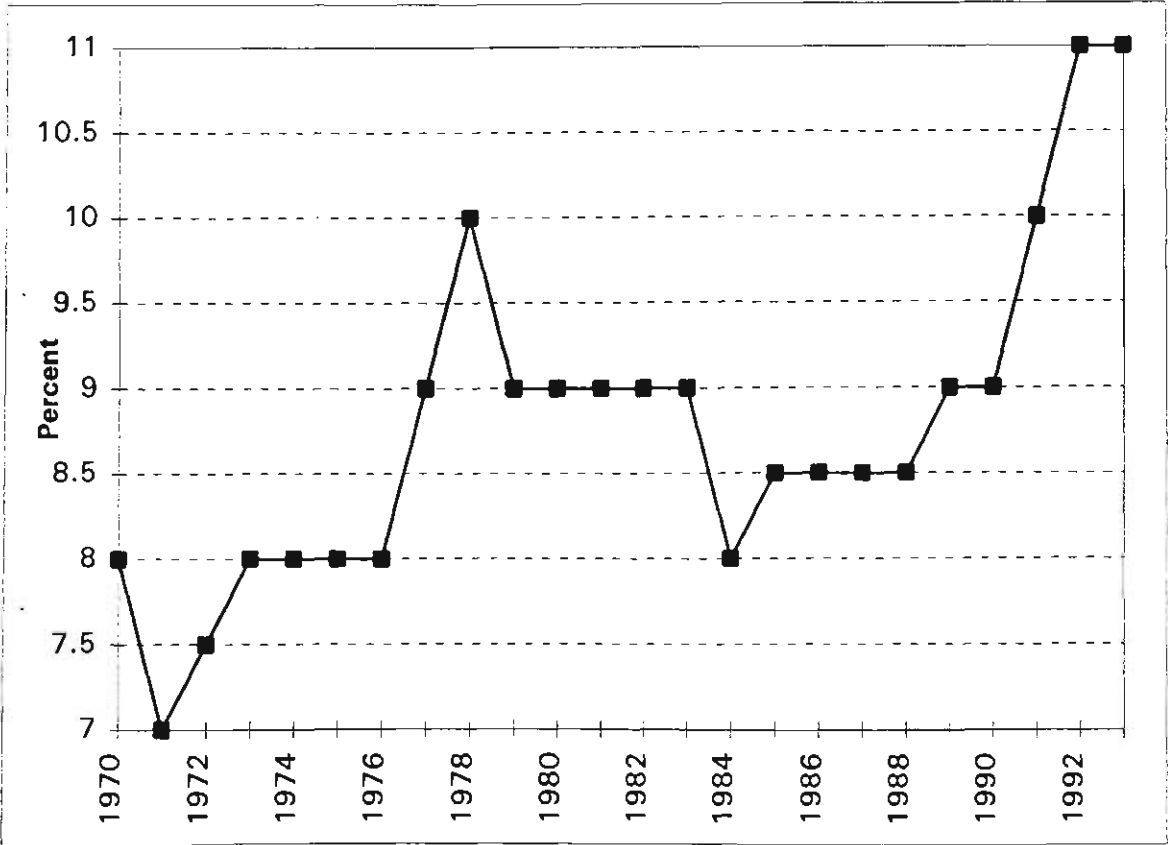


Figure 4.7. Real Gross Domestic Investment and Gross Domestic Product at 1982 Prices

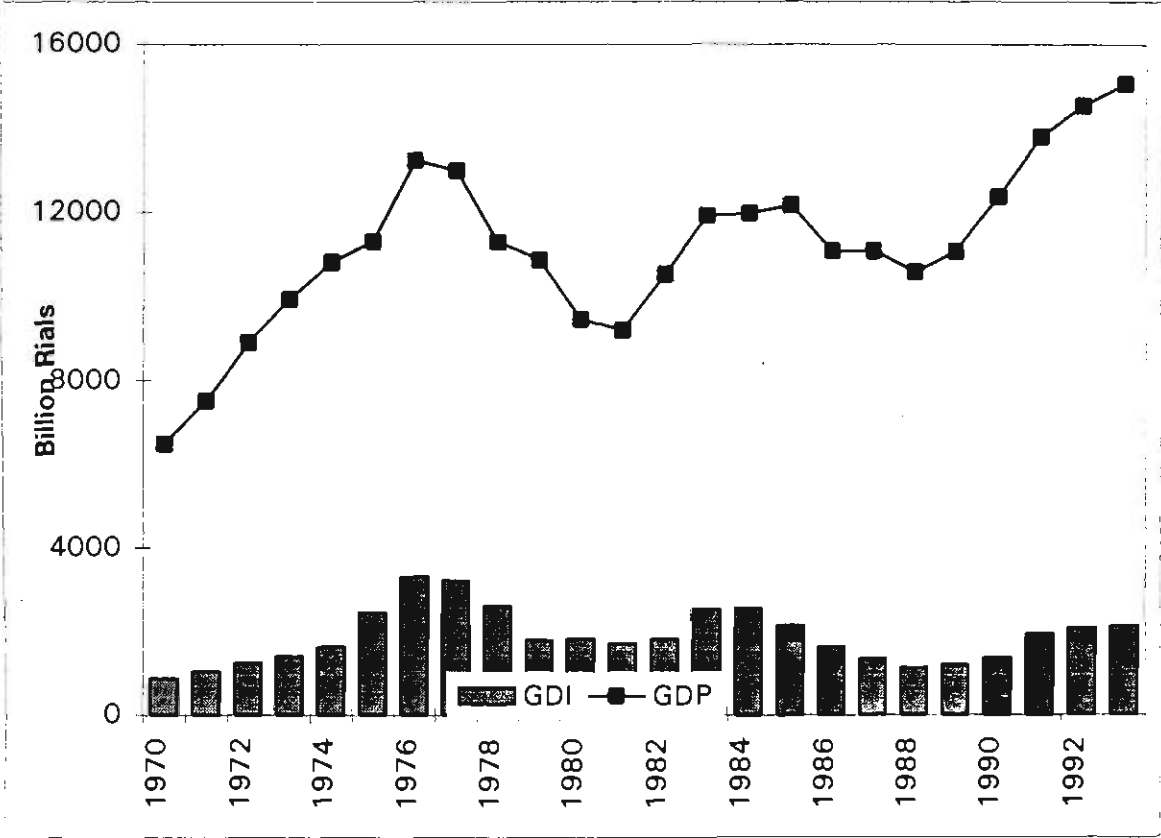


Figure 4.8. Real Private wealth at 1982 Prices

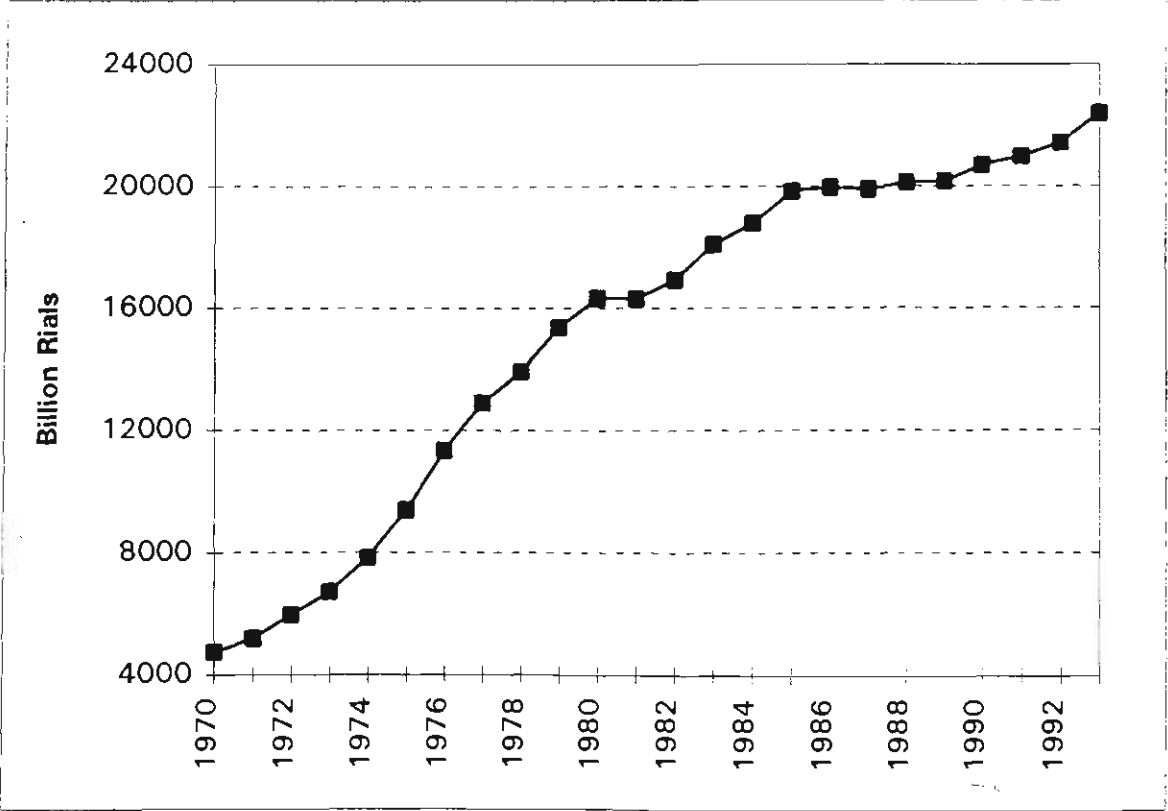


Figure 4.9. Oil and Gas Exports and Non-oil Exports

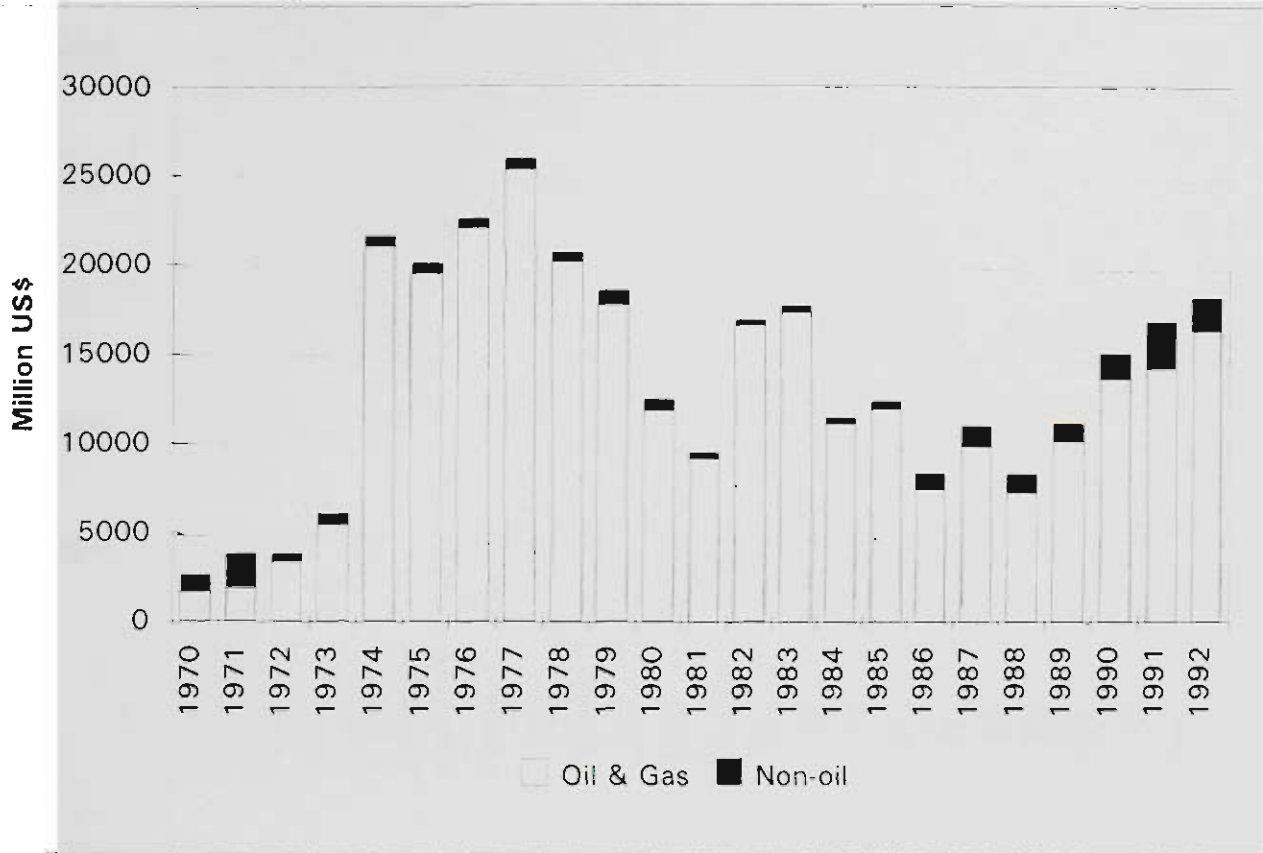


Figure 4.10. Composition of Imports

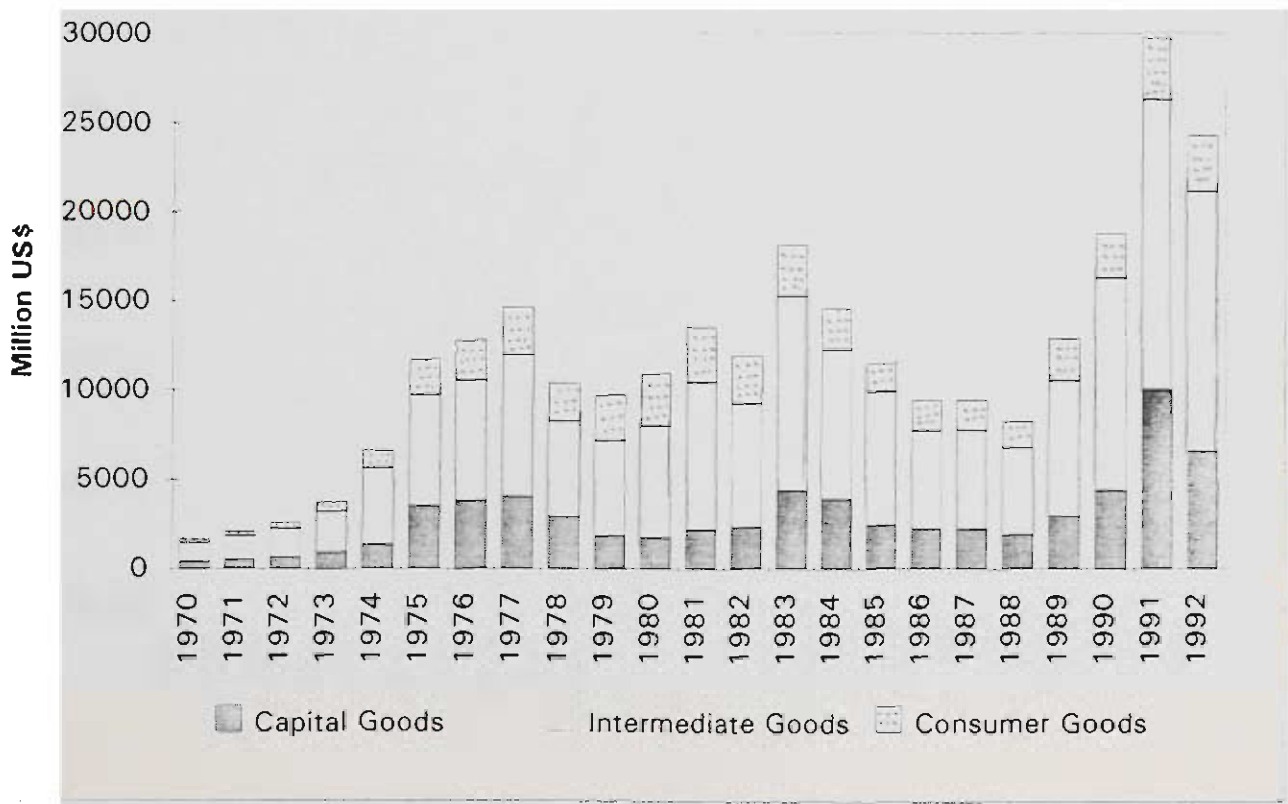


Figure 4.11. Rials per US Dollar in the Parallel Market

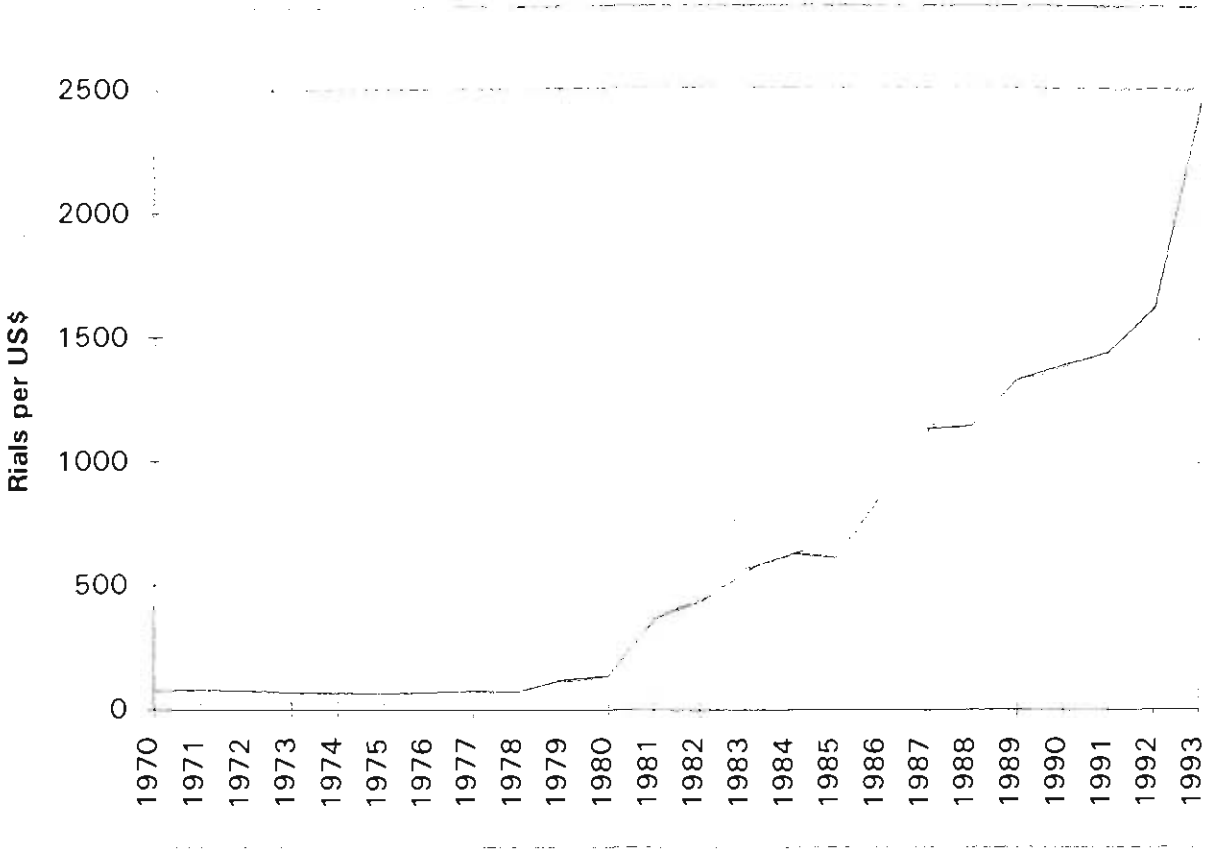
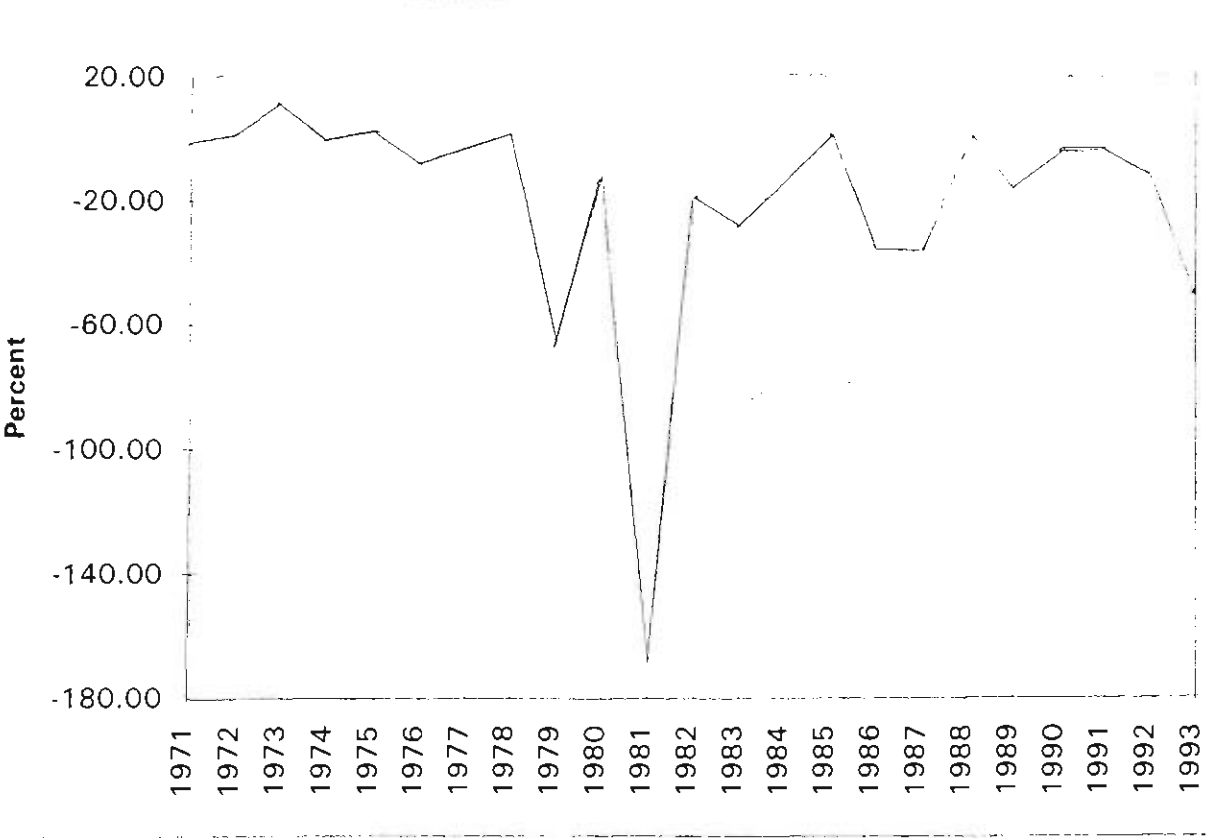


Figure 4.12. Rate of Devaluation of the Rial



CHAPTER 5:
IRANIAN PRODUCTION
AND INVESTMENT BY INDUSTRY

5.1. Introduction

The empirical investment model which was presented in the last chapter employed data for Iran between 1970 and 1993. As the conclusion of the chapter indicated private investment in Iran was positively affected by private consumption and negatively influenced by the interest rate, while public investment expenditure crowded in private investment and public current spending crowded it out during the study period. Simultaneously, the model shows that private investment was increased by aggregate supply and private wealth through increasing private consumption. It also showed that public current and investment expenditure are usually confined by oil export revenues in the short term and often in the long term. Finally, non-oil net exports (non-oil exports minus imports), which was positively affected by a devaluation of the domestic currency and world income, hardly influenced private investment. In brief, aggregate supply, private wealth and oil export revenues were the main determinants which had a direct impact on private investment in Iran during the study period. Government policy in the allocation of oil export revenues to either public investment or public current expenditure, could crowd in or crowd out private investment.

As a complementary study to the last chapter, a comparative study of production and investment in the major economic sectors is presented in this chapter. A single equation investment function is identified for this objective. This function estimates the major effects of macroeconomic factors, as well as government economic policy, on gross domestic investment as a whole and investment in major sectors during the oil booms, revolutionary turmoils, oil crisis and the Iran-Iraq war. These events, and the role of government economic policy, are included as well as sectoral production, capital stock, bank financing, public investment, oil exports and foreign exchange rate factors.

The results from estimation of the above investment function for different sectors using OLS (Ordinary Least Squares) and SUR (Seemingly Unrelated Regressions) in two stages, are presented in Tables (5.3)-(5.6). The results from doing so are mostly significant and interesting. They show that production often positively affected investment by industry. A higher volume of capital stock negatively affected gross domestic investment and investment in each sector. While the interest rate for investment was determined by the government at much lower rates than the market interest rate, greater access to banking facilities increased investment in all industries (except services) and vice versa. An increase in oil exports had positive effect on the investment in water and electricity and housing sectors, but a negative effect on investment in the services sector. The crowding out effect of public investment expenditure on gross domestic investment is not supported in this study.

The effect of the real exchange rate on investment is positive and, except in the housing sector, this effect is weak. A dummy for the revolution and the Iran-Iraq war (1979-88) shows that these important events negatively affected agricultural investment, but increased investment in the oil and gas and water and electricity

sectors. The oil boom periods (dummy for 1974 and 1982)⁴⁵ did not increase investment in the industries and mines and services sectors. The oil crisis increased investment in the housing sector, of which most of its needs are produced by domestic manufacturers and suppliers.

This chapter proceeds as follows; section 5.2 presents an overview of output and investment in the major economic activities; agriculture, oil and gas, industries and mines group, and services in Iran during the study period. The main bottleneck for investment in developing countries is the availability of finance for importing capital goods, since such goods are hardly produced in these countries. Investment in manufacturing machinery will be considered in section 5.3. Foreign direct investment before the revolution and shortcomings in the existing regulations in favour of foreign direct investment will be reviewed in section 5.4. The major conclusions are presented in section 5.5. The tables and figures related to production and investment in different economic activities are displayed in the appendix. All data used in this chapter are real with the exception of the interest rate and are based on the price level in 1982 (i.e. 1982 = 100).

5.2. Aggregate Production and Investment

Real gross domestic product (GDP) experienced a 125 percent increase over the study period. Table 5.1 in the appendix identifies developments in GDP and its components (agriculture, oil and gas, industries and mines group, and services output) over the period 1970-1993. The first six years of the 1970s coincided with sizeable oil export revenue for Iran, which affected most of the macroeconomic variables in the Iranian

⁴⁵ The oil price also increased in 1979-80, but the Iranian economy did not benefit from this oil price boom due to the sharp decrease in Iranian oil exports. This decrease was the result of strikes in the Iranian oil industry before the revolution, and the pursuit of a conservation policy in favour of oil resources in the first years after the revolution.

economy. Real production sharply increased from Rials 6416 billion in 1970 to Rials 13475 billion in 1976.

The real growth rate of GDP was 13.2 percent annually during this period. This high growth rate provided a unique opportunity for investment in the country. At the same time, real gross domestic investment (GDI) increased annually by 24.7 percent. The above indicators show that the real growth rate of investment was almost two fold that of the same rate in GDP. In other words, GDI benefited relatively more than GDP and other aggregate variables from the petro-dollars which were gained at that time. This economic honeymoon was very short, as unexpected decreases in the demand for crude oil in the world after 1977 diminished GDP and GDI and many other macroeconomic factors. The economy suffered from shortages in infrastructure facilities, skilled manpower and government mismanagement in 1977 and 1978. This situation generated a big gap between aggregate demand and aggregate supply, which resulted in a high inflation rate in the last three years of the Shah's regime. Combined with widespread government corruption, this economic crisis was the most influential factor against the Pahlavie regime. The overwhelming strikes of 1978 contributed to economic chaos which brought down the monarchy in Iran.

The economic crisis continued during, and for a few years after, the revolution (1979-1981). Economic uncertainty, western countries' economic embargoes, a decline in oil exports and finally the Iran-Iraq war were the causes of this impoverishment. Real GDP was Rials 9218 billion in 1981 which was the lowest on record after 1972, being only 68.4 percent of GDP in 1976 in real terms. Along with real GDP, real GDI also fell sharply to Rials 1724 billion in the same year (1981) which was almost half of the 1976 record. The average annual negative growth rate of GDP and GDI were 8.4 and 12.3 percent respectively, during the period 1977-1981. Such evidence indicates that investment was vulnerable in times of economic recession or uncertainty and economic instability.

The economy improved in the following four years. The real annual average growth rate of GDP was 4.3 percent, and this rate for GDI was also higher at 5.7 percent during the period 1982-1985. The Iranian GDP and GDI were Rials 11604 billion and Rials 2562 billion in 1984. This economic growth was the result of an easing of the economic embargo and increments in oil exports over this period. Investment increased during 1982-1984 when the government was designing the first five year plan bill. Expansion of the war from battle fronts to bombardment of cities, factories and oil export ports, deteriorated the economy in the last years of the war. The government replaced its economic development policy with an economics of war policy in this period. According to this policy a large number of production lines were changed from ordinary market goods to armaments. Public pricing and a widely controlled distribution system were designed by the government to confine the high inflation rate and supply the essential needs of citizens through rationing or other government distribution channels.

In such circumstances, encouraging private investment was not the first priority of the statesmen and these investments actually started to decrease from 1985 until the ceasefire in 1987. The above evidence again supports the rational view that investment is affected by future economic expectations. The last three years of the war coincided with the bombardment of refineries, depots and the main oil export port (Khark island in the Persian Gulf). These events caused a fall in real GDP and a sharper fall in real GDI. The annual negative growth rates of GDP and GDI were 4 and 19 percent respectively.

The last period of our study coincided with reconstruction of the war damages and the first five year plan (1989-93). Real GDP increased from Rials 10846 billion in 1989 to Rials 14925 billion in 1993, which for the first time was the highest on record since 1970. Real gross domestic investment also increased from Rials 1144 billion to

Rials 2133 billion in this period. The real annual growth rates of GDP and GDI were 8.3 and 16.9 percent respectively during the plan. Generally speaking, in less than 24 years the country's GDP and GDI had three expansionary and two recessionary periods. The expansionary periods coincided with oil export booms and the recessionary periods coincided with the world oil crisis, the peak times of the war and internal economic instability. This evidence shows that GDI was more sensitive than GDP during periods of expansion or recession. Also, investment is affected by government policies and economic expectations as much as by other macroeconomic factors. Output and investment growth had different trends in different sectors. These trends in agriculture, oil and gas, industries and mines, housing and services sectors are considered in detail in the following parts of this chapter.

Real gross domestic investment (GDI) in Iran was between 11 and 25 percent of gross domestic product (GDP), and except between 1975 and 1985 it was often less than 15 percent of GDP from 1970 to 1993. GDI fluctuations were considerably larger than fluctuations in private consumption and public current expenditure during the study period. This characteristic is particularly interesting. Tables 5.1 and 5.2, and Figure 5.1 in the appendix, show how production and investment changed over the period 1970-1993 and especially in the years of the oil boom, oil crisis and during the Iran-Iraq war (1980-88). From 1970 to 1976 the investment increase paralleled the oil boom and receded with the decline in oil exports, and also with government mismanagement as described in chapter 2.

After the revolution in 1979, investment spending experienced two recessionary periods and two expansionary periods until 1993. Immediately after the revolution and until 1981, total investment in the country halved as a result of the revolutionary turmoils and their aftermaths, the economic uncertainty and the onset of the war with Iraq. On the other hand, improvements in the oil market and a new investment protection policy increased investment spending for a short time between 1982 and

1984. Investment in the country decreased once again during the following three years (1986-1988), with heavy air attacks on the oil depots and oil export ports. During this time, only one fourth of the industrial capacity was actively employed. Limited foreign exchange, which was allocated to armaments and other battle front needs, resulted in the rest of the civil production facilities remaining idle (CBIRI 1992, p.31).

The first five year plan (1989-1993) provided a mandate by the government in favour of investment and production after the ceasefire in 1987. Annual investment and imports of capital goods almost doubled during this plan. A more detailed analysis of investment behaviour over the study period will be presented in the following sections.

Based on our conclusions in chapter three and the flexible acceleration principle, investment is a function of output (Y) and lagged capital stock (K). Noferesty and Arabmazar (1994) argue that oil export revenue (OX) and the volume of bank financing (F) affect investment behaviour in Iran. The latter variable was a replacement for the interest rate which was determined by the government. It was set much lower than the market interest rate during the study period. We assume that public investment (GI) also contributed to investment behaviour, thus the investment function is postulated to be:

$$I_t = f[Y_t, K_{t-1}, F_t, GI_t, OX_t]$$

We applied the above function to explain the behaviour of gross domestic investment in this section for Iran over the period 1970-1993. The above equation for GDI and investment in each sector are estimated by ordinary least squares (OLS) and seemingly unrelated regressions (SUR). The SUR method is applied for the estimation of GDI and also the investment function in each sector because the error

terms across the equations may be correlated (error correlation may not be zero). These estimations are presented in Tables 5.3 and 5.4 in the appendix. Coefficients of a few variables are insignificant in the first estimation, thus the above estimations are repeated after eliminating the insignificant coefficients from the model. The results of the second estimation are shown in Tables 5.5 and 5.6 in the appendix. The above results using the SUR method for the gross domestic investment function, are also shown below:

$$I_t = -1.85 + 0.92Y_t + 0.02K_{t-1} + 0.08F_t + 0.32GI_t - 0.92OX_t + 0.05E_t$$

(2.82) (6.41) (0.24) (0.93) (8.32) (3.48) (1.31)

$$R^2 = 0.98 \quad D.W. = 1.61$$

Values in brackets are "t" values. The above results show that gross domestic investment (I) was positively affected by output (Y), lagged capital stock (K), bank financing (F), public investment (GI) and the foreign real exchange rate in the parallel market (E) but not by oil exports (OX). These results, except for the lagged capital stock, bank financing and real exchange rate, are statistically significant. Reestimation of the above function after deleting the lagged capital stock is:

$$I_t = -1.94 + 0.74Y_t + 0.14*F + 0.37GI_t - 0.49OX_t + 0.08E_t + 0.05D14$$

(4.05) (5.57) (2.69) (10.2) (1.90) (3.50) (2.69)

$$R^2 = 0.98 \quad D.W. = 2.00$$

Both results do not support the hypothesis that gross domestic investment increased during the oil booms or decreased in the oil export crisis period. Gross domestic investment was influenced by the growth in output and by the increase in public investment expenditure. The last result does not support the position that investment behaviour is crowded out by public investment expenditure. The effect of bank financing on investment was positive but weak. The belief that the foreign exchange rate influences the whole economy as well as gross domestic investment was not supported by the above results. Finally, the dummy for the oil crises⁴⁴, for the

⁴⁴The years in which oil export revenues were less than US\$ 14 billion.

years that oil exports were less than US\$ 14 billion, has a weak effect on gross domestic investment. The trends of production and investment in the agriculture, oil and gas, water and electricity, industries and mines, housing and services sectors are considered in the next sections. Also, the above investment function will be estimated for each sector.

5.2.1. Agriculture Sector

Iran's main agricultural products are grains (especially wheat, barley and rice), potatoes, sugar beets, sugar cane, cotton, nuts, dairy products, meat, vegetables and fruits. The main shortages of agricultural products in Iran are for wheat, rice and a number of other grains, oil seeds, meat and dairy products. The level of production and shares of the agricultural sector in the Iranian GDP and GDI are plotted in Figures 5.2 and 5.3 in the appendix for the period 1970-1993. Real GDP in the agricultural sector was Rials 1105 billion in 1970, increasing to Rials 1747 billion in the last year of the Shah's regime (1978). The share of this sector in GDP was 17.2 percent in 1970. This share continuously decreased during the oil export boom in the first eight years of the 1970s. This share diminished to 12.4 percent of GDP in 1977 which had been the lowest level until that time. This is indicative of the "Dutch Disease" effect in the agriculture sector before the revolution.

After the revolution the share of agriculture in GDP increased to over 20 percent from time to time, and between 1987 and 1989 it reached over 25 percent. Annual growth of agricultural output in real terms was 5.9 percent and it was 30 percent below the GDP growth rate (7.7 percent) from 1970 until the Islamic revolution in 1979. This trend was changed after the revolution. Real output in the agricultural sector increased and doubled between the Islamic revolution (1979) and the end of the first five year plan (1993). The average annual growth rate of this sector was 4.4 percent and it was 112 percent greater than the average annual rate of GDP (2.2 percent) after the revolution to 1993. These products grew about 220 percent while

GDP grew only 133 percent over the study period. Agricultural output was Rials 3536 billion, accounting for 23.7 percent of the Iranian GDP in 1993. In spite of a slow down in the growth rate of agricultural output and GDP after the revolution, the above trend shows that the Iranian government succeeded in enacting its first priority of policy in favour of agricultural activities during this period.

The new policy after the revolution which curtailed or limited imports, increased the production of rice, potatoes, sugar beet root, beans, milk and other dairy products, meat, poultry, eggs and pistachio, while the subsidisation policy and mass imports of some basic agricultural products affected the production of wheat, barley, sugar cane and oil seeds into the country after the revolution (CBIRI, 1992, pp. 178-9).

Private investors in the agriculture sector enjoyed low interest rates as a result of the special allocations by the Bank of Agriculture to this sector. The share of agricultural investment in total domestic investment was 8.1 percent in 1970, increased to 10.7 percent in 1974 which was the highest record during the study period. Massive petrodollars were mostly allocated for a new range of industrial plants, decreased the share of agriculture to 4.1 percent of gross domestic investment in 1978. This share again increased after the revolution, since the agriculture sector was considered and propagated as the strategic sector. Its share in investment was about 6 percent on average after the revolution to 1993. Based on the investment function defined in the last section, the investment function is estimated for the agriculture sector during the study period. The results of this estimation are as below:

$$AI_t = 3.53 - 0.93AY_t + 0.59AK_{t-1} + 0.11AF_t + 0.53GI_t - 0.02OX_t - 0.31DWAR$$

$$(1.51) \quad (3.26) \quad (1.40) \quad (0.63) \quad (5.03) \quad (0.03) \quad (3.23)$$

$$R^2 = 0.71 \quad D.W. = 1.62$$

The results show that investment in the agriculture sector (AI) is positively affected by the lagged capital stock (AK) and public investment expenditure (GI), and

negatively influenced by production (AY) and oil exports (OX). The coefficients of the lagged capital stock and oil exports are not statistically significant. Bank financing for the agriculture sector (AF) had a weak and insignificant effect on investment in this sector. The dummy for the revolution and the war period (1978-87) had a negative effect on investment in this sector. The above results show that increases in agriculture output, which were mostly related to rainfall and other climatic elements, did not increase investment in this sector. Public investment expenditure crowded in agricultural investment during the study period. The above estimation is repeated after deleting the lagged capital stock, bank financing and the foreign exchange rate from the right hand side of the investment function for the agriculture sector. The results of this estimation are:

$$AI_t = 2.25 - 0.19AY_t + 0.60GI_t - 0.16DWAR$$

(2.63) (2.22) (7.62) (2.74)

$R^2 = 0.70$ $D.W. = 1.63$

Agriculture investment was crowded in by public investment expenditure and slightly suffered during the Iran-Iraq war. Production negligibly affected investment in the agriculture sector during the study period.

5.2.2. Oil Sector

The oil sector in Iran is the monopoly of the government through the National Iranian Oil Company (NIOC), the National Iranian Gas Company (NIGC) and the National Iranian Petrochemical Company (NIPC) as well as a number of supporting and affiliated companies operating as public enterprises. The NIOC is a giant corporation which exploits crude oil and gas, controls oil exports, manages domestic refining as well as domestic distribution of about 4 million barrels of oil product per day. Oil revenues are identified as the sole government revenue and the principal source of foreign exchange for imports of goods and services.

Total oil exports were 1.3 billion barrels which generated Rials 2898 billion revenue in 1969 in real terms. Oil exports increased about 62 percent to reach 2.1 billion barrels with Rials 4826 billion revenue, showing a 67 percent growth in 1974 (Looney 1977, p. 4). Figure 5.4 in the appendix shows the share of oil sector in gross domestic investment and GDP. GDP in this sector gradually decreased to Rials 3144 billion in 1978 and this downward trend continued until 1986 when the total real oil sector GDP reached Rials 1403 billion. In the following years oil production and oil exports expanded once again and reached Rials 2645 billion in 1993. The share of the oil sector in GDP does not show a simple trend during the study period. Its share sharply increased in the first half of the 1970s, rising from 17.4 percent of GDP in 1970 to 46.6 percent in 1974. However, real oil output declined from 34 percent of GDP in 1977 to 9.2 and 9.6 percent in 1980 and 1981 respectively. There were further fluctuations in the following years as it increased to 18.5 percent of GDP in 1982, decreased to 12.7 percent in 1986 and further increased during the first five year plan (1989-1993), reaching 18 percent of GDP in 1993.

The above changes were mainly related to the economic sanctions inflicted by western countries against Iran during the Iran-Iraq war. It was also due to the government's new conservation policy for oil exports and the poor maintenance of the oil industry, which contributed to the declining share of the oil sector in GDP between 1978 to 1989. In reality the share of oil products in GDP was much higher than the above record, considering that oil export revenue was changed to domestic currency at the official exchange rate which was two to thirty five times overvalued after the revolution until 1993. The average growth rate of the oil sector's real output was 9.8 percent, which was 1.9 percent greater than the GDP growth rate in the first four years of the first five year plan. The share of the oil sector in GDP jumped once again to 18 percent when the domestic currency (Rial) was officially devalued in 1993 (from Rials 70 to Rials 1610 for one US\$). The average share of the oil sector in GDP was 12.5 percent during the study period.

The oil industry was dominantly capital intensive and was only a minor source of employment. While its share in GDP was up to 50 percent, its contribution to labour employment was and still is between 90,000 and 110,000 which formed less than one percent of the Iranian labour force (PBO 1976 and 1986)⁴⁶. In spite of this characteristic, a substantial investment in this sector increased its capacity from less than 4 million barrels per day (bpd) to 8 million bpd before the revolution. The revolutionary government cut down crude oil exports to 2.5 million bpd. This was a conservation policy in favour of sustaining depletable oil resources. The war and air attacks on the Iranian refineries were another reason for the decrease in the share of the oil sector in the economy after the revolution. Other major reasons for such fluctuations in oil's share in GDP were western economic sanctions, volatile crude oil prices and the lack of investment in the oil industry after the revolution. The investment function which was defined in section 5.2 is estimated for the oil and gas sector during the study period. The results of this estimation are as below:

$$OI_t = -3.52 + 1.04 OY_t + 0.11 OK_{t-1} - 0.15 E_t + 0.88 DWAR$$

$$(1.11) \quad (4.97) \quad (0.39) \quad (1.34) \quad (4.97)$$

$$R^2 = 0.71 \quad D.W. = 1.83$$

The estimation results show that investment in the oil and gas sector (OI) was positively affected by its output (OY) and by the lagged capital stock (OK) and was negatively affected by the foreign exchange rate (E). The last two factors had weak and insignificant effects on investment in the oil industry. These results support the argument that investment in the oil and gas sector was mostly financed by the sales of this sector's products in advance or through "buy back" negotiations. The dummy for the revolution and the Iran-Iraq war (1978-87) shows that investment increased to

⁴⁶ Official census in 1976 and 1986

maintain this industry. The reestimation of the above equation after dropping the lagged capital stock, because of its insignificant coefficient, is:

$$OI_t = -3.22 + 1.05OY_t - 0.09E_t + 0.94DWAR$$

(1.64) (5.55) (0.86) (5.86)

$R^2 = 0.70$ $D.W. = 1.77$

This computation supports the above arguments. Oil production directly affected investment in this sector. Also, a considerable part of the investment in the oil sector was built up during the Iran-Iraq war. A major part of this investment was for repairing the war damages. The government increased investment in the oil sector to maintain its export capacity in spite of continuing bombardment of oil fields and oil export ports during the war.

5.2.3. Industries and Mines Group

The industries and mines group in this study is an aggregation of water, electricity, mines, industries and housing activities. The real value of the products of this group was Rials 726 billion in 1970. It tripled in six years reaching Rials 2347 billion in 1976 but declined during the revolutionary turmoils (1978-1979) and again increased to Rials 2364 billion in 1984. The last four years of the war coincided with a 15 percent decrease in industrial and mining output. The output of this group again increased during the first five year plan and reached Rials 3000 billion in 1993 in real terms. The real share of this group in GDP was 11.5 percent in 1970 and increased to 18.4 percent in 1978. This share did not change significantly and was about 20 percent after the revolution until 1993. On average, the share of this group in GDP was 15 percent before the revolution and 18 percent during the study period. Its real average growth rate was 8.7 percent which was slightly greater than the real GDP growth rate (7.5 percent) during the first five year plan (1989-1993). According to the above overview, the industries and mines group grew rapidly before the

revolution but it could not maintain its share in GDP after the revolution. Figure 5.5 in the appendix shows trends in production and investment for this group.

Investment in the industries and mines group increased from Rials 175 to Rials 782 billion between 1970 and 1977. Investment in this group slid down to Rials 538 billion in 1978. During the above period, industries and mines succeeded in absorbing more than Rials 3626 billion (about US\$ 50 billion) from unexpected oil export revenues. The average annual investment between the revolution and the end of the war was only Rials 249 billion. The main objectives of the government for this group after the ceasefire were rectifying the war damages, completing unfinished plants, increasing the utilisation of existing capacities of the industries, raising the output of intermediate goods such as iron and steel, cement, pulp and paper, and promoting the export of processed food and other manufactured goods.

Investment in industries and mines was Rials 1948 billion during the first five year plan. The plan's projections suggested a greater role for private investment in the industries and manufacturing sector, but still about half of the domestic gross investment would be controlled by the government. Output and investment in water and electricity, industries and mines and housing will be separately considered in detail in the following sections.

5.2.3.1. Water and Electricity Industry

Water and electricity is a public industry in Iran. The production of this infrastructure industry was Rials 30 billion in 1970 and, except in 1980, continuously increased during the study period. The real value of this product increased about eleven times and reached Rials 339 billion in 1993. The average growth rate of this sector was 16 percent before and 8.7 percent after the revolution. The average share of this sector within the industries and mines group was 4.8 percent in 1970, increasing to 11.4 percent in 1993. As mentioned earlier, this main industry was the

most successful division of the Iranian economy during the study period. It was the only economic activity which constantly boomed from the revolution until 1988.

With the completion of the new plants projected in the first five year plan, the electricity capacity of the country was expected to double and reach 35000 megawatts by the due date of this plan. Nine new great dams in different provinces and Boushehr Nuclear Generators Complex are under construction. These will also enable the government to reach their goals in this sector (Amuzegar 1993, p.133). Based on the investment function which was defined in section 5.2, the following investment function in the water and electricity sector was estimated during the study period. The results of this estimation are as below:

$$WEI_t = -1.07 + 1.37WEY_t - 1.11WEK_{t-1} + 3.15OX_t + 1.23DWAR$$

(0.26) (5.10) (3.01) (2.18) (6.84)

$R^2 = 0.64$ $D.W. = 1.66$

The results show that investment in this sector (WEI) is positively affected by its output (WEY) and strongly increased with oil export revenue (OX). The elasticity of investment with respect to these are 1.37 and 3.15 respectively. Increases in the capital stock had negative effects on investment in this sector. In other words, the low rate of depreciation in power stations and dams fulfils public needs and reduces the need for new investment. The dummy for the revolution and the war period (1978-87) had a positive effect on investment in this sector. This result shows that investment in water and electricity, similar to the oil sector, was the first priority of the government and did not recede in the economic recession during the study period. In brief, in spite of the air raids and damage to this industry during the war, a considerable investment in water resources and electricity has increased the capacity of this infrastructure industry since the revolution.

5.2.3.2. Mines

Real GDP of the mining sector was Rials 23 billion in 1970, increasing to Rials 60 billion in 1977. Strikes in industries and mines and economic uncertainty during the revolution decreased mining output to Rials 52 billion in 1979. It once again increased to Rials 74 billion in 1984. Over 1985-1988 the GDP of the mines sector declined for the second time but recovered again after the ceasefire in 1988. In 1993 minerals output reached Rials 77 billion. The share of mining output in the industries and mines group was 3.5 percent in 1970 and decreased to 2.5 percent in 1976 then gradually increased to 3.5 percent in 1980 and once again decreased to 2.6 percent in 1993. Among the reasons for lack of growth in mining was partially different definitions and interpretations of "major minerals", which had to be nationalised according to article 44 of Iran's Constitution (1980). The implications of this article will be discussed in the next section.

5.2.3.3. Industries Sector

Industrial goods have been produced for almost a century in Iran. Iran's main industrial products are metals, textiles, cement and other building materials, chemicals, plastic, food processing, household appliances, pharmaceuticals, automobiles and machinery. After the revolution, 28893 production licences were issued by the Ministry of Industries for setting up a variety of new industrial plants. 7504 of these plants had already started their operations before the revolution without official licences. The total investment in these plants amounted to Rials 6415 billion, with more than 665000 new and directly employed workers. In September 1994, more than 56000 establishment permits for new industrial workshops and factories were issued by the above Ministry for new projects. These projects are expected to invest about Rials 43000 billion and employ 1.4 million workers.

Carrying out the above mentioned projects has a number of limitations. First, sharply devalued domestic money has increased the cost of capital goods which have to be imported for most of these projects. Second, increases in official interest rates have

decreased the present value of the future revenue of industrial projects. Third, the government has followed a new restrictive monetary policy after the first five year plan, and the banking system is limited in its ability to finance a major volume of investment in the new economic environment. Fourth, and the most important reason, is a new restrictive foreign exchange policy. Since 1994, foreign exchange allocation for importing capital goods with the new official (US\$ 1 = Rials 1750) or "floating" (US\$ 1 = Rials 3000) exchange rate is strongly limited by the Central Bank. Consequently, hard currency restrictions have stalled the progress of a large number of these projects.

Real industrial value added was Rials 383 billion in 1970, which almost tripled to Rials 1101 billion in 1977. It decreased to Rials 982 and 858 billion in 1978 and 1979, then gradually increased to Rials 2022 billion in 1993 in real terms. The average growth rates of this sector before and after the revolution were 16.3 and 6.3 percent respectively. The average share of the industries sector in the industries and mines group (i.e. water, electricity, mines, industries and housing) was 48.8 percent before the revolution (1970-1979), increasing to 60.2 percent after the revolution (1980-1993). This share increased to 69.3 percent in 1991 when the Central Bank of Iran allowed other banks open letters of credit with a "competitive" exchange rate (US\$ 1 = Rials 600) for manufacturing industries without previous requirements, which included the allocation of foreign exchange by the Ministry of Industries from its defined budget. The "competitive" exchange rate was about nine times higher than the official exchange rate, but still 60 percent cheaper than the exchange rate in the free market at that time.

Imports of raw and semi-manufactured goods are the most essential part of input of domestic manufacturing. Due to the shortages of imported raw materials and semi-manufactured goods, the availability of industrial products declined in the first years after the revolution and during the Iran-Iraq war. After the ceasefire (1988), and

following the launch of the first five year plan, industrial output grew rapidly for at least three years. It was mainly due to the open market policy which encouraged private sector activities and allowed unlimited foreign exchange allocations for importing industrial input materials.

As a result private investors were encouraged to divert their funds to manufacturing. Most of the permits for establishing new industrial plants recorded by the Ministry of Industries in September 1994, were for investments by the private sector. The value of these investments was estimated at about Rials 43000 billion. The most important projects in this group were twenty cement projects with a total of 35500 metric tons capacity per day, pulp and paper, tyres and rubber, drugs and pharmaceuticals, food and dairy products. The process of completing these projects has been concurrent with a variety of shortcomings and preconditions. The lack of hard currency, the absence of capital markets and availability of direct foreign financing by the private sector, the gap between savings and investment and the low rate of savings to GDP were all major obstacles. Also, the absence of research and development, shortages of skilled labour and qualified industrial managers are some other socio-economic constraints upon these industrial projects. The investment function defined in section 5.2 is estimated for the industries and mines sectors during the study period. The results of this estimation are as follows:

$$INMI_t = 3.93 + 0.37INMY_t - 1.56INMK_{t-1} + 0.93INMF_t + 0.50GI_t + 0.15E_t - 0.15DBOOM$$

$$(4.65) (2.01) \quad (9.69) \quad (5.09) \quad (5.44) \quad (1.80) \quad (2.51)$$

$$R^2 = 0.94 \quad D.W. = 1.81$$

The results show that investment in the industries and mines sector (INMI) is positively affected by its output (INMY), bank financing (INMF), public investment expenditure (GI) and the real exchange rate (E) but not by the lagged capital stock (INMK) during the study period. All these results are statistically significant. A

dummy for the oil price booms⁴⁶ shows that the industries and mines sector did not benefit from these oil booms. Gross domestic Investment in this sector was crowded in by public investment. The elasticity of investment in this sector to the real foreign exchange rate is weak (0.15). This result does not support the belief that devaluation of the domestic currency restricts investment in the industries and mines sector.

5.2.3.4. Housing Industry

In this section we survey residential investment which is by and large different in its characteristics. The required inputs (raw materials and capital goods) for housing are mostly produced domestically, while other industries are often dependent on imports of materials and goods for their routine operations. Thus, residential investment is mostly related to the supply and demand of residences, while other manufacturing industries are mostly affected by the government's foreign exchange allocation policy and the availability of finance for industrial purposes. A major part of house purchases is funded through mortgages and loans to the buyers and builders. In this regard monetary policy and banking facilities have powerful effects on the demand for housing. Public investment in residential activities is not considerable and the investments in this sector are largely done by the private sector. Housing activities have large cyclic fluctuations when compared to manufacturing activities. The above considerations and the effects of government policy on dwelling investment are discussed in more detail hereunder.

Real housing GDP increased rapidly between 1970 and 1976. It rose from Rials 290 billion in 1970 to Rials 1150 billion in 1976. The housing value added had several fluctuations after the revolution. The lowest level of housing output was Rials 426 billion in 1989. It increased during the first five year plan, and reached Rials 562

⁴⁶DBOON represents the years in which crude oil prices increased sharply

billion in 1993. The average share of housing in the industries and mines group was 44.6 percent before the revolution but slid down to 28.6 percent after the revolution. This downward trend continued to the point where the share of this sector was only 18.7 percent in 1993. Real investment and production in the housing industry are plotted in Figure 5.6 in the appendix.

By and large, construction sector activities dropped soon after the revolution. This recession forced the revolutionary government to intervene in this trend, since housing in Iran has important backward linkage effects on other industries. The government gave low interest rate bank loans for residential housing. The applicants could save their money in the bank, and after a short period they could borrow up to ten times of their savings from the banking system with a low non-variable interest rate (4 percent) to purchase a house.

Also, the government attempted to revive constructional activities through selling state-owned land to corporations and individuals with low registered prices, which were many times cheaper than the privately-owned land in the same area. It sold more than 4.5 million square metres for residential housing in 1982-1983 (Amuzegar 1993, p. 57). The above policies considerably enhanced housing activities. Its output increased about 40 percent from Rials 671 billion in 1981 to 937 billion in 1983. During the same period housing investment almost doubled, from Rials 23.9 billion to Rials 44.6 billion.

The market recession which resulted from the oil crisis, bombardment of cities and the oil export ports in the last years of the war, and the war economy produced a sharp fall in housing activities. Real investment in housing was only Rials 6.8 billion and Rials 6.6 billion in the last two years of the war (1987 and 1988). It was only revived after the ceasefire when rebuilding of the destroyed or damaged cities started and economic activity picked up. At this time activities of the construction sector

increased rapidly. Housing investment was Rials 57.5 billion in 1991 which was, except for 1975, the highest on record during the study period in real terms. Based on the investment function defined in section 5.2, this function for the housing sector is estimated during the study period. The results of this estimation are as below:

$$HI_t = -18.31 - 2.15HY_t - 4.76HK_{t-1} + 1.64HF_t + 3.99GI_t + 7.31OX_t + 1.51E_t + 0.83D12$$

(3.37) (3.10) (3.84) (3.00) (5.92) (2.60) (5.77) (2.25)

$R^2 = 0.74$ $D.W. = 1.57$

The results of this estimation show that investment in the housing sector (HI) was positively affected by bank financing, public investment expenditure (GI), oil export revenue (OX) and the real exchange rate but negatively by the output (HY) and lagged capital stock in this sector. All the results are significant. The elasticity of housing investment related to oil exports, public investment expenditure and bank financing are 7.31, 3.99 and 1.64 respectively. The dummy for the oil crisis (years that oil exports were less than US\$ 12 billion) shows that while for most industries the oil crisis caused a shortage in the foreign currency to imported capital goods, it encouraged investment in the housing sector.

In summary, the mines and industries sector lost its share in GDP while housing increased its share between 1970 and the year to the revolution (1979). On the other hand, infrastructure industries (water, electricity and gas) and other industries gained a larger share in GDP while housing lost between the revolution and 1993. The share of mining products in GDP was recorded at between 2.5 to 3.5 percent during the study period. The investment function defined in section 5.2 is also estimated for the non-service sectors (agriculture and industries and mines group) during the study period. The results of this estimation are as follows:

$$NSI_t = 0.79 + 0.34NSY_t - 0.91NSK_{t-1} + 0.36NSF_t + 0.91GI_t + 0.62OX_t + 0.10E_t$$

(0.61) (1.85) (5.26) (2.55) (16.7) (1.87) (1.66)

$R^2 = 0.98$ $D.W. = 2.29$

The results show that investment in all non-service sectors (NSI) is positively affected by output (NSY), bank financing (NSF), public investment expenditure (GI), oil export revenue (OX) and the real exchange rate but not by the lagged capital stock (NSK). All results are statistically significant at the 95 percent level; except the real exchange rate which is significant at the 90 percent level. The elasticities of investment in the non-service sector related to public investment expenditure and oil exports are larger than the others but are still less than one. The elasticity of investment in the non-service sector to the real exchange rate is less than ten percent. Finally, investment in the non-service sector was crowded in by public investment expenditure.

5.2.4. Services Sector

The services sector is the largest sector in the Iranian economy. The real GDP of services was Rials 1686 billion in 1970, tripling in less than a decade to reach Rials 4964 billion in 1979. This trend slowed down after the revolution. Its real output was Rials 5744 billion in 1993. This output increased 241 percent during the study period (1970-93) while in the same period real GDP increased only 125 percent. The share of this sector to GDP was 26.7 percent in 1970, increased to 40-50 percent during the revolution and the war period and then gradually decreased to 37.3 percent in 1993. The average share of this sector in GDP was 33 percent before the revolution (1970-78), and increased to 42.3 percent after the revolution (1979-93). The average growth rate of services output was 7.3 percent, which was 0.6 percent below the economic growth rate in the first four years of the first plan. Real investment and production in the services industry are plotted in Figure (5.8) in the appendix.

Quantitatively speaking, the services sector was the most successful sector, followed by water and electricity since the beginning of the last decade. This sector is

comprised of a variety of essential, semi-essential and luxury activities which had different trends after the revolution. On the whole this sector was not seriously affected by the deep recession during the Iran-Iraq war. The services sector gained a sizeable and quick boost from the gap between aggregate demand and aggregate supply after the revolution, and especially during the eight year Iran-Iraq war. Its revenue was much higher than the official records show and was, and still is, undetectable for taxation and other state tolls.

Investment in services was between 123 percent (in 1976) and 326 percent (in 1985) of the total investment in all other sectors (PBO 1994). On average, investment in services captured two thirds of GDI during the study period. It was 57 percent of GDI in 1976, growing to 76 percent of GDI in 1985. The investment function which is defined in section 5.2 is also estimated for the services sector during the study period. The results of this estimation are as below:

$$SI_t = -0.46 + 0.87SY_t - 0.31SK_{t-1} - 0.14SF_t + 0.54GI_t + 0.09E_t$$

(1.14) (5.10) (2.53) (2.65) (7.59) (1.88)

$R^2 = 0.97$ $D.W. = 1.67$

The results of this estimation show that investment in the services sector (SI) is positively affected by output (SY), public investment expenditure (GI) and the real exchange rate (E) but negatively related to the lagged capital stock (SK) and bank financing (SF). All the results are statistically significant. The real exchange rate and bank financing have weak effects on investment in this sector. The results also indicate that public investment expenditure crowded in domestic investment in the services sector during the study period.

In brief the trends of GDP and GDI indicate that major structural changes have taken place over the study period. Both these macroeconomic variables were affected by the oil boom and oil crisis. The Islamic revolution in 1978-9 and the Iran-Iraq war

were other events which affected these trends. Increases in GDP encouraged gross domestic investment. Public investment expenditure had a crowding in effect on gross domestic investment and investment in each sector. The share of agriculture and manufacturing in GDP increased, while the oil sector and services activities could not maintain their shares in GDP during the study period. The agriculture sector which had suffered from the "Dutch Disease Effect" before the revolution gained a higher share of GDP after the revolution.

Government economic policy favoured the agriculture and manufacturing sectors at the cost of the depletion of natural resources (exports of crude oil) for financing these sectors during the study period. Output, bank financing and oil export revenue often directly affected investment in each sector, while the lagged capital stock usually had a reverse effect on it. Investment is always crowded in by public investment expenditure. The revolution and the war had different effects on each sector. These events increased investment in the oil and gas, water and electricity, industries and mines, and housing sectors, but slightly reduced agricultural investment. The estimations did not show significant effects of the revolution and the war on investment in the services sector. The gap existing between aggregate demand and aggregate supply, which caused the widespread opportunities for middle men in the black market, was the main reason for this result during the revolution and the war. In the following section the investment in machinery, as an essential component of investment, will be considered in detail.

5.3. Investment in machinery

Investment in machinery is a critical portion of gross domestic investment especially in developing countries where capital industries are weak. Foreign exchange accessibility determines the quantity of investment in machinery in these countries. Also, this accessibility addresses whether domestic investment should be capital intensive or labour intensive. These arguments will be supported by the following information and data.

Real investment in machinery was Rials 211 billion in 1970, rapidly increasing to Rials 500 billion in 1974. The annual growth rate of capital investment was 24 percent in that short period. The growth rate of investment in machinery was 50 percent more than the same rate for total investment. This evidence shows that investment moved towards more capital intensive plants, while Iran enjoyed an unexpected boom in oil export revenue in the first half of the 1970s. Investment in machinery jumped to Rials 866 billion in 1975 and gradually increased to Rials 987 billion in 1977. The real growth rate of investment in machinery was 73 percent in 1975. This ascending trend slowed down in the following years. The real growth rate of investment spending on machinery was 4.3 and 9.2 percent in 1976 and 1977 respectively. Real investment in machinery is plotted in Figure (5.7) in the appendix.

On the whole, investment in machinery had a 24.7 percent annual growth rate between 1970 and 1977. This rate is comparable to, and consistent with, the annual growth of total investment (20.3 percent), which shows that investment was oriented towards capital intensive projects during 1970-1977. From 1978 to 1980 investment in machinery rapidly decreased to Rials 358 billion, which was less than 36 percent of the 1977 figure. Investment in machinery was often below Rials 500 billion after the revolution (1979) to 1990 in real terms. This component of aggregate investment increased once again in the second half of the first five year plan, reached Rials 781 billion in 1991 and Rials 863 billion in 1993 in real terms. During the study period average investment in machinery was Rials 539 billion, which was 29 percent of GDI. Based on the investment function defined in section 5.2 investment in machinery is estimated during the study period. The results of this estimation are as below:

$$\begin{aligned}
 MI_t = & -3.66 + 1.08Y_t - 1.90K_{t-1} + 1.24F_t + 0.83GI_t - 0.92OX_t + 0.73E_t \\
 & (1.58) \quad (2.16) \quad (5.45) \quad (4.05) \quad (5.98) \quad (0.92) \quad (5.51) \\
 R^2 = & 0.90 \quad D.W. = 2.13
 \end{aligned}$$

The results of this estimation show that investment in machinery (MI) was positively affected by GDP (Y), bank financing for investment, public investment expenditure (GI) and the real exchange rate (E), but negatively related to the lagged capital stock (K) and oil export revenue (OX). This estimation indicates that the cost of investment in machinery increased when the domestic currency was devalued in the market. It was crowded in by public investment expenditure and also increased with rising output and improvements in economic conditions. The elasticity of machinery investment related to bank financing was 1.24. All the above results except for the oil export revenue are statistically significant, thus the machinery investment function is reestimated after deleting the oil export revenue from the right hand side of the above equation. The result is shown as follows:

$$MI_t = -4.38 + 0.73Y_t - 1.62K_{t-1} + 1.14F_t + 0.91GI_t + 0.72E_t$$

(1.97) (2.34) (5.32) (3.99) (6.83) (5.66)

$R^2 = 0.90$ $D.W. = 2.13$

In brief, increases in output or public investment expenditure encouraged domestic investment in machinery. A higher real exchange rate did not decrease expenditure on machinery during the study period. In other words, devaluation of the domestic currency increased the marginal cost of investment through increasing the costs of imported machinery. The next section discusses the attractions and shortcomings of foreign investment in Iran during the study period.

5.4. Foreign Direct Investment

The legal limitations for foreign investment were introduced in article 81 of the Islamic Republic of Iran Constitution (1980). According to this article the "granting of concessions to foreigners for the formation of companies or institutions dealing with commerce, industry, agriculture, services or mineral extraction, is absolutely forbidden". This article does not abolish the "Attraction and Protection of Foreign

Investment Law" (1955) which had been the main legal framework for foreign investment in Iran. Also, the "Establishment of Free Zone Law" (1993) specifies regulations and rights of foreign investors in the free trade zones of the Islamic Republic of Iran.

According to the aforementioned laws, individuals or private companies can establish and develop industrial, mineral, agricultural, transportation and other related activities in the country. They can import capital in the form of foreign currency, machinery, plant and materials. The government extends support and protection to foreign capital imported into the country under the above laws. Profits earned from utilisation of foreign investment are also protected. Investors have the right to transfer profits from their business activities regularly, and the principal capital invested and its returns can be withdrawn at any time.

The Iranian market has always been open for the import of capital and intermediate goods as well as a variety of consumer goods. This wide foreign trade openness did not, however, introduce foreign direct investment in reality. This type of investment did not expand because of the surplus of oil exports to imports in the first half of the 1970s. This trend continued after the revolution basically because of the belief that foreign investment could threaten national interests. This notion raises questions about foreign direct investment, and disables the government from presenting an adequate policy to attract foreign investment.

Foreign direct investment was US\$ 25 million in 1970, increased to US\$ 561 million in 1973 but slid down in the mid 1970s (after an increase in the oil price) to US\$ 324 and 141 million in 1974 and 1975 respectively. Total investment during the years (1970-1975) was US\$ 1207 million which was less than 10 percent of Iranian assets in foreign banks at that time. There are no official records on foreign investment after 1975. However, there are a number of projects which were assisted by foreign

investors after the Iran-Iraq war. The Al-Mahdi Aluminium Smelter complex with US\$ 350 million investment in Bandar-Abbas (the biggest of Iran's ports on the Persian Gulf coastline) is the largest joint venture investment in Iran since the revolution. This project involved investment by a Malaysian enterprise and ABB, a multinational company. The Mimas-Nestle baby food factory with US\$ 47 million investment in Tehran, is another example of foreign direct investment in recent years (MEB 1995).

There are a number of factors which have affected foreign direct investment in Iran since the revolution. Government intervention in the economy has been high through foreign exchange allocation, the operation of a fixed exchange rate policy, pricing and public distribution especially since the Iran-Iraq war. These interventions have interfered with an open market environment which is a precondition for promoting and encouraging foreign direct investment. The government has cut back imports to essential goods, raw materials and machinery. Import regulations and exchange allocation policies were mostly implemented to stabilise domestic money against foreign currencies, which is a measure of the inflation rate and economic stability in Iran.

The above interventions, and especially the fixed exchange rate policy and the control of the foreign exchange market, made the repatriation of profits from foreign direct investment problematic for potential investors. The pricing and public distribution system by government bodies denied the opportunity to supply goods at market prices, while the gap between supply and demand existed in the market for many goods and services. Besides these elements, the most important limitation for foreign investment has been the level of risk and uncertainty in the Iranian economy. Although the government attempted to introduce a number of policies to encourage foreign investment in the first five year plan (1989-93), the rights and position of private and foreigner investors in the Iranian economy were still not defined clearly.

Some of the ambiguous areas in this regard will be outlined in the following paragraphs.

According to article 44 of the constitution, a number of the most attractive fields for investment such as "large-scale and mother industries, foreign trade, major minerals, banking, insurance,... media, communication, aviation, shipping, roads, railroads" are nominated for the public sector. These activities are not open to the domestic private sector, let alone private foreign investors. The above fields are among the most attractive industries in which foreigners prefer to invest. However, some of the new interpretations related to the above article (such as the concept of "large-scale") ease investment in some industries. Examples are the auto industry and metal smelting in which the domestic private sector as well as private foreign investment are allowed. Another progress in this regard is that foreigners are allowed to invest in free trade and industrial zones almost beyond regulations, which are strongly implemented in the mother land. They can establish all the above mentioned and many other industries together with their related services in any free zone, with full protection by the government free of tax (ICCIM 1994).

Another shortcoming for foreign investment is the regulation related to investment in heavy industries. The laws and regulations related to foreign investment are still very complicated and may have different interpretations from one state body to another. Besides, unpublished internal regulations and guidelines as well as unpredictable day to day economic changes are the biggest disadvantages for foreign direct investment. The share limitation for foreign individuals and companies in an Iranian company had been different from one industry to another, and also from export-oriented to import-substitute industries before the revolution. This share limitation has remained uncertain and undefined since the revolution. The share restriction was omitted, or reduced, for foreign direct investment in many countries, among them, the former Yugoslavia, the Philippines and India which do not have any limitation on the shares

obtainable by foreign investors (Pfeffermann 1988). In spite of a number of interpretations favouring an unlimited share for foreign direct investment, the aforementioned laws and regulations do not indicate that foreign investors can invest more than fifty percent in a firm in Iran. This measure is a major debate between the government and the Iranian parliament.

Many developing countries have several fiscal and financial incentive policies to attract foreign investment. However, in principle, assistance is provided through a number of programs. They take three major forms:

- incentives to offset protective barriers such as tariffs;
- incentives in the form of cash, tax benefits or cheap credit tied to the volumes of investment or increases in investment; and
- support for infrastructure such as education and information

The government could encourage foreign investors to import their resources and capital by eliminating or reducing tariffs and quotas. Foreign investors could receive credits for investment, or insurance in the form of cash guarantees, if a firm owned by a foreign investor was confiscated. Tax holidays or favourable taxation rates are other attractive policies. In Iran, besides a favourable tax rate, supplies of cheap fuel, electricity and mineral materials are available. Also the Iranian government supplies a variety of industrial needs at low prices to attract foreign investment. Foreign investors can enjoy a heavy protection policy against imports of finished goods, while domestic products are much less available than their demand. Some of the above policy incentives are for a certain number of years after establishing each industry, and then these incentives are gradually reduced or omitted.

Repatriation of profits or transferring of dividends on foreign investment is another important restriction in Iran, like many other developing countries. The main reason

for this restriction is that the government controls foreign currency. This restriction will remain until the exchange rate is fully floated and the external balance has improved. The current monetary policy is still a real restriction on foreign investment, and the authorities should guarantee the principle and future profits of foreign investors.

On the whole, the Iranian authorities have reduced several restrictions on foreign investment, through liberalisation policies and devaluation of the local currency during the first five year plan. Some of these reforms further reduced politicisation of the economy, through deregulation and liberalisation. Restrictions became fewer and the procedures for foreign investment became easier than before. Increasing the percentage of foreign shareholders creates increased motivation for foreign investment, but this agreement will not promote foreign investment until this right is legalised through legislation. Repatriation of profit and principal of foreign investment has not become easier than it was before.

Although the government has attempted to ease some of the restrictions, however, there are still a number of factors which have severely affected foreign investment. Firstly, macroeconomic policies and government intervention have interrupted the operation of markets, which is an essential element for foreigners to participate in investment. This intervention through a new fixed exchange rate policy, and a low rate of interest to cut down the inflation rate, distorts relative prices. Secondly, the economy is still highly regulated which constrains foreign investment. For example, in the sectors in which foreign investors are allowed, the proportion of ownership is regulated. Also, the number of workers that a foreign investor can employ locally, land ownership rights and the minimum percentage of domestic value added are some other regulations which may reduce investment by foreigners. Ultimately, the most important limitation for foreign investment is the risk and uncertainty which still exists after the revolution and the Iran-Iraq war. The Iranian government could

encourage foreign investment through new economic policies which further open the country's markets to supply more products and services with foreign investment. Sectors such as banking, insurance, communications, high technology commodities or know-how, informatics, iron ore and gold mining, oil and gas exploration, refineries and shipping are among the industries that potentially can attract foreign investment.

5.5. Conclusion

Production and investment in Iran have experienced three expansionary periods and two recessionary periods, which were often affected by the revenue from oil exports. Oil export revenue was, and still is, a major proportion of total government income, providing the vast majority of funds for importing raw materials, intermediate and capital goods. Any fluctuation in the oil market directly changes government revenue and causes a shock in production and investment in Iran, which relies on the allocation of foreign currency for imports. By and large, this dependency has been increased since the beginning of the 1970s when the oil price increased rapidly.

Production and investment slowed down when oil export revenue decreased from 1977 to the revolution in 1979. The revolutionary government attempted to alter economic dependency from oil revenue soon after the revolution. There was a shift in production and investment policy from capital intensive plants, which were mainly dependent on foreign exchange availability, to medium scale and small scale industries as well as housing, which used more domestic materials rather than imported goods.

Gross domestic investment often captured less than 15 percent of gross domestic product, and it had more fluctuations than private consumption or public expenditure. About two thirds of gross domestic investment was secured by investments in services during the study period. The agricultural sector enjoyed government priority after the

revolution and during the Iran-Iraq war. Water and electricity was another sector in which investment never decreased in real terms during the revolution and the war period. The industries and mines sector, under the protection policy, saved their share in the domestic market but rarely succeeded in exporting their products. The oil sector did not expand, or even maintain, its capacity for oil and gas exports after the revolution. This sector continually repaired the oil export facilities which were under heavy air strikes during the Iran-Iraq war. The western countries' economic embargo was, and still is, a major restriction for investment and production in this sector.

The services sector, which was substantially formed by small businesses, was the most successful sector between the revolution and the end of the Iran-Iraq war in 1988. This sector could make money from the increasing gap between aggregate demand and aggregate supply since the revolution. The ceasefire in 1988 was a turning point in production and investment in Iran. The first five year plan (1989-1993) expanded production by almost fifty percent and doubled investment. The most successful sectors during this plan in production and investment were the oil and gas, and the industries and mines sectors.

Investment expenditure in manufacturing is mostly comprised of machinery in Iran where land, construction and the labour force are not expensive. Like many other developing countries, manufacturing of machinery was an infant industry in Iran. Iranian industries rarely produce machinery for the purpose of production, thus investment in manufacturing was highly dependent on imports of machinery and know how from abroad. Imports of machinery were confined by the availability of foreign currency which was highly dependent on oil export revenues, where non-oil exports formed a small percentage of Iranian exports. On the other hand, investment in housing has a low import ingredient since bricks, cement, gypsum and other construction goods are the main housing materials. These products are by and large

produced domestically. The share of investment in manufacturing, which is highly dependent on imported machinery, increased when foreign currency was available and decreased in the oil crisis during the study period. Also investment in capital intensive industries was determined by oil export revenue and the availability of foreign currency during the study period.

Estimations of investment functions by industry showed that increased production extends investment by industry in all sectors, except in agriculture and housing. A higher level of capital stock often reduces investment by industry. In other words, the capital which was formed by investment in the previous periods restricted new investments in the same sector. Bank financing and oil export revenue often increased investment in different sectors, and public investment expenditure always crowded in domestic investment by industry during the study period. The effect of the real exchange rate on investment was positive in all major economic sectors. However this effect was weak, except in the case of housing. As it can be seen, this result does not support the common belief among policy makers that the foreign exchange rate has been one of the most influential macroeconomic factors for economic stability and development in Iran.

The dummy for the revolution and the Iran-Iraq war years (1979-88) positively affected investment in the oil-gas and water-electricity sectors, but negatively affected agriculture. While the economy enjoyed oil booms in 1974 and 1982, a dummy for these years shows that the services as well as industries and mines sectors, slightly lost their shares in gross domestic investment in these years. Finally, investment in housing increased its share during the oil crisis. This oil crisis decreased investment in the industries and mines sectors which were highly dependent on imported capital goods.

Foreign investment was renounced for almost ten years after the revolution. The Iranian government has only attempted to attract foreign investment since 1989, when the first five year plan was launched. However, the government's efforts confronted several restrictions and shortcomings. The lack of an open market environment was a substantial element. Foreign investment was encouraged when the government introduced a single-rate floating foreign exchange rate in 1993, although there was a set back later when the Central Bank introduced a new fixed exchange rate to slow down a two digit inflation rate in 1995. This recent inflexible foreign exchange policy along with the new government pricing system for curtailing the inflation rate, were breaches of the free market principles which could exacerbate the difficulties in attracting foreign direct investment. The next chapter will introduce a macroeconomic model to predict the effects of a number of economic policies on aggregate demand, aggregate supply and specifically on private investment.

5.6. Appendix

5.6. Appendix

5.6.1. Tables

Table 5.1. Real Product by Economic Sectors at 1982 Prices Billion Rials

Year	Agriculture	Oil & Gas	Industries & Mines	Non- Services	Services	Total
	1	2	3	4=1+2+3	5	7=4+5
1970	1105	2898	726	4729	1686	6416
1971	1115	3521	842	5477	1944	7421
1972	1262	4027	1003	6292	2437	8729
1973	1344	4723	1229	7295	2534	9829
1974	1394	4826	1431	7650	3371	11021
1975	1530	4250	1703	7483	4102	11585
1976	1706	4781	2347	8835	4641	13475
1977	1640	4408	2330	8379	4817	13196
1978	1747	3144	2104	6996	4841	11837
1979	1851	2535	1774	6160	4964	11125
1980	1915	866	1874	4655	4855	9510
1981	1953	883	1875	4710	4507	9218
1982	2091	1948	1884	5923	4543	10467
1983	2193	2006	2255	6454	5136	11590
1984	2354	1626	2364	6344	5261	11604
1985	2538	1644	2232	6414	5373	11787
1986	2651	1403	2033	6086	4655	10741
1987	2716	1599	2084	6399	4341	10739
1988	2648	1754	1978	6380	4030	10410
1989	2746	1890	2109	6745	4101	10846
1990	2968	2265	2392	7624	4500	12124
1991	3120	2517	2802	8439	4946	13385
1992	3352	2554	2932	8837	5344	14181
1993	3536	2645	3000	9181	5744	14925

PBO (1994)

Table 5.2. Real Investment by Economic Sectors at 1982 Prices Billion Rials

Year	Agriculture	Oil & Gas	Industries & Mines	Non- Services	Services	Total	Machinery expenditure
	1	2	3	4=1+2+3	5	7=4+5	
1970	71.5	66.2	175	312.7	574.2	886.9	211.1
1971	97.4	95.9	180.6	373.9	668.7	1042.6	257.6
1972	127.6	145	201.4	474	782.6	1256.5	323.1
1973	132	140.7	228	500.7	914.6	1415.3	363
1974	174.5	148.2	281.9	604.6	1029.2	1633.8	499.5
1975	201.6	201.6	557.3	960.5	1492.5	2453	866.3
1976	187.8	620.1	681.8	1489.7	1839.1	3328.8	903.5
1977	164.7	402.4	782.4	1349.5	1881.5	3231	986.9
1978	119.3	294.8	537.9	952	1671	2623	591.6
1979	114	139.4	254.1	507.5	1308.3	1815.8	377.6
1980	120.9	95.9	246.3	463.1	1385.3	1848.4	358.2
1981	128.4	115	238.2	481.6	1242.6	1724.2	426.4
1982	108.9	167.9	298.5	575.3	1266.2	1841.5	473.4
1983	150.5	188.5	356	695	1856.1	2551.1	720
1984	106.6	139.6	424.3	670.5	1891.7	2562.2	828
1985	110.7	98.8	296.9	506.4	1646.9	2153.3	616.6
1986	94	89.6	233.4	417	1228.9	1645.9	320.4
1987	86.9	45.6	195.6	328.1	1032.5	1360.6	244.9
1988	83.4	47.2	169	299.6	844	1143.6	249.3
1989	78.4	57.5	195	330.9	885.9	1216.8	352.6
1990	108.9	48	254.5	411.4	967.4	1378.8	460.7
1991	124	110.5	471.4	705.9	1237	1942.9	781
1992	108.5	73.2	507.2	688.9	1388.4	2077.3	849.9
1993	112	75	520	707	1426.4	2133.4	863.2

PBO (1994)

Table 5.3. First Estimation of the Investment Function by Industry (OLS)

	Agri- culture	Oil & Gas	Water & Elec.	Indus. & Min.	Hous- ing	Non-S ervices	Servic- es	Mach- inery	GDI
Sector's Production	-0.45 (1.05)	0.90 (3.43)	1.01 (2.08)	0.45 (1.66)	-2.06 (1.91)	0.37 (1.31)	1.03 (3.67)	1.53 (1.86)	0.94 (4.13)
Sector's Lagged Capital Stock	-0.18 (0.26)	0.33 (1.00)	-0.59 (0.92)	-1.40 (6.65)	-5.46 (2.84)	-0.90 (3.78)	-0.40 (2.03)	-1.68 (3.21)	0.04 (0.31)
Sector's Bank Financing	0.21 (0.85)			0.79 (2.95)	1.78 (2.13)	0.33 (1.65)	-0.15 (1.79)	0.92 (1.96)	0.04 (0.32)
Public Investment	0.60 (3.79)			0.48 (4.13)	4.09 (4.03)	0.94 (13.8)	0.46 (4.14)	0.75 (4.09)	0.35 (6.85)
Oil Export Revenue	-0.80 (0.78)		4.48 (2.28)		6.82 (1.62)	0.54 (1.17)		-1.39 (0.96)	-1.03 (2.57)
Foreign Exchange Rate		-0.37 (1.98)		0.07 (0.64)	1.68 (4.46)	0.10 (1.15)	0.09 (1.40)	0.61 (3.25)	0.04 (0.80)
Dummy	-0.24 ^w (1.53)	0.66 ^w (2.75)	1.07 ^w (4.19)	-0.22 ^b (2.34)	0.85 ^c (1.47)				
Constant	5.94 (1.79)	-2.69 (0.71)	-5.60 (0.93)	3.69 (3.31)	-16.55 (2.14)	0.61 (0.35)	-0.40 (0.68)	-4.87 (1.42)	-1.91 (2.01)

R-squared	0.73	0.73	0.65	0.94	0.75	0.98	0.96	0.90	0.98
Durbin-Watson	1.60	1.81	1.69	1.91	1.63	2.35	1.96	2.01	1.69
F- statistic	7.66	12.81	8.95	45.0	6.95	125.0	79.9	26.2	164.6

Sources: 1. PBO (1994), Iran National Accounts various years

2. International Financial statistics and World Tables 1992-1994

Sample 1970-1993

All data are real (1982=100)

Figures in parentheses are t-values

b. Dummy for the oil price booms (1974 and 1982)

c. Dummy for the oil crisis (years that oil exports was less than US\$ 12 billion)

w. Dummy for the revolution and the war (1978-1987)

Table 5.4. First Estimation of the Investment Function by Industry (SUR)

	Agri- culture	Oil & Gas	Water & Elec.	Indus. & Min.	Hous- ing	Non-S ervices	Servic- es	Mach- inery	GDI
Sector's Production	-0.93 (3.26)	1.04 (4.97)	1.37 (5.10)	0.37 (2.01)	-2.15 (3.10)	0.34 (1.85)	0.87 (5.10)	1.08 (2.16)	0.92 (6.41)
Sector's Lagged Capital Stock	0.59 (1.40)	0.11 (0.39)	-1.11 (3.01)	-1.56 (9.69)	-4.76 (3.84)	-0.91 (5.26)	-0.31 (2.53)	-1.90 (5.45)	0.02 (0.24)
Sector's Bank Financing	0.11 (0.63)			0.93 (5.09)	1.64 (3.00)	0.36 (2.55)	-0.14 (2.65)	1.24 (4.05)	0.08 (0.93)
Public Investment	0.53 (5.03)			0.50 (5.44)	3.99 (5.92)	0.91 (16.7)	0.54 (7.59)	0.83 (5.98)	0.32 (8.32)
Oil Export Revenue	-0.02 (0.03)		3.15 (2.18)		7.31 (2.60)	0.62 (1.87)		-0.92 (0.92)	-0.92 (3.48)
Foreign Exchange Rate		-0.15 (1.34)		0.15 (1.80)	1.51 (5.77)	0.10 (1.66)	0.09 (1.88)	0.73 (5.51)	0.05 (1.31)
Dummy	-0.31 ^w (3.23)	0.88 ^w (4.97)	1.23 ^w (6.84)	-0.15 ^b (2.51)	0.83 ^c (2.25)		-0.11 ^b (3.25)		
Constant	3.53 (1.51)	-3.52 (1.11)	-1.07 (0.26)	3.93 (4.65)	-18.31 (3.37)	0.79 (0.61)	-0.46 (1.14)	-3.66 (1.58)	-1.85 (2.82)

R-squared	0.71	0.71	0.64	0.94	0.74	0.98	0.97	0.90	0.98
Durbin-Watson	1.62	1.83	1.66	1.81	1.57	2.29	1.67	2.13	1.61

Sources: 1. PBO (1994), Iran National Accounts various years

2. International Financial statistics and World Tables 1992-1994

Sample 1970-1993

All data are real (1982=100)

Figures in parentheses are 't' values

b. Dummy for the oil price booms (1974 and 1982)

c. Dummy for the oil crisis (years that oil exports was less than US\$ 12 billion)

w. Dummy applied for the revolution and the war (1978-1987)

Table 5.5. Second Estimation of the Investment Function by Industry (OLS)

	Agri- culture	Oil & Gas	Water & Elec.	Indus. & Min.	Hous- ing	Non-S ervices	Servic- es	Mach- inery	GDI
Sector's Production	-0.17 (1.81)	0.83 (3.28)	0.58 (4.31)	0.58 (3.25)	-2.06 (1.91)	0.71 (5.18)	0.93 (3.97)	0.88 (1.86)	1.08 (12.8)
Sector's Lagged Capital Stock				-1.31 (8.39)	-5.46 (2.84)	-0.88 (5.98)	-0.27 (1.95)	-1.46 (3.11)	
Sector's Bank Financing				0.66 (3.70)	1.78 (2.13)	0.15 (1.27)	-0.23 (3.34)	1.01 (2.23)	
Public Investment	0.58 (6.38)			0.47 (4.15)	4.09 (4.03)	0.91 (17.3)	0.49 (4.96)	0.82 (4.89)	0.37 (7.39)
Oil Export Revenue			5.81 (4.40)		6.82 (1.62)				-1.04 (4.16)
Foreign Exchange Rate		-0.28 (1.71)			1.68 (4.46)			0.63 (3.40)	0.05 (1.65)
Dummy	-0.16 ^w (2.21)	0.78 ^w (3.77)	0.90 ^w (5.06)	-0.23 ^b (2.48)	0.85 ^c (1.47)		-0.14 ^b (2.69)		0.05 (1.50)
Constant	2.25 (2.31)	-0.25 (0.09)	-10.35 (3.33)	3.48 (3.32)	-16.55 (2.14)	0.79 (0.75)	0.19 (0.44)	-5.28 (1.56)	-2.52 (3.86)

R-squared	0.70	0.72	0.64	0.94	0.75	0.98	0.97	0.90	0.98
Durbin-Watson	1.62	1.69	1.67	1.84	1.63	2.21	1.57	2.03	1.83
F- statistic	15.5	16.7	11.73	55.7	6.95	186.3	102.0	31.34	226.5

Sources: 1. PBO (1994), Iran National Accounts various years

2. International Financial statistics and World Tables 1992-1994

Sample 1970-1993

All data are real (1982=100)

Figures in parentheses are t-values

b. Dummy for the oil price booms (1974 and 1982)

c. Dummy for the oil crisis (years that oil exports was less than US\$ 12 billion)

w. Dummy applied for the revolution and the war (1978-1987)

Table 5.6. Second Estimation of the Investment Function by Industry (SUR)

	Agri- culture	Oil & Gas	Water & Elec.	Indus. & Min.	Hous- ing	Non-S ervices	Servic- es	Mach- inery	GDI
Sector's Production	-0.19 (2.21)	1.05 (5.48)	1.06 (3.93)	0.51 (2.92)	-2.00 (3.12)	0.46 (2.69)	0.96 (5.71)	0.73 (2.34)	1.10 (16.8)
Sector's Lagged Capital Stock			-0.72 (2.06)	-1.44 (9.89)	-4.31 (3.73)	-0.88 (6.00)	-0.37 (3.13)	-1.62 (5.32)	
Sector's Bank Financing				0.78 (4.81)	1.34 (2.64)	0.26 (2.10)	-0.17 (3.07)	1.14 (3.99)	
Public Investment	0.59 (7.60)			0.47 (5.52)	3.95 (6.32)	0.92 (17.1)	0.53 (7.45)	0.91 (6.83)	0.33 (8.54)
Oil Export Revenue			3.75 (2.87)		5.70 (2.18)	0.46 (1.65)			-1.11 (6.23)
Foreign Exchange Rate		-0.10 (0.90)		0.07 (0.90)	1.55 (6.30)	0.08 (1.40)	0.09 (2.11)	0.72 (5.66)	0.04 (1.78)
Dummy	-0.16 ^w (2.72)	0.93 ^w (5.70)	1.08 ^w (5.92)	-0.12 ^b (2.11)	0.59 ^c (1.74)		-0.12 ^b (3.46)		0.04 ^c (1.72)
Constant	2.24 (2.63)	-3.14 (1.59)	-3.45 (0.95)	3.68 (4.68)	-16.52 (3.24)	0.53 (0.47)	-0.42 (1.05)	-4.38 (1.97)	-2.33 (4.72)

R-squared	0.70	0.70	0.65	0.94	0.74	0.98	0.97	0.90	0.98
Durbin-Watson	1.63	1.77	1.60	1.75	1.63	2.25	1.77	2.13	1.69

Sources: PBO (1994), Iran National Accounts various years, International Financial statistics and World Tables 1992-1994

Dummy applied for the oil price booms (1974 and 1982) or the revolution and the war (1978-1987)
Sample 1970-1993

All data are real (1982=100)

Figures in parentheses are t-values

b. Dummy for the oil price booms (1974 and 1982)

c. Dummy for the oil crisis (years that oil exports was less than US\$ 12 billion)

w. Dummy applied for the revolution and the war (1978-1987)

5.6.2. Figures

Figure 5.1. Real Gross Domestic Product and Investment at 1982 Prices

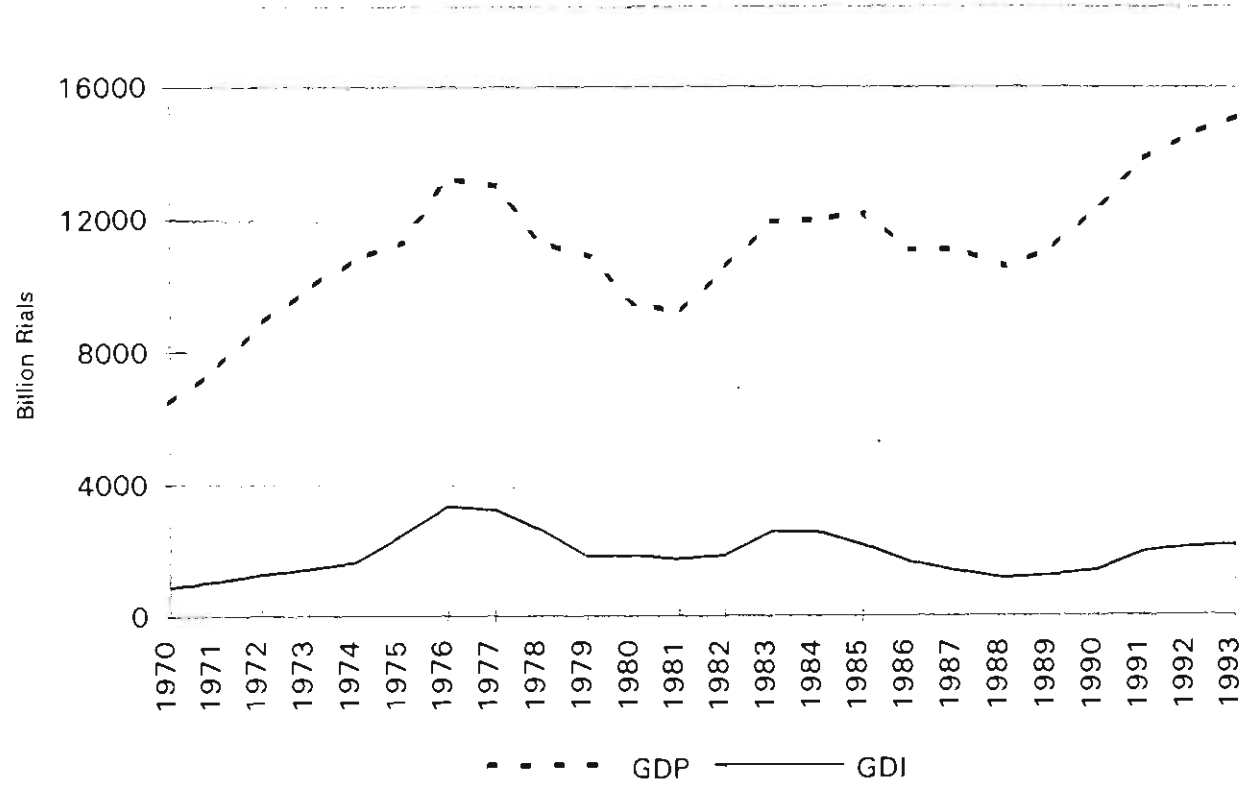


Figure 5.2. Real Product and Investment in the Agriculture Sector at 1982 Prices

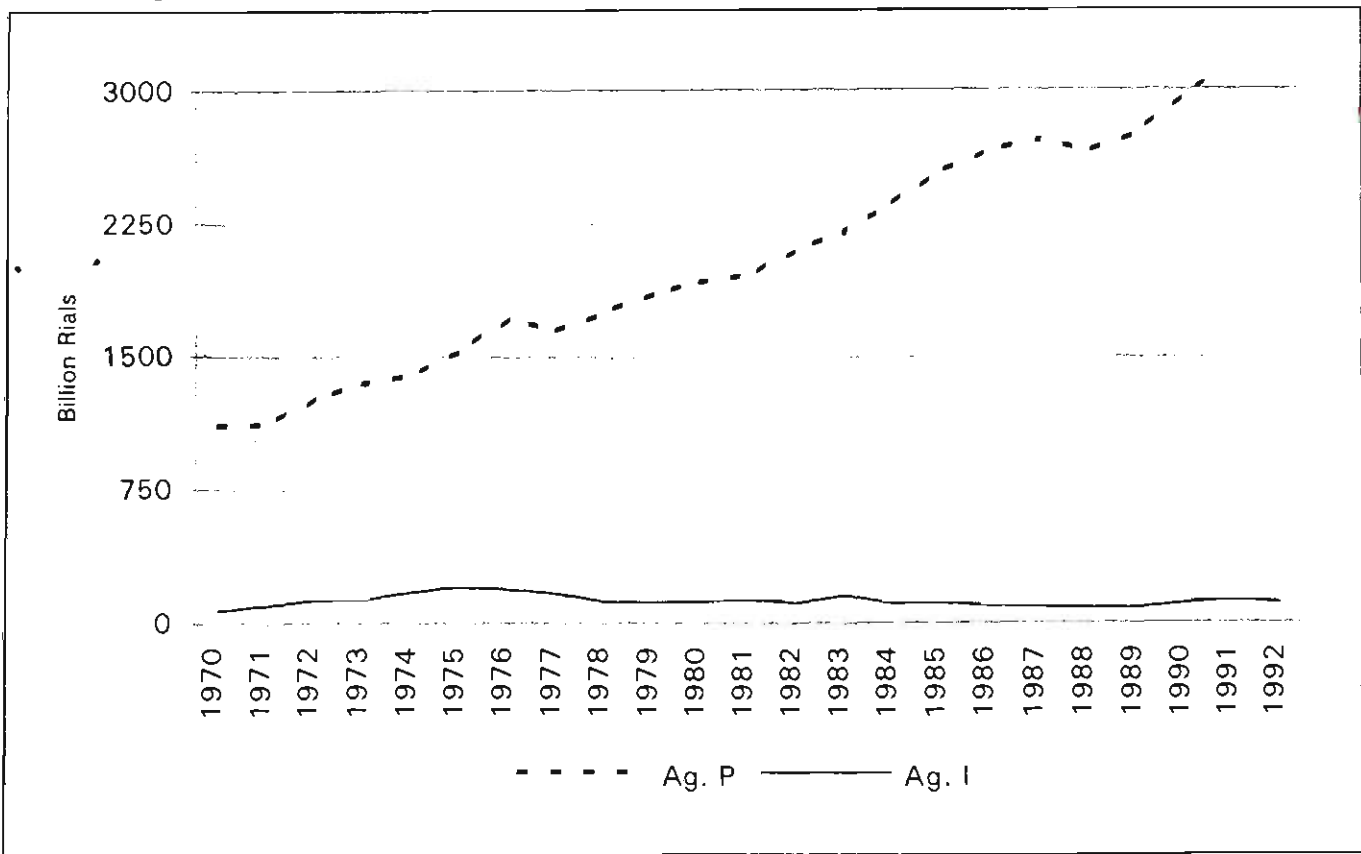


Figure 5.3. Share of the Agriculture Sector in GDP and GDI

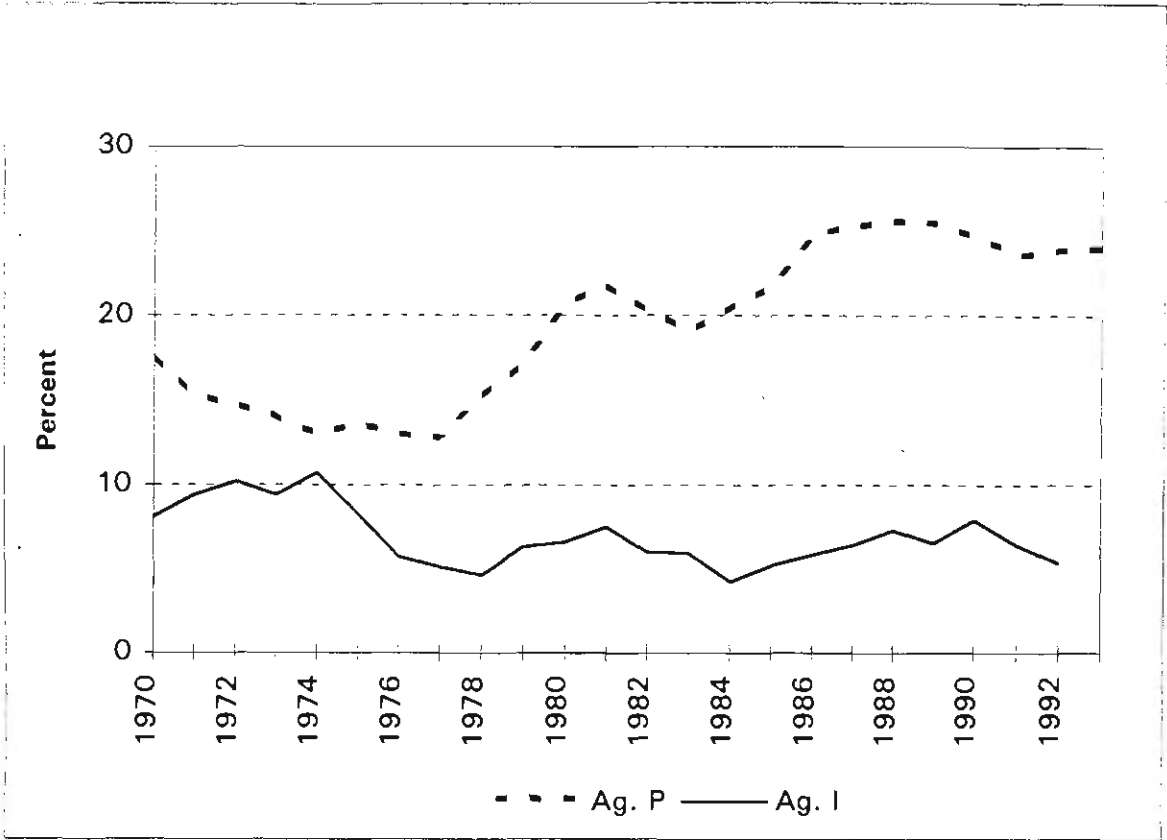


Figure 5.4. Share of the Oil and Gas Sector in GDP and GDI

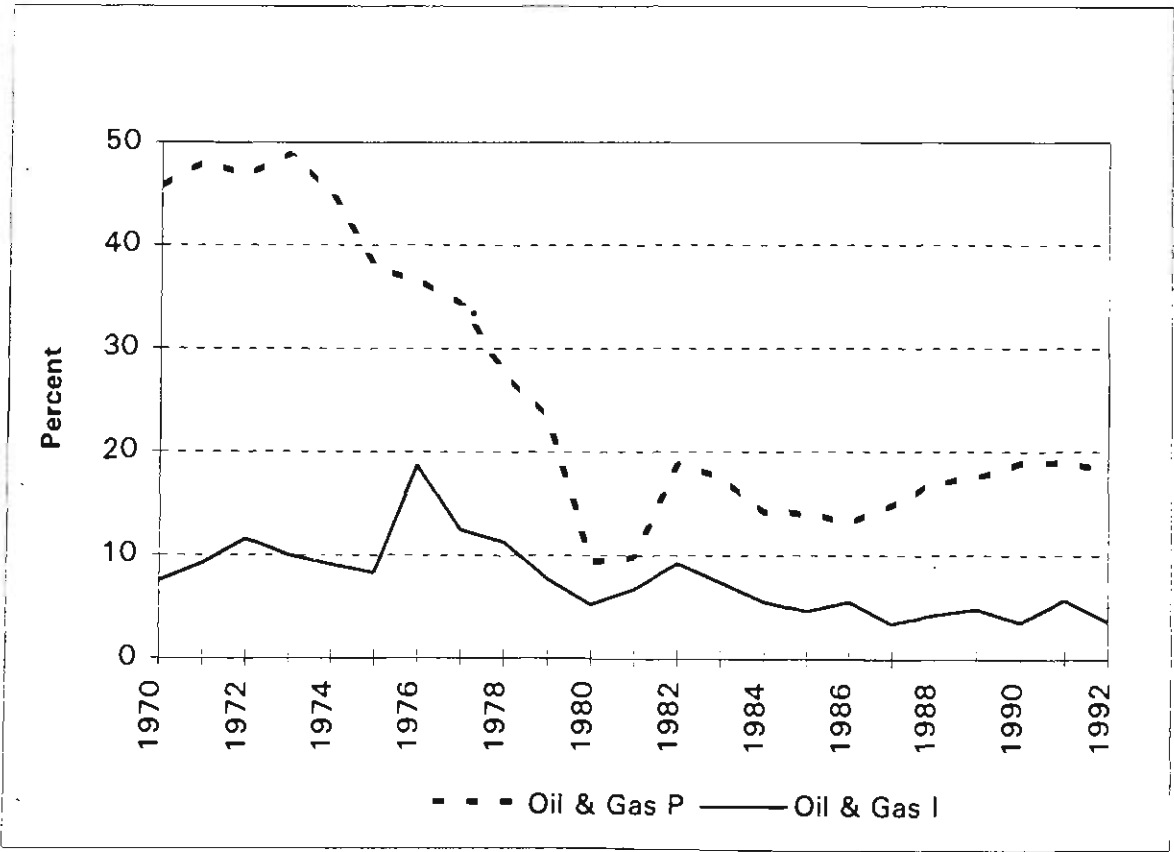


Figure 5.5. Real Product and Investment in the Industries and Mines Sector at 1982 Prices

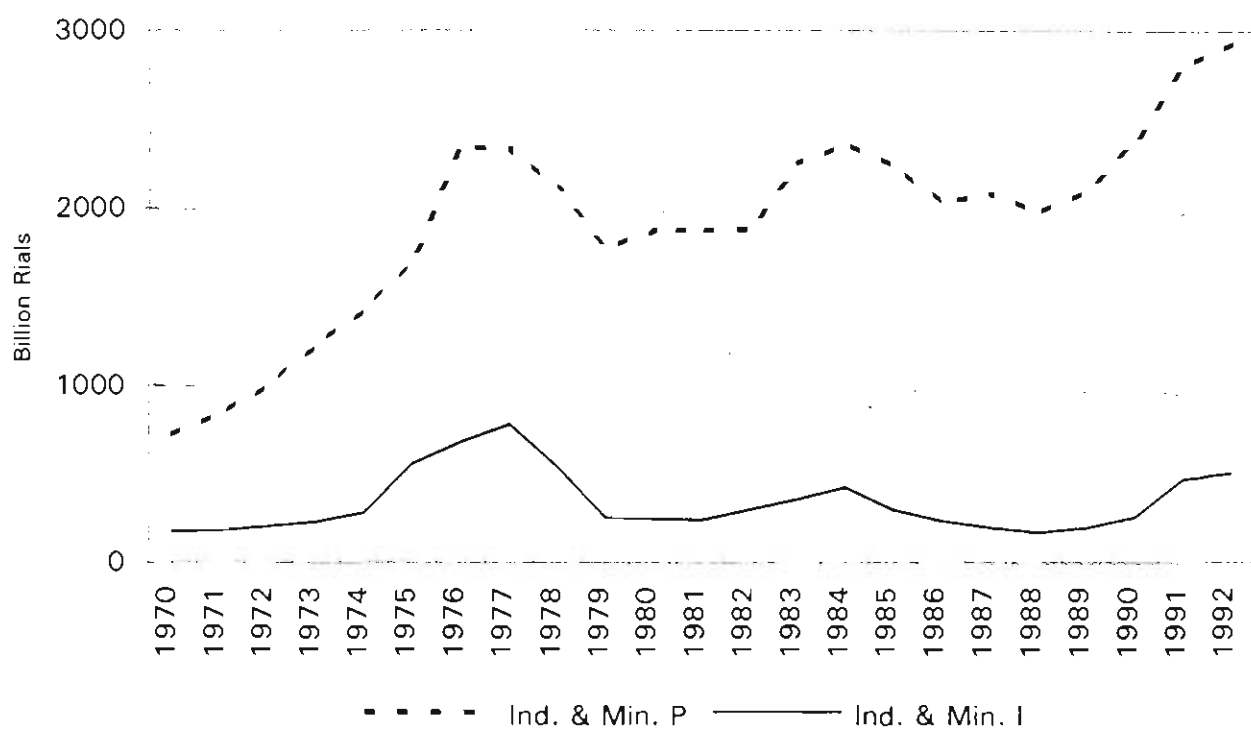


Figure 5.6. Real Product and Investment in the Housing Sector at 1982 Prices

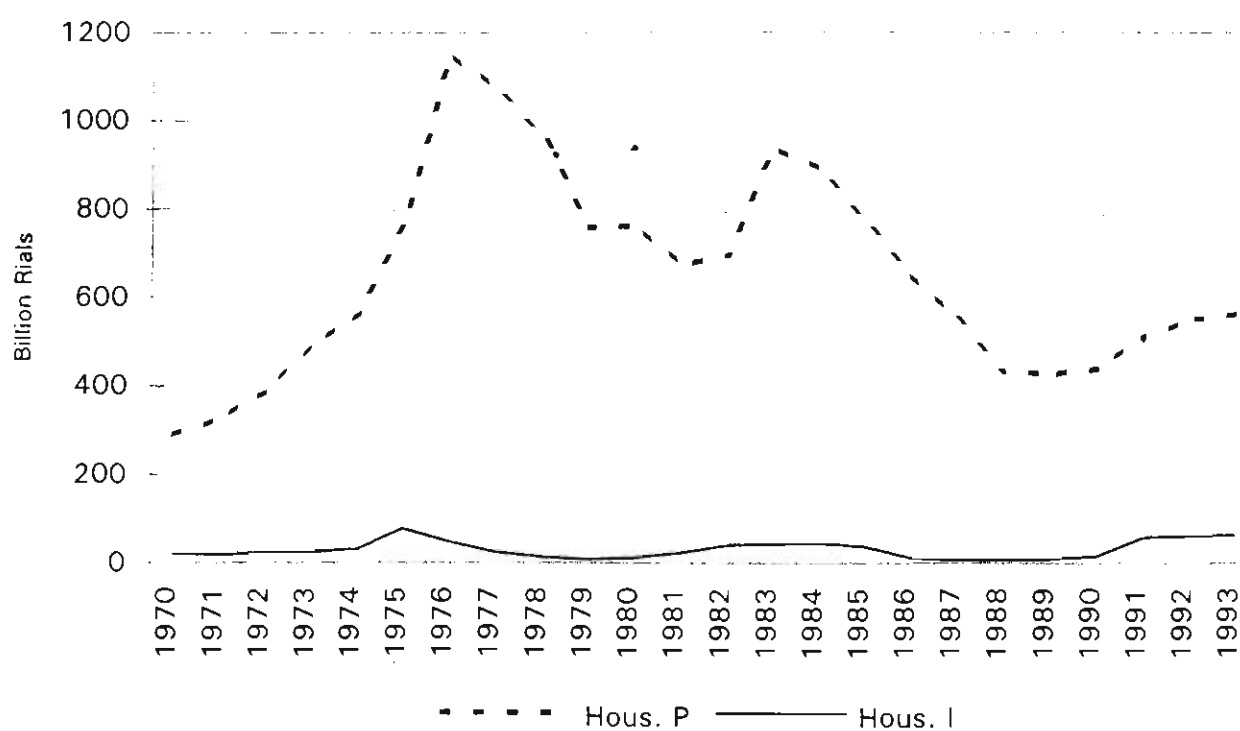


Figure 5.7. Real Investment in Machinery and GDI at 1982 Prices

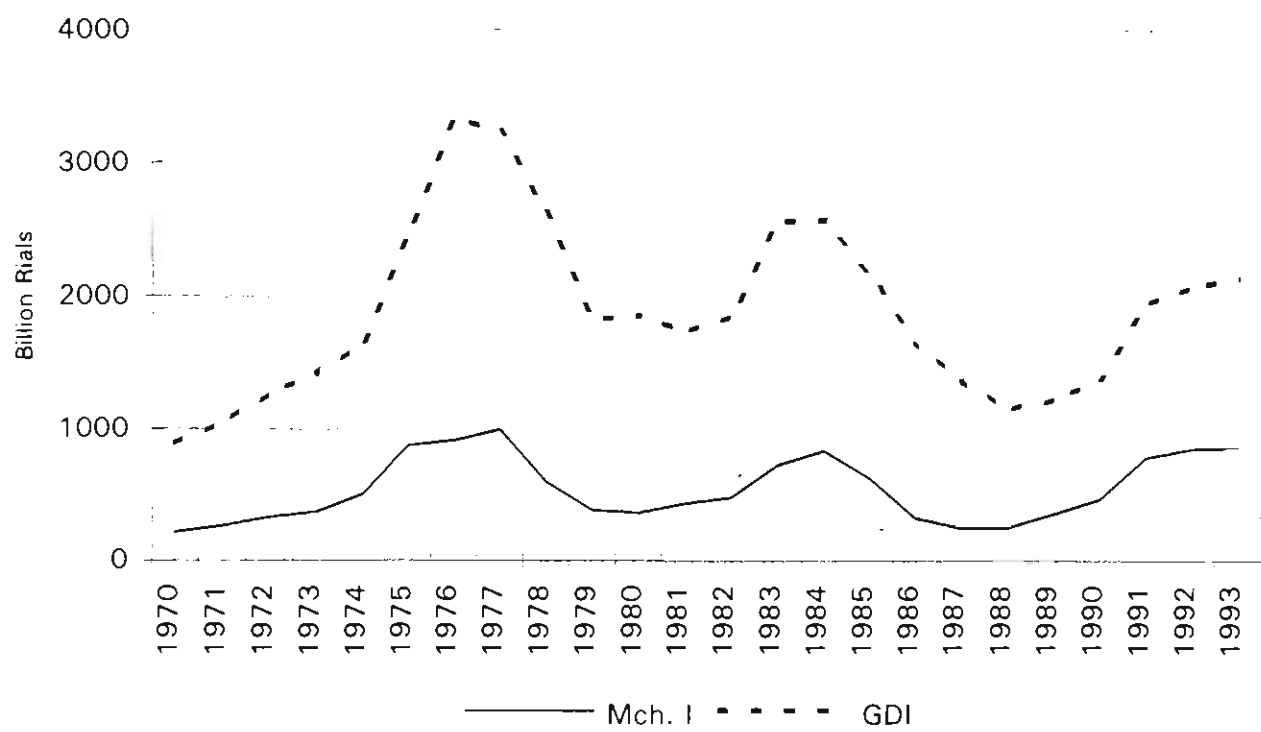
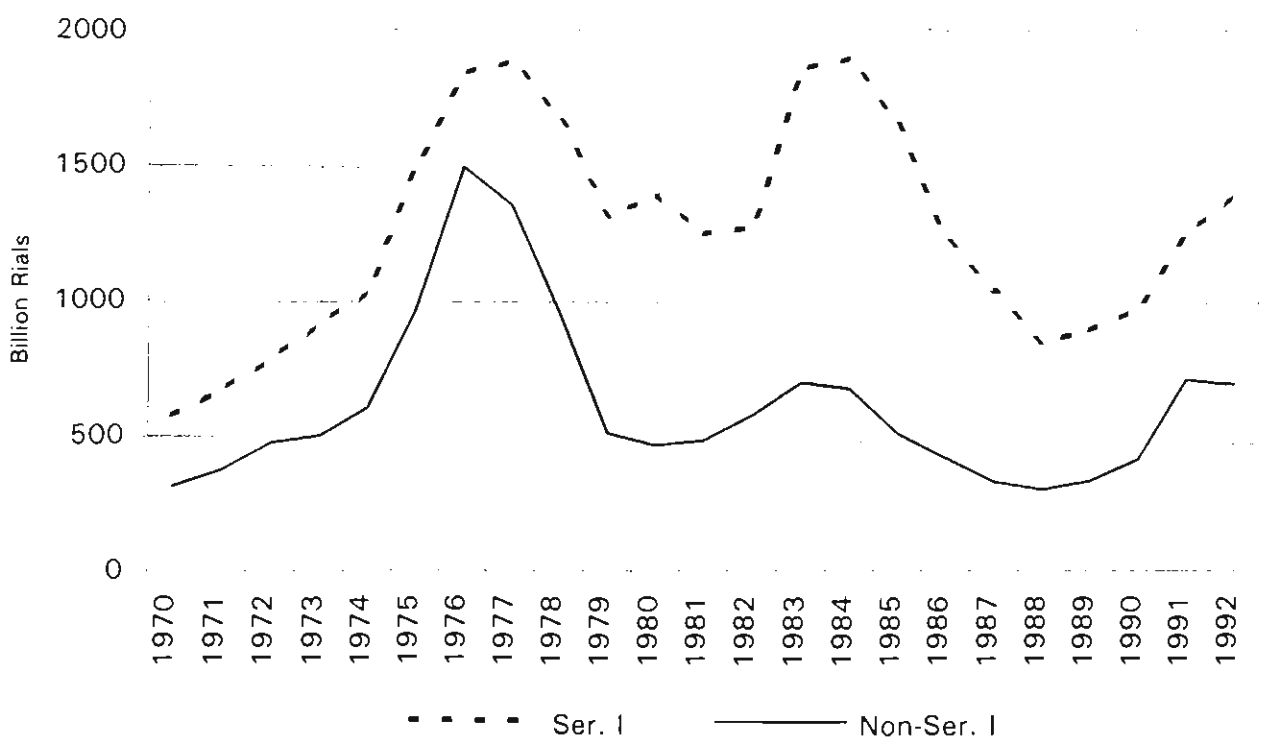


Figure 5.8. Real Product and Investment in the Services Sector at 1982 Prices



CHAPTER 6:
ECONOMIC POLICIES FOR ENHANCING
INVESTMENT IN IRAN

6.1. Introduction

The Iranian economy, like those of many other members of OPEC (Organisation of Petroleum Exporting Countries), has been greatly affected by increases in oil export revenue since the 1970s. More than 50 percent (e.g. 79 percent in 1975) of government's revenue was generally obtained from oil exports, which was the monopoly of the government. Oil export revenue also contributed between 85 to 98 percent of total Iranian exports during the study period. This tremendous income resulted in strong intervention by the government in the economy. These government interventions are briefly considered in the following before introducing a macroeconomic model for Iran.

Government intervention presented itself through a high share of public expenditure in aggregate demand. The public share was between 9 and 21 percent, while the share of private consumption in aggregate demand was 23 to 48 percent between 1970 and 1993. Public expenditure was 40 to 67 percent of total private expenditure (private consumption plus private investment) in the study period. At the same time public investment was often more than 50 percent of gross domestic investment before 1983, decreasing to between 40 and 50 percent thereafter.

The government also intervened in the economy through a fixed exchange rate policy between 1981 and 1992. As a part of the public reforms after the end of the war, this policy was abandoned and substituted by a floating exchange rate policy in 1993. In late 1994 again the fixed exchange rate policy was resumed after a series of heated debates about the merits and problems of this reform. In the outline of the first five year plan, having a floating exchange rate was considered more important than any other public measure since 1979 (revolution) when the domestic currency was sharply devalued in the parallel (black) market. From that time the exporters of non-oil commodities have been obligated to sell the proceeds of their exports to the Central Bank of Iran, based on the official exchange rate. This policy gave an official monopoly of foreign currency to the government, while a small portion of it was illegally exchanged by individuals in the parallel market. In the meantime the government allocated hard currency for importing goods and services based on its priorities. However, the crucial point in this regard was that the Central Bank allocations were at the official exchange rate (i.e. one US dollar exchanged for about seventy Rials). It was over-valued by 2 to 35 times compared to the rates in the parallel market, where one US dollar exchanged for between Rials 135 and Rials 2450 in the second half of the study period (1980-93). The major beneficiary of this allocation system was the public sector; nationalised industries, the so called "Procurement and Distribution Centres" which were affiliated to the Ministry of Commerce, and many other public enterprises which were the main users of large volumes of foreign currency between 1981 and 1988.

The government established a nation wide distribution and pricing system during the Iran-Iraq war. The main purpose of this government regulation was to campaign against profiteering in favour of consumers and slow down the inflation rate. A strong protectionist policy against the importation of consumer or luxury goods, was another form of government intervention in the economy. These measures, plus a number of

uncertainties over the role of the private sector in the economy and the protracted war with Iraq, contributed to an exceptionally confined and tight economic environment for private sector activities. The end of the war was the beginning of a new era for economic development, since the war economy policies were no longer required.

This chapter aims to suggest a number of economic measures for enhancing private investment. Devising economic policies for enhancing investment can be usefully analysed by developing an appropriate macroeconomic model to study the implications of such policies on major economic variables. This chapter adapts and extends a macroeconomic model developed by Harvie and Kearney (1995), which analyses the crowding out, or crowding in, effects of public current and capital expenditure on private investment. The study of these effects is an interesting issue in Iran, which is a developing country and a member of OPEC, where the public sector controls a sizeable portion of the economy. Simulation results can be obtained from the macroeconomic model, enabling a study of the impact of different economic policies on private investment and other major economic variables in Iran, and to thereby identify optimum investment policies.

This chapter proceeds as follows. In the next section a macroeconomic model is formulated and specified for Iran. Estimation results of this model are discussed in section 6.3. The model is simulated in section 6.4 for the impact of changes in selected exogenous variables on key aggregate variables. Section 6.5 considers the major policy implications for enhancing private investment. Finally, in section 6, a summary of the major conclusions from this chapter is presented. Simulation figures are plotted in the appendix of this chapter.

6.2. A Macroeconomic Model for Iran

Harvie and Kearney (1995) developed a theoretical macroeconomic model based on a substantially expanded open economy IS-LM model, emphasising both the demand and supply sides of the economy and the importance of wealth effects. They designed their model for a developed economy to show the effects of public capital expenditure on key macroeconomic variables, and especially upon private investment. This needs to be distinguished from the Iranian economy which is in a developing country with substantial oil resources (a member of OPEC), and where the public sector exerts enormous influence over of the economy. A theoretical macroeconomic model that extends the Harvie and Kearney model to capture the key characteristics of the Iranian economy, especially through incorporating the oil sector, is outlined in this section.

The macroeconomic model developed here emphasises the significance of Iranian oil export revenues, and its expenditure, on the whole economy. Such expenditure of oil revenues is at the discretion of government, and the way in which it is spent will have important ramifications. The critical issue of the crowding out effects of public current and capital expenditures are separately considered in the context of this model. The model assumes that the public capital stock contributes to productivity and hence the return on private capital, and enhances aggregate supply. It also emphasises the contribution of world income and the real exchange rate to net exports, aggregate demand as well as private investment. The effects of the interest rate on private investment and real money balances are also studied in the model. Again, the influence of changes in the private capital stock, real money balances and the real exchange rate on private consumption, aggregate demand and finally private investment through private wealth are examined in this model. The impact of changes in world income, oil exports and imports fluctuations as well as the interest rate, foreign exchange rate and nominal wages policies on the major economic variables, can be analysed with the model by conducting a simulation procedure.

A Macroeconomics Model for Iran

Product Market

$$YD_t = a_{10} + a_{11}PI_t + a_{12}PC_t + a_{13}GI_t + a_{14}GC_t + a_{15}NX_t + u_{1t} \quad (6.1)$$

$$PI_t = a_{20} + a_{21}YD_t - a_{22}r_t + u_{2t} \quad (6.2)$$

$$PC_t = a_{30} + a_{31}YS_t + a_{32}PW_t + u_{3t} \quad (6.3)$$

$$GI_t = a_{40} + a_{41}OX_t + a_{42}GI_{t-1} + u_{4t} \quad (6.4)$$

$$GC_t = a_{50} + a_{51}OX_t + a_{52}GC_{t-1} + u_{5t} \quad (6.5)$$

$$NX_t = a_{60} + a_{61}YD_t + a_{62}YOECD_t + a_{63}(e_t - p_t) + u_{6t} \quad (6.6)$$

Money and Asset Market

$$m_t - p_t = b_{10} + b_{11}YD_t - b_{12}r_t + b_{13}PW_t + u_{7t} \quad (6.7)$$

$$PW_t = b_{20} + b_{21}PK_{t-1} + b_{22}(m_t - p_t) + b_{23}(f_t + e_t - p_t) + u_{8t} \quad (6.8)$$

Price, Wage and Aggregate Supply

$$p_t = c_{10} + c_{11}w_t + c_{12}(e_t + p_t^{im}) + c_{13}p_{t-1} + u_{9t} \quad (6.9)$$

$$\overset{\circ}{w}_t = c_{20} + c_{21}(YD_t - YS_t) + c_{22}\overset{\circ}{p}_t + c_{23}\overset{\circ}{w}_{t-1} + u_{10t} \quad (6.10)$$

$$YS_t = c_{30} + c_{31}PK_{t-1} + c_{32}GK_{t-1} - c_{33}(w_t - p_t) + c_{34}IM_t + u_{11t} \quad (6.11)$$

Definitions

$$PK_t = \sum_{i=0}^{\infty} (1-d)^i PI_{t-i} \quad (6.12)$$

$$GK_t = \sum_{i=0}^{\infty} (1-d)^i GI_{t-i} \quad (6.13)$$

$$G_t = GI_t + GC_t \quad (6.14)$$

$$\overset{\circ}{p}_t = \overset{\circ}{p}_t - \overset{\circ}{p}_{t-1} \quad (6.15)$$

A dot (°) above a variable signifies its rate of change.

Definition of Variables*

d	Depreciation rate for the capital stock
e	Rials per US\$
f	Foreign currency held by the private sector
G	Total real public spending
GC	Real public current expenditure
GI	Real public capital expenditure
GK	Real private capital stock
IM	Real imports
m	Nominal money stock
NX	Real net exports
OX	Real oil export revenue
p	Domestic price level
p^e	Inflationary expectations
PC	Real private consumption
PI	Real gross private investment
p^{im}	Imported goods price index
PK	Real private capital stock
PW	Real private sector wealth
r	Nominal interest rate
w	Nominal wages
YD	Real aggregate demand
YOECD	Real GNP of OECD economies
YS	Real aggregate supply

* All variables are in logarithm form with the exception of the interest rate.

The model, and definitions of its variables, are shown in the above. Equation (6.1) shows a standard IS equation for an open economy. Equations (6.1)-(6.6) outline the goods market or aggregate demand and its components; private investment, private consumption, public current expenditure, public investment and non-oil net exports (non-oil exports minus imports) in the product market. According to equation (6.1) non-oil aggregate demand is affected by private investment, private consumption, public current and investment spending, and net exports. Private investment is an important determinant of output and economic growth. This variable in equation (6.2) is positively related to aggregate demand and negatively affected by the interest rate. Private consumption, equation (6.3), depends on non-oil aggregate supply and is positively affected by private wealth. Public current and capital expenditure in equations (6.4) and (6.5) depend on the oil export revenue, which formed a high

proportion of government revenue during the study period. The lags of public current and capital expenditure are added to the right hand side of the above equations for a dynamic study of oil exports in the model. Non-oil net exports in equation (6.6) is affected by non-oil aggregate demand and world income, replaced by the total real GNP of the OECD economies containing the main trading partners of Iran, and the real exchange rate. The real exchange rate variable is calculated from the foreign exchange rate in the parallel market, deflated by the domestic price level.

Money, bonds and stocks are traded in the money and asset markets. Equilibrium in this market is where money supply equals money demand. The money and asset markets are defined by equations (6.7) and (6.8). The demand for real money balances, the nominal money stock deflated by the domestic price level, is positively related to non-oil aggregate demand and private wealth, and negatively to the nominal interest rate. Private sector wealth in equation (6.8) is determined by the lag of the private capital stock, the amount of real money balances and the amount of real foreign currency held by the private sector.⁴⁸

Price, wage and aggregate supply determinants are given by equations (6.9)-(6.11). The domestic price level in equation (6.9) is affected by nominal wages and the domestic currency cost of imports. The latter is defined by the imported goods price index multiplied by the foreign exchange rate in the parallel market. Nominal wage dynamics in equation (6.10) are determined by the gap between aggregate demand and aggregate supply. According to the expectations augmented Phillips curve, nominal wage changes are also related to inflationary expectations. Lags in the domestic price level and nominal wage changes, are added to the above equations for a dynamic study of the domestic price level and wage changes in the model.

⁴⁸ Tobin's q and the real return on private capital services are omitted from this model because of lack of data and adequate information.

Non-oil aggregate supply, in equation (6.11), depends positively on both the lagged values of the private and public capital stock and negatively upon real wages. This argument arises from the assumption that the public capital stock is complementary to the private capital stock in nature. Thus, an increased public capital stock (especially in infrastructure) promotes productivity of the private capital stock and increases private capital returns and enhances aggregate supply. According to the conclusions of the previous chapter, the supply of goods was often inadequate during the oil crisis because of shortages in imported raw materials and intermediate goods during the study period. Importation of such goods was the most essential part of input for domestic products. Amirahmadi (1992) argues that "... most (Iranian) industries depend on the foreign market for between 65 to over 85 percent of their inputs, including intermediate goods which are critical for current production". Also Behdad (1988) believes "that Iran, as an oil-exporting economy, is heavily dependent on imports of industrial inputs...". Thus, imports are a vital proportion of inputs for the supply of goods and services and are additionally added to the right hand side of equation (6.11). Imports of such a nature are assumed to be exogenous, considering that the government's foreign exchange allocation policy has influenced most of Iran's foreign trade since 1981.

The definitions used in the model are presented in equations (6.11)-(6.16). It is assumed that both the private and public capital stock are accumulated by yearly net investment after subtracting their depreciation. The value of the capital stock is calculated for the years that the relevant data were not available based on 2.5, 5, 7.5 and 10 percent depreciation rates. The calculation of the capital stock based on a 5 percent depreciation rate shows that both the private and public capital stock increased before and after the war, and did not decrease during the war. We prefer this calculation rather than the others because we believe that, in spite of the war damages, industrial capacity did not decrease during the war. Public expenditure is divided into current and capital expenditure and is mostly financed by oil export revenue and money supply. Also we

assume that adaptive inflationary expectations equal the lagged inflation rate. Although holdings of foreign currency by individuals form a part of private wealth it is not legal, and this data is not accessible. As a result, foreign currency held by the private sector is assumed to be constant in equation (6.8).

The above model shows how private investment contributes to non-oil aggregate demand and is affected by the interest rate. Higher non-oil aggregate demand or a lower interest rate, directly promote private investment. Private investment is indirectly affected by private consumption, public current and capital expenditure and net exports. A higher level of oil export revenue directly increases public current and capital expenditures, and indirectly increases non-oil aggregate demand and private investment. Similarly, a higher level of the private capital stock or real domestic money balances increases private wealth.

The issue of crowding out effects arising from public current expenditure and/or public investment will be examined using this model. The effects of public current expenditure and capital expenditure on private investment are also separately contemplated. Public investment expenditure affects both the demand and supply sides of the economy. An increase in public investment expenditure increases aggregate demand and encourages private investment. In the meantime, the above increases in capital stock (private and public) contribute to a higher level of aggregate supply.

World economic growth and the real exchange rate influence, through net exports, aggregate demand as well as private investment. Money demand is positively related to aggregate demand and private wealth and negatively related to the interest rate. The gap between aggregate demand and aggregate supply and also the expected inflation rate influence nominal wages. The level of domestic prices contributes to the changes in private investment through non-oil net exports, private wealth and aggregate supply. Increases in the interest rate reduce money demand and directly diminish private wealth,

private consumption and finally private investment. An increase in private wealth, through the level of real money balances, increases private consumption and aggregate demand and eventually private investment.

A number of deficiencies in the nature and definition of Iranian economic data complicate the adaptation of the aforementioned model for this country. The absence of perfect asset and money markets is a major shortcoming. Although the Tehran Stock Exchange resumed its activities at the end of the war (1989)⁴⁹, the share of the stock exchange in the asset market is still very low. The exchange of domestic currency with foreign currencies is restricted, and domestic currency is kept overvalued by the government to slow down inflation since the revolution. Holdings of foreign currency by individuals, as a component of private wealth, is unlawful and as a result this data is not available. In spite of the above deficiencies, the estimation and simulation of the model in the next section show that this is an appropriate model for Iran.

6.3. Empirical Estimation of the Model

The above macroeconomic model consists of eleven structural equations together with eleven endogenous variables. These variables depend on a number of exogenous and lagged variables. The model is consistent and over identified. To avoid confusion, Two Stage Least Squares (2SLS) and Three Stage Least Squares (3SLS) methods are applied for estimation purposes. Iranian data is used for 24 years covering the period 1970-1993. Except for the interest rate, which is nominal, all other variables in the model are real (1982=100) and in logarithmic form. For negative variables that cannot be converted to logarithmic form, non-oil net exports are replaced by net imports (imports minus non-oil exports) in the computing. The results of the estimations, using both the 2SLS and 3SLS methods, are mostly the same. The estimated coefficients of the model have the same sign and their magnitudes are close using both methods. The latter results are presented in Table (6.1). These results are encouraging and significant.

⁴⁹ Golestani (1994)

Except for non-oil net exports in equation (6.1) and the lag of the public capital stock in equation (6.11), the sign of all other parameters are the same as predicted in the last section. The model shows the behaviour of most of the endogenous variables well with a high R-square (between 78 to 99 percent), acceptable level of the Durbin-Watson test for all equations, except equation (6.3), and significant t-values at the 95 percent level for most coefficients.

The parameter values in the table below show that non-oil aggregate demand (equation 6.1) is positively affected by private investment and consumption, public current and capital expenditure and negatively by non-oil net exports. All coefficients in equation (6.1) have significant t-values. The elasticity of aggregate demand to private consumption (0.61) is more than eight times higher than the elasticity of aggregate demand to private investment (0.07). Since the gap between aggregate demand and aggregate supply is a major economic problem, the above results show any shift from consumption to investment in the private sector reduces aggregate demand and slows down the inflation rate. Similarly, the elasticity of aggregate demand to public current expenditure (0.12) is almost double that of the elasticity of aggregate demand to public investment (0.07). These recent results also support the proposition that inflationary pressure (the gap between aggregate demand and aggregate supply) was increased more by increases in public current expenditure rather than public investment. This is because a major part of the public investment is formed by imported capital goods compared to public current spending, which is mainly spent on public employees, salaries and purchasing domestic products.

The estimation of equation (6.2) supports the view that private investment is positively affected by aggregate demand and negatively related to the interest rate. The elasticities of private investment on aggregate demand and the official interest rate are 122 and 132 percent respectively. A dummy for the oil crisis (the years in which oil

export revenues were less than US\$ 12 billion) shows that private investment was negatively affected during the oil crisis periods. Estimation of equation (6.3) shows

Table 6.1. Parameter Values of the Model

Equation 1	Equation 2	Equation 3	Equation 4	Equation 5	Equation 6
$a_{10} = 1.19$	$a_{20} = -1.40$	$a_{30} = -6.56$	$a_{40} = 0.65$	$a_{50} = -0.04$	$a_{60} = 4.31$
$a_{11} = 0.07$	$a_{21} = 1.22$	$a_{31} = 1.19$	$a_{41} = 0.12$	$a_{51} = 0.15$	$a_{61} = 1.45$
$a_{12} = 0.61$	$a_{22} = -1.32$	$a_{32} = 0.43$	$a_{42} = 0.78$	$a_{52} = 0.85$	$a_{62} = -0.92$
$a_{13} = 0.07$					$a_{63} = -0.12$
$a_{14} = 0.12$					
$a_{15} = 0.12$					
	$a_{29}^c = -0.14$	$a_{39}^n = 0.31$	$a_{49}^n = -0.27$		

Equation 7	Equation 8	Equation 9	Equation 10	Equation 11
$b_{10} = -1.06$	$b_{20} = 2.65$	$c_{10} = -0.04$	$c_{20} = -0.59$	$c_{30} = 5.40$
$b_{11} = 0.30$	$b_{21} = 0.33$	$c_{11} = 0.01$	$c_{21} = 1.01$	$c_{31} = 0.49$
$b_{12} = -0.20$	$b_{22} = 0.49$	$c_{12} = -0.03$	$c_{22} = 0.20$	$c_{32} = -0.37$
$b_{13} = 0.15$	$b_{23} = -0.05$	$c_{13} = 1.11$	$c_{23} = 0.94$	$c_{33} = -0.12$
				$c_{34} = 0.45$
	$b_{29}^n = -0.14$			

c. A dummy for the oil crisis (the years in which oil export revenues were less than US\$ 12 billion).

n. A dummy for the last three years of the war (1986-88).

that aggregate supply and the level of private wealth positively contribute to private consumption. According to this estimation private consumption was mostly dominated by aggregate supply rather than private wealth. This variable strongly increased with a higher level of aggregate supply but much less with additional private wealth. The dummy for the end of the war has a positive effect on private

consumption. In other words while the economy and especially domestic investment was restricted in the last three years of the war, private consumption did not fall during that period because of a high population growth rate and lack of investment opportunities. All coefficients in equations (6.2) and (6.3) are significant at the 95 percent level.

Estimation of equation (6.4) shows that public investment is positively affected by oil export revenue and its lag in the short term, and by oil export revenue in the long term. The above results offer an alternative policy. This policy urges a higher share of oil export revenue for public investment to ease aggregate supply and diminish the inflation rate. Obviously, the allocation of this foreign revenue to public current spending increases aggregate demand and causes a higher inflation rate.

The computation of equation (6.5) suggests that public current expenditure is moderately related to oil export revenues in the short term, but this relationship is quite strong in the long term. In brief, the allocation of oil export revenue for public investment, rather than public current expenditure, can decrease the gap between aggregate demand and aggregate supply and slow down inflation in the long term. Any increase in oil export revenue raised public current and capital expenditure and eventually crowded in private investment through its impact on aggregate demand during the study period. The impacts of this shock (an increase in oil exports) are three times higher on public current and capital expenditure compared to aggregate demand or private investment. All parameter values in equations (6.4) and (6.5) are significant at the 95 percent level.

As mentioned before, to avoid negative variables which cannot be converted to logarithmic form, non-oil net exports are replaced by net imports in equations (6.1) and (6.6). Estimation of this equation shows that a higher level of aggregate demand increased net imports or decreased net exports. Net imports decreased, or net exports

increased, with increases in the OECD gross national product. A higher real exchange rate in the parallel market was consistent, although very small, with a lower level of net imports or higher level of net exports. In other words, any depreciation of the domestic currency in the parallel foreign exchange market promoted non-oil net exports during the study period. The elasticity of net exports to aggregate demand is positive and more than 145 percent. The elasticity of net exports to OECD income and the real exchange rate in the parallel market are 90 and 12 percent respectively. All parameter values in equation (6.6) are significant at the 95 percent level.

Estimation of the money market equation (6.7) shows that aggregate demand and private sector wealth positively affect money demand. This estimation also indicates that a higher interest rate policy decreased the demand for money in Iran during the study period. This result and the result for equation (6.2), show that a lower interest rate encouraged private investment and increased money demand during the study period. Consequently, a two tier interest rate policy can enhance private investment and at the same time encourage savings; offering a higher interest rate for term deposits, on call savings and all bank credits and a lower interest rate for private investment. This policy encourages private investment and decreases money demand at the same time. Estimation of equation (6.8) shows that private wealth is positively affected by the lag of the private capital stock and the volume of real money balances, but not by the real exchange rate in the parallel market. A dummy for the last three years of the war (1986-88 equal one and other years equal zero) reduced private wealth. This can be explained as a result of war damage, economic uncertainty and recession in the last three years of the war.

The computation of equation (6.9) shows that an increase in nominal wages increased domestic prices during the study period, although this effect is weak and negligible. The parallel real exchange rate plus the imported goods price index did not have a significant effect on the domestic price level. This result does not support the view that domestic inflation was partially imported through foreign inflation during the study period. This estimation also shows that the domestic price level was mostly affected by its lag rather than the above mentioned factors. Estimation of equation (6.10) shows that the gap between aggregate demand and aggregate supply increased nominal wages. Expected inflation, as measured by the lagged inflation rate, slightly affected nominal wages in the short term. By and large the rate of change of wages was mostly affected by its lag and the gap between aggregate demand and aggregate supply in the short term, and by the latter factor in the long term.

The results from estimating equation (6.11) show that the lag in the private capital stock and the volume of imports, positively affect aggregate supply. This estimation does not support the argument that the public capital stock promotes productivity of the private capital stock and increases private capital returns. Regarding the last result and the results of equation (6.1) it can be concluded that although public investment crowds in private investment in the short term, the accumulation of public investment (i.e. public capital stock) does not contribute to increased productivity and returns to private capital or aggregate supply. This is due to the fact that a vast number of public projects, which had been started before the revolution (in the 1970s) were not completed during the study period. The low productivity of the public sector compared to the private sector is another explanation for the negative effect of the public capital stock on aggregate supply. The above result indicates the necessity for public enterprise reform and/or privatisation of public companies which will be discussed in the next chapter. The elasticity of aggregate supply to real wages (-0.11) is negative and weak. Based on the above results a number of alternative economic policies will be simulated and discussed in the following section.

6.4. Model Simulations and Policy Implications

This section simulates and analyses the results of a number of economic policies, by applying the aforementioned macroeconomic model for Iran during the study period. These simulations test the fitness of the model and explore the impact of alternative policy scenarios on the main aggregate variables, especially on private investment in the Iranian economy. To evaluate the overall performance of the model, it is simulated during the whole study period (1970-93) rather than just the last years (ex post) of that period. The actual and simulated results of the key variables are depicted in Figures (6.1)-(6.8) in the appendix. As demonstrated in these figures, simulations of aggregate demand and supply, private investment, domestic price level and other variables show small standard errors from their actual values. These simulations predict expansionary periods in the middle of the 1970s, 1982-84 and after the Iran-Iraq war, and also recessionary periods during the revolutionary turmoils (1978-80) and the last years of the Iran-Iraq war.

The effects of policy actions and changes in the exogenous variables on the key macroeconomic variables are examined in this section. The first simulation computed is based on the assumption that the interest rate is doubled during the study period. The interest rate which is used in this estimation is the bank interest rate for a one year term deposit. This rate was between 7 to 11 percent during the study period and was often much lower than the market interest rate and even lower than the inflation rate. The simulation of four variables, based on the above assumption, are plotted in Figures (6.9) to (6.13). Figure (6.9) shows that private investment would have decreased by between 3.7 and 26.9 percent through doubling the interest rate. The average reduction of private investment from doubling the interest rate is about 15.1 percent during the study period.

Owing to the positive effect of private investment on aggregate demand in equation (6.1), the above decrease in private investment should decrease non-oil aggregate demand. Aggregate demand would decrease about 4.4 percent in the first three years becoming 0.5 percent during the last three years of the study period. Figure (6.10) indicates that doubling the interest rate would reduce aggregate demand by 1.7 percent on average in the study period. This policy would also decrease real money balances by an average of 4.1 percent (Figure 6.11), but hardly affect the domestic price level or aggregate supply due to high inflationary expectations and instability in government economic policy.

In brief, increasing the official interest rate to approach the market interest rate would boost savings and decrease aggregate demand and real money balances, but it would barely increase aggregate supply or slow down the inflation rate. The major weakness of this policy is the discouragement of private investment. On the other hand, while the official interest rate offered by the nationalised banks is much lower than the market interest rate and even the inflation rate, a decrease in the official interest rate could not be a realistic economic policy. Thus, offering different interest rates for different purposes is implied from this study; a low interest rate for private capital investment and competitive rates for savings and current credits.

A rise in oil exports provides an extra resource for both public current and capital expenditure. The impact of a ten percent rise in oil exports for public expenditure as well as private investment and non-oil aggregate demand are simulated in Figures (6.14) to (6.17). Figure (6.15) and (6.16) show that this shock in oil export revenue, would increase public current and capital expenditure 8.4 and 3.6 percent respectively in the first year (1971). This impact would be reduced in the following years. The average increase of public current and capital spending from this shock are 4.5 and 4.2 percent respectively during the study period (1971-93). This oil export revenue shock would encourage private investment slightly (about 1.4 percent on average)

during the study period. Finally, the overall effect of the above shock would increase non-oil aggregate demand by 1.2 percent on average. This exogenous shock would not have significant effects on other macroeconomic variables. In brief, a higher level of oil export revenue immediately increases both public current and capital spending but this effect will be reduced in the following years. This shock would have positive, but weak, effects on private investment and non-oil aggregate demand.

Given the importance of foreign trade in the Iranian economy, the impact of an increase in OECD income on non-oil net exports and aggregate demand are simulated in Figures (6.18) and (6.19). Iran suffered from non-oil trade deficits during the study period. Figure (6.18) displays that a ten percent increase in OECD income could reduce the gap between non-oil exports and imports and improve the balance of trade. This improvement was considerable during the 1971-72, 1978-82 and 1985-89 periods. This development could improve non-oil net exports and reduce the non-oil trade deficit by about 14.1 percent on average during the study period. While an increase in OECD income could encourage non-oil exports, it did not affect non-oil aggregate demand.

The effects of a ten percent domestic currency devaluation in the parallel market on non-oil net exports, private investment, aggregate demand, domestic price level and changes in nominal wages are simulated in Figures (6.20) to (6.23) in the appendix. This devaluation of the domestic currency would increase non-oil exports and reduce the non-oil trade deficits. This policy would decrease the gap between non-oil exports and imports by 5.5 percent on average during the study period. The improvement would be about 15 percent in 1971-72, 1986 and 1988. A devaluation of the domestic currency in the parallel market would slightly increase the cost of investment for the private sector, but rarely affects real money demand, aggregate demand or supply and/or the domestic price level. This devaluation would increase the change of nominal wages by 1.1 percent on average during the study period. In

short, a devaluation of the domestic currency could promote non-oil exports and improve the trade deficits. This policy would increase private investment expenditure through increasing the cost of imported capital goods. This study does not support a significant relationship between a devaluation of the domestic currency in the parallel market and changes in aggregate demand, aggregate supply and money demand. This simulation also could find little support for the widely accepted argument that a depreciation of the domestic currency and the inflation rate have a strong positive relationship.

The impact of a rise in nominal wages on non-oil aggregate supply, private consumption, non-oil aggregate demand and the domestic price level is plotted in Figures (6.24) to (6.27) in the appendix of this chapter. A ten percent increase in the nominal wage would decrease aggregate supply by 1.9 percent on average during the study period. This policy would slightly increase private consumption, aggregate demand and the domestic price level. The previous result does not support the position that a rise in nominal wages, after the revolution, has been the major factor behind a high inflation rate since 1980.

The impact of a ten percent increase in imports is shown in Figures (6.28) to (6.32) in the appendix. It would increase aggregate supply by 2.2 percent on average. At the same time, it could increase private consumption by 0.5 percent on average. This policy would slightly increase (0.2 percent) private investment for the whole period except during the last years of the war; when the private sector often preferred to wait rather than invest because of the lack of security. However, the above measure would barely increase non-oil aggregate demand. These results indicate that an increase in imports would reduce the gap between aggregate demand and aggregate supply, but it could not decelerate the inflation rate due to high inflationary expectations.

To conclude, private investment will be encouraged by offering a low rate of interest and an increase in oil exports. Aggregate demand would be increased by an oil export promotion, a devaluation of the domestic currency, and an increase in nominal wages. A rise in oil export revenue and/or imports would increase non-oil aggregate supply. On the other hand, aggregate supply would be reduced by an increase in nominal wages and/or a devaluation of the domestic currency. This study could not identify a significant effect from a rise in OECD income and/or a higher interest rate on aggregate supply. The domestic price level would slightly increase with a higher rate of interest, an increase in nominal wages and/or a devaluation of the domestic currency.

6.5. Summary and Conclusions

This chapter adapted a macroeconomic model for Iran to study the effects of public current and capital expenditure on the whole economy as well as on private investment. The major part of such public expenditure is financed by the government from oil export revenues. The model has been estimated by using the 2SLS and 3SLS methods. The results show the behaviour of the endogenous variables with a high R-square, acceptable level of the Durbin-Watson statistic and significant t-values for most of the equations and parameters.

The results show that non-oil aggregate demand is increased by greater private consumption or investment and also by public current or capital expenditure. Private investment is positively affected by aggregate demand and decreased by a higher rate of interest. The results also show the importance of government policy in allocating oil export revenue for current or capital expenditure. Both public current and capital expenditure crowd in private investment through their effects on aggregate demand. The study indicates that any shift from current to capital expenditure by the public or private sector, will reduce inflation owing to the high elasticity of aggregate demand to private consumption in comparison to that of private investment. Similarly, any

move from current to capital expenditure reduces inflationary pressure and eventually slows down the inflation rate due to the lower elasticity of aggregate demand to public investment rather than public current expenditure. Replacing public current expenditure by public investment would barely promote productivity of the private capital stock until reform of public enterprise management is implemented. This argument will be discussed in the next chapter.

Non-oil net exports are directly affected by OECD income and/or a devaluation of the domestic currency in the parallel market. The real money demand is decreased by a higher interest rate. The domestic price level is directly affected by a change in nominal wages but not by a higher interest rate or the real exchange rate plus the price of imported goods. Nominal wage growth is positively affected by both the gap between aggregate demand and aggregate supply as well as expected inflation. Finally, non-oil aggregate supply is directly increased by a higher level of private capital stock and imports and adversely affected by real wages. This study could not support the argument that the public capital stock is complementary to the private capital stock. This is justified by the many public projects which were established in the early 1970s and not completed up to the end of the study period. The low productivity of the public capital stock compared to the private capital stock, is another explanation for the negative effect of the public capital stock on aggregate supply. This result addresses the necessity of reform of public enterprises to increase the productivity of the public capital stock. This issue will be discussed in the next chapter.

The key policy implications of the adapted model are summarised as follows. First, a higher interest rate policy discourages private investment and decreases real money demand and aggregate demand. This policy is not effective in influencing non-oil aggregate supply and/or the inflation rate. Second, an increase in OECD income improves non-oil net exports but does not increase aggregate demand due to the low

share of non-oil exports in total exports and obviously in aggregate demand. The third major implication of the model is related to oil export policy. A rise in oil exports directly increases public current and capital expenditure while indirectly increasing private investment and non-oil aggregate demand. A devaluation of the domestic currency in the parallel market promotes non-oil exports and increases private investment expenditure and private consumption as well as aggregate demand. This policy does not have significant effects on real money demand or the domestic price level. A rise in nominal wages decreases non-oil aggregate demand and supply and finally slightly increases the domestic price level. This policy does not have a significant impact on consumption or investment in the private sector. A rise in the volume of imports increases non-oil aggregate supply and aggregate demand, but growth of the first variable is higher than the second one. In other words, this policy decreases the gap between aggregate demand and aggregate supply but hardly decreases the inflation rate.

In summary, a lower interest rate, a rise in oil exports or imports and a devaluation of the domestic currency encourages private investment, while they rarely have inflationary side effects on the economy. The above study suggests a number of economic policies for enhancing private investment and diminishing the inflation rate, but these measures can only succeed if a number of microeconomic reforms are applied. These reforms were commenced after the ceasefire (1989), but were abandoned given various political considerations in recent years. The next chapter analyses some of the adopted microeconomic reforms.

6.6. Appendix

Figure 6.1. Actual and Simulation Values of Non-oil Aggregate Demand

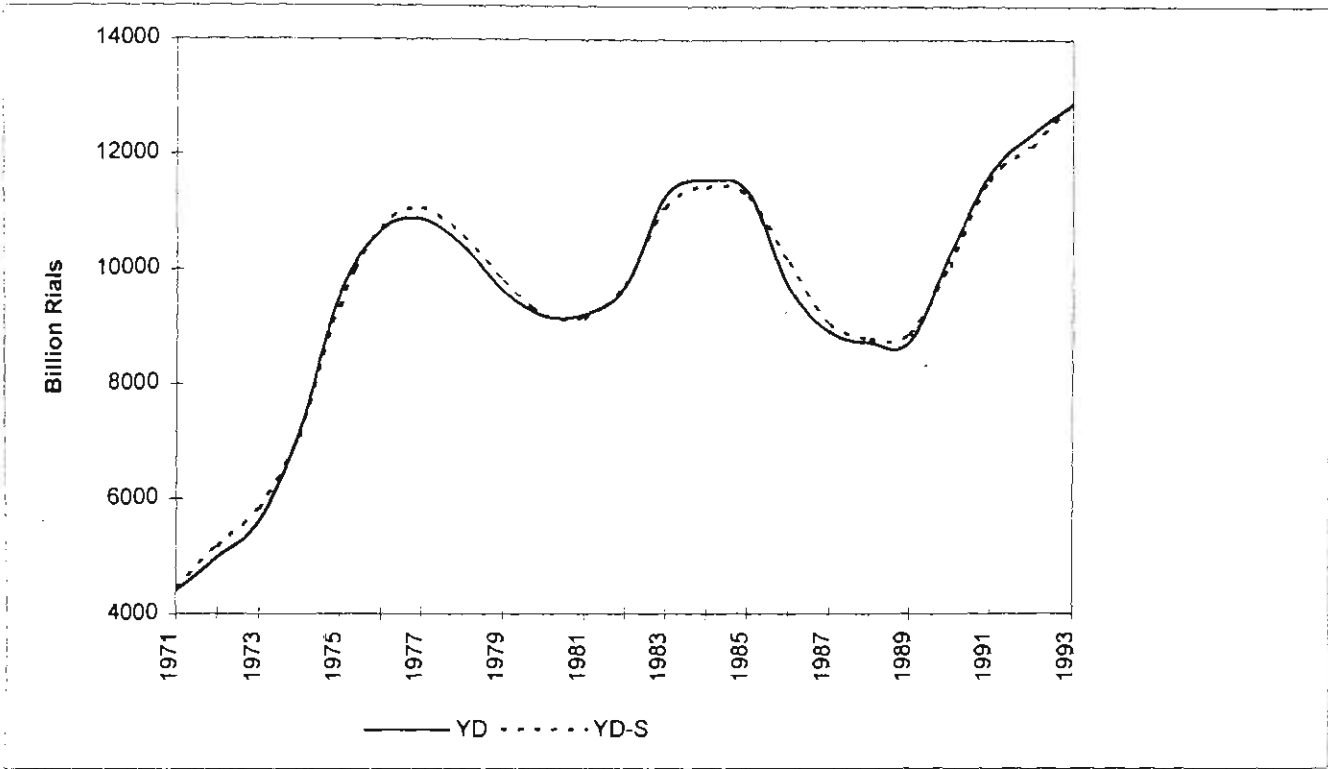


Figure 6.2. Actual and Simulation Values of Private Investment

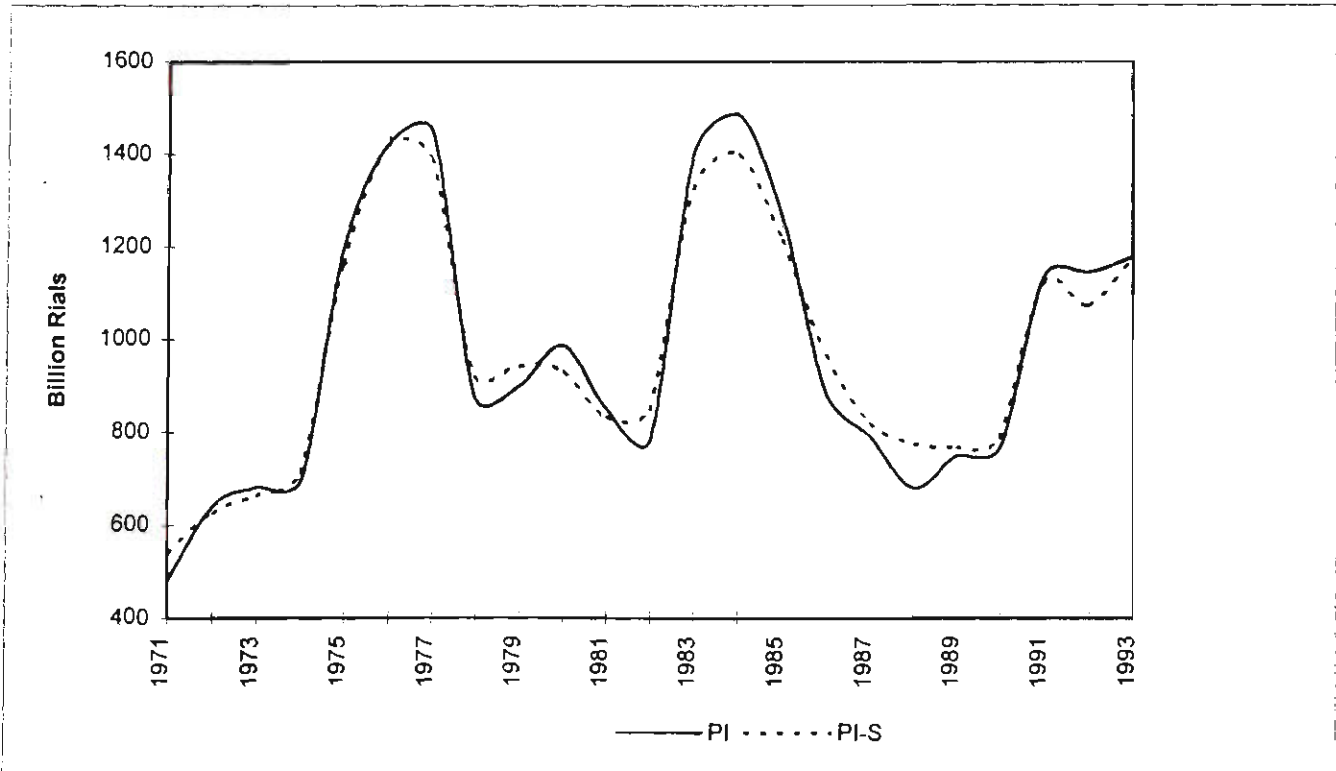


Figure 6.3. Actual and Simulation Values of Private Consumption

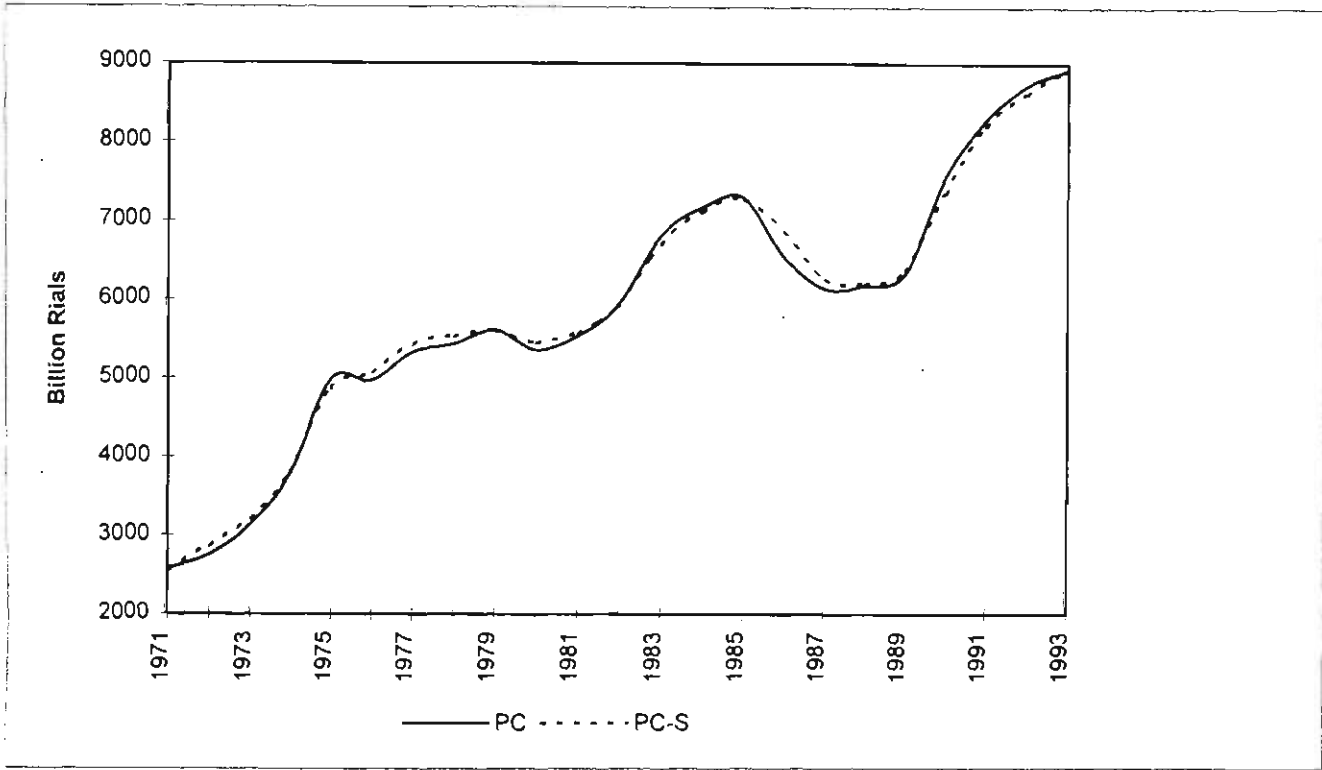


Figure 6.4. Actual and Simulation Values of Public Investment

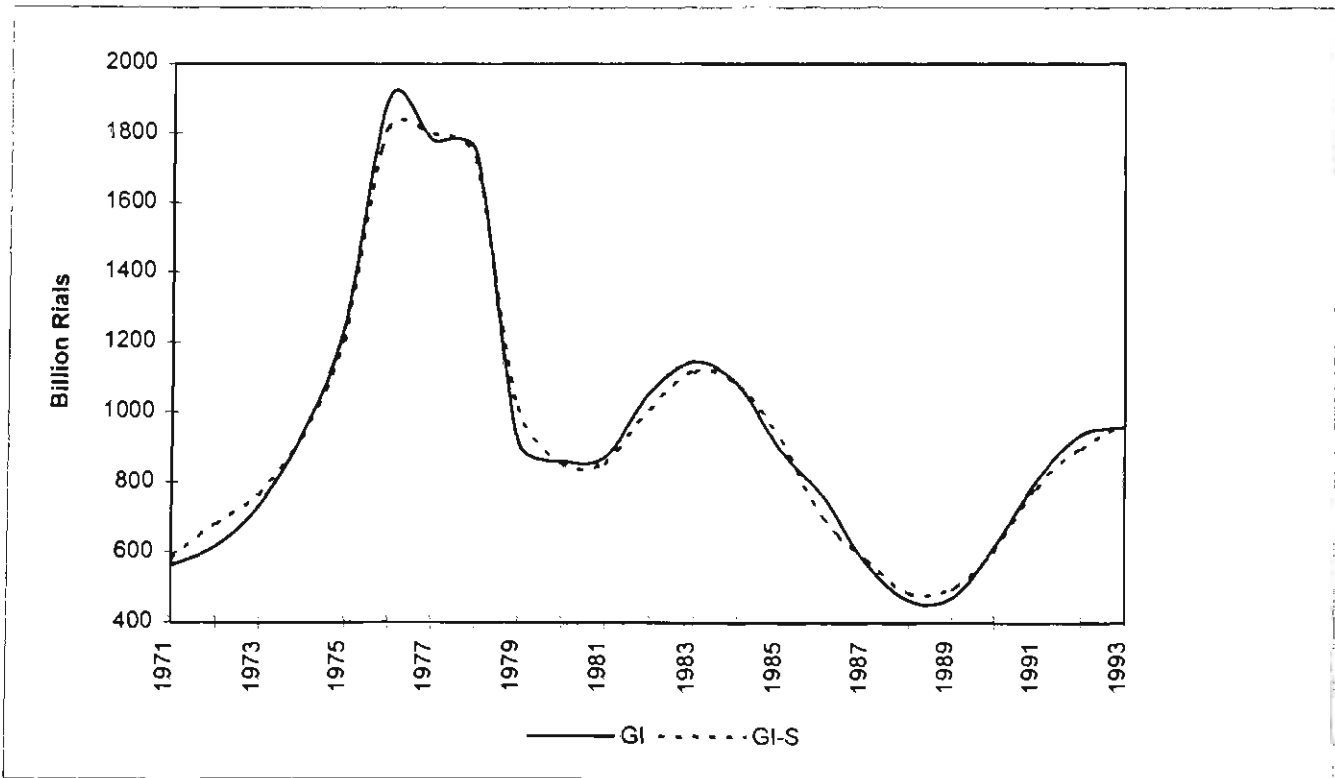


Figure 6.5. Actual and Simulation Values of Public Current Expenditure

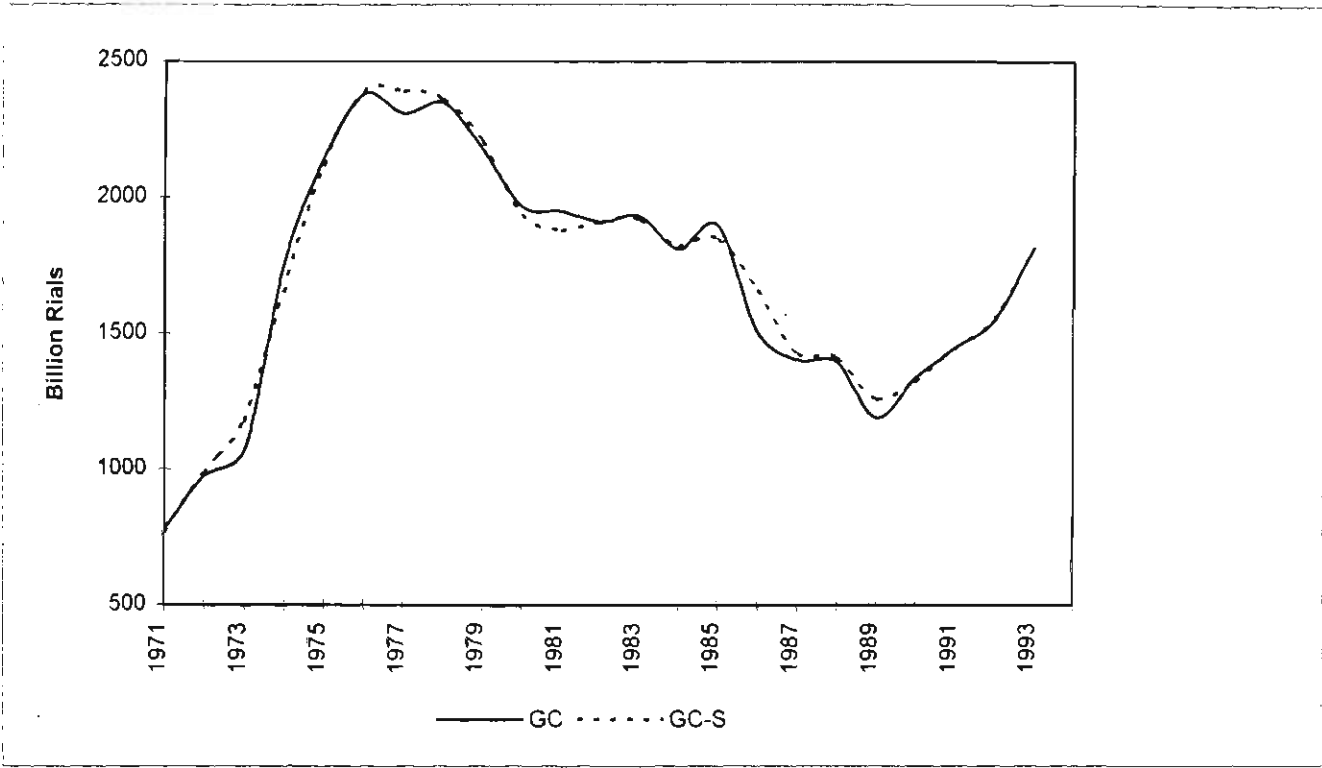


Figure 6.6. Actual and Simulation Values of Non-oil Net Exports

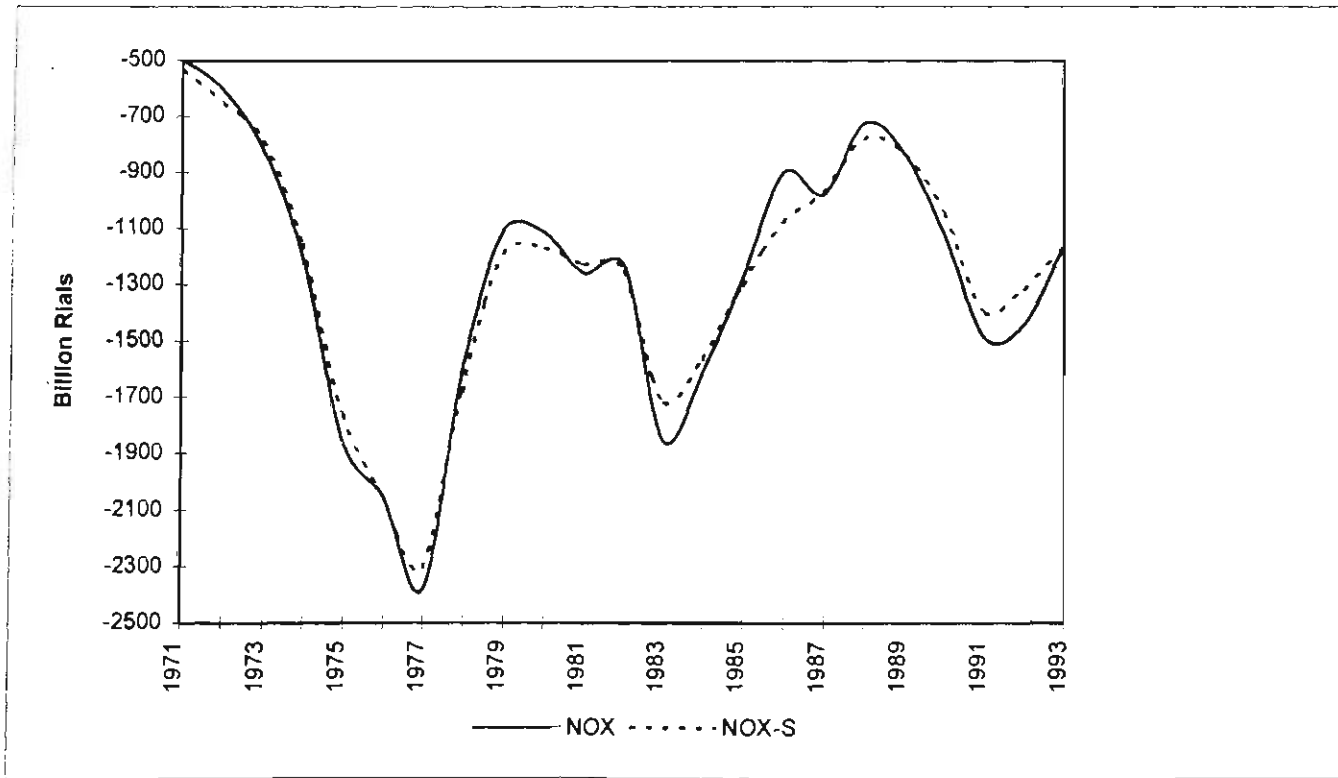


Figure 6.7. Actual and Simulation Levels of Domestic Prices

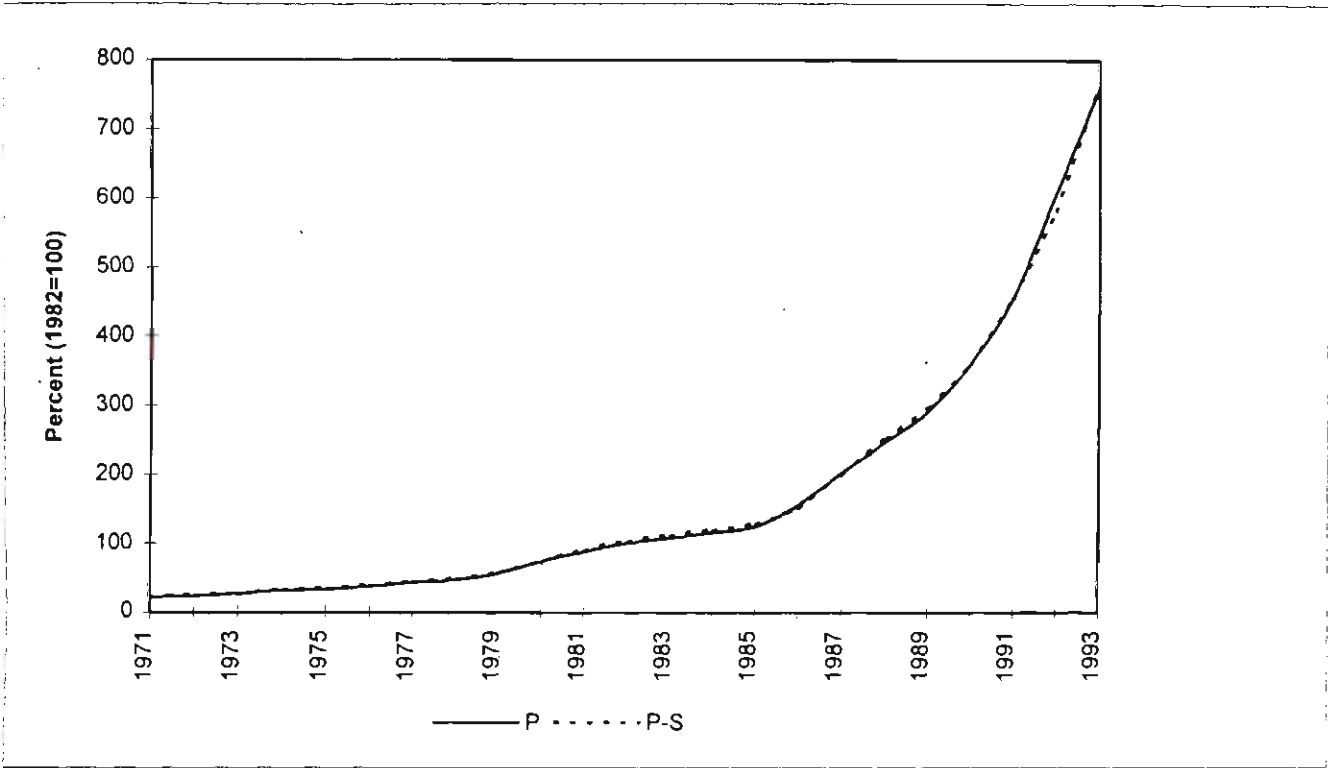


Figure 6.8. Actual and Simulation Values of Non-Oil Aggregate Supply

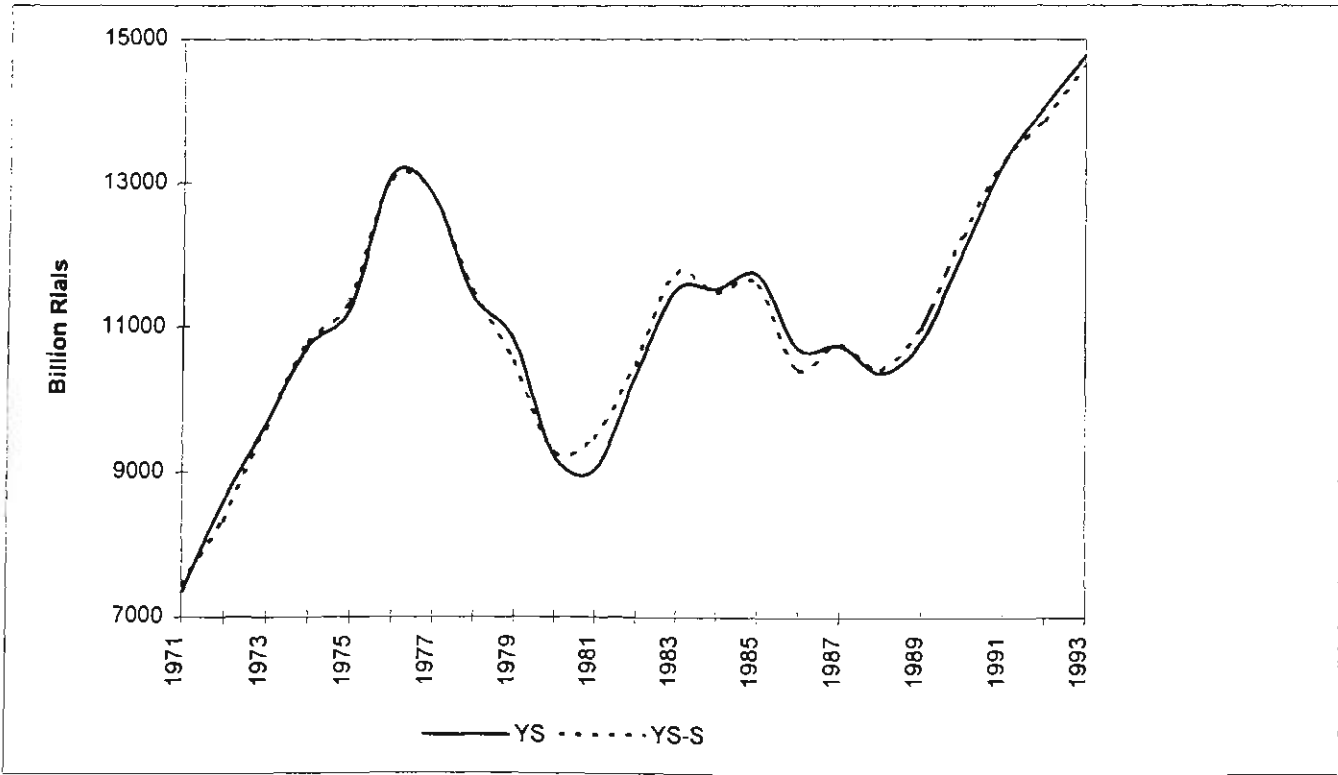


Figure 6.9. The Interest Rate Effect on Private Investment

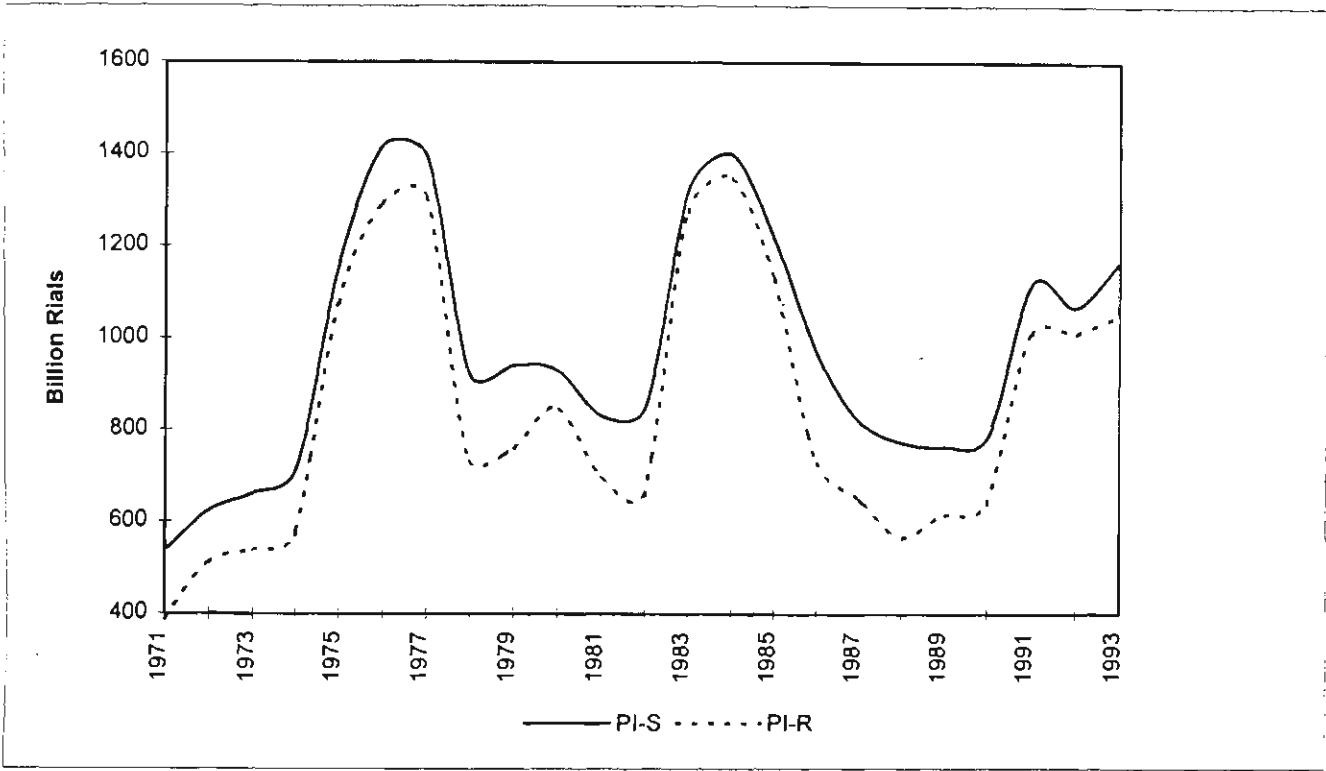


Figure 6.10. The Interest Rate Effect on Non-oil Aggregate Demand

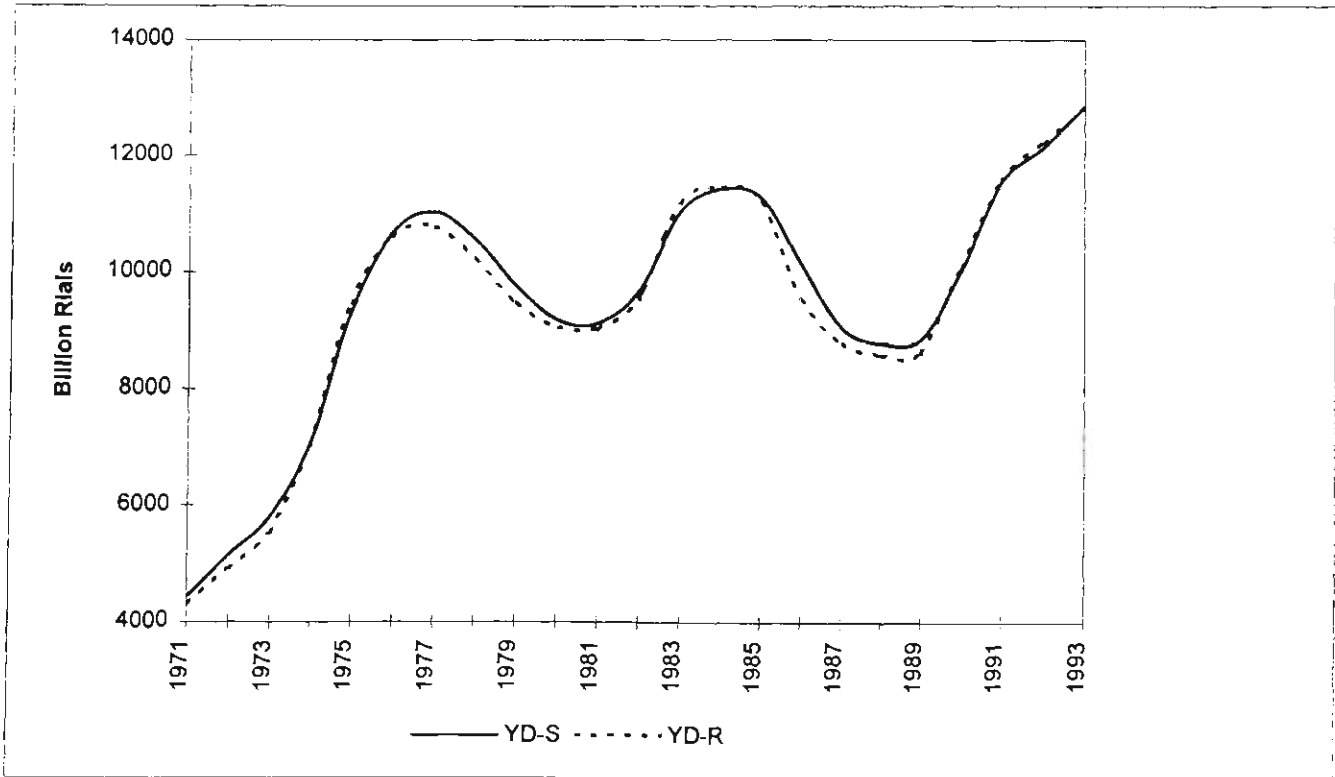


Figure 6.11. The Interest Rate Effect on Real Money Demand

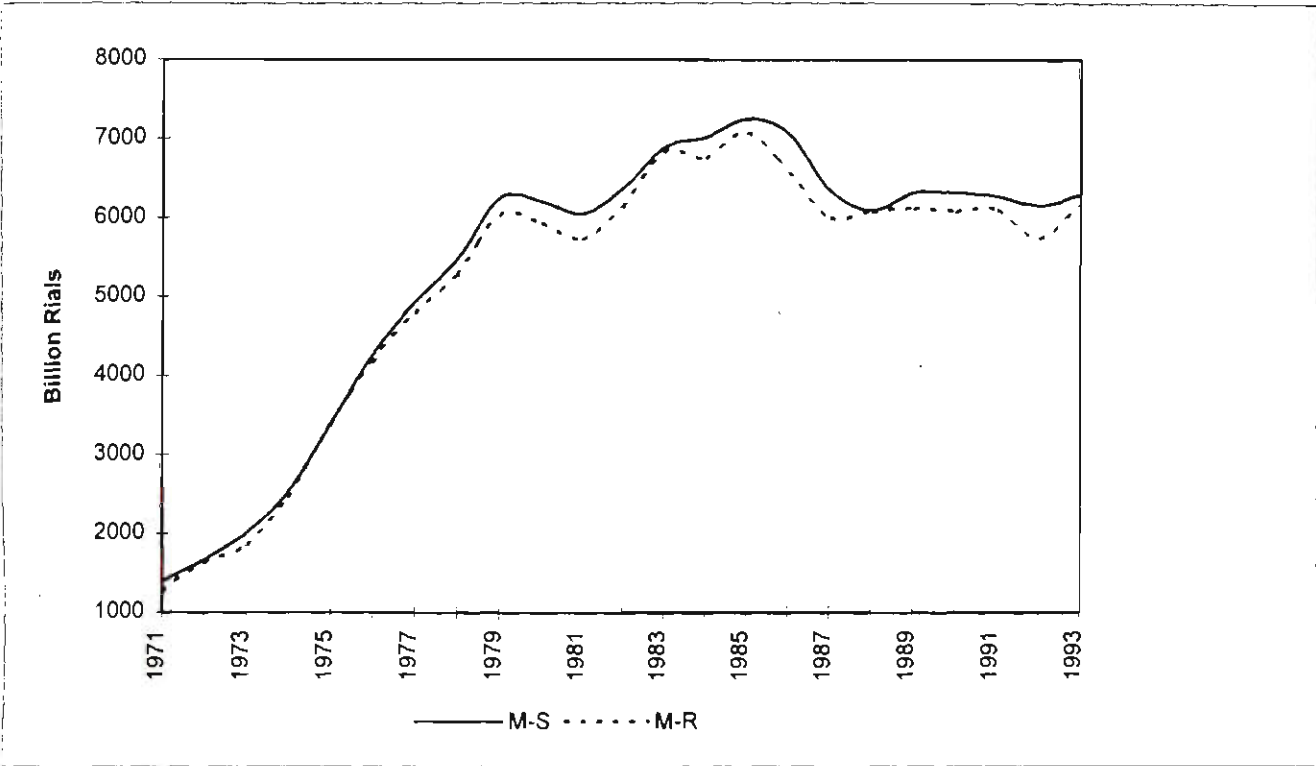


Figure 6.12. The Interest Rate Effect on the Domestic Price Level

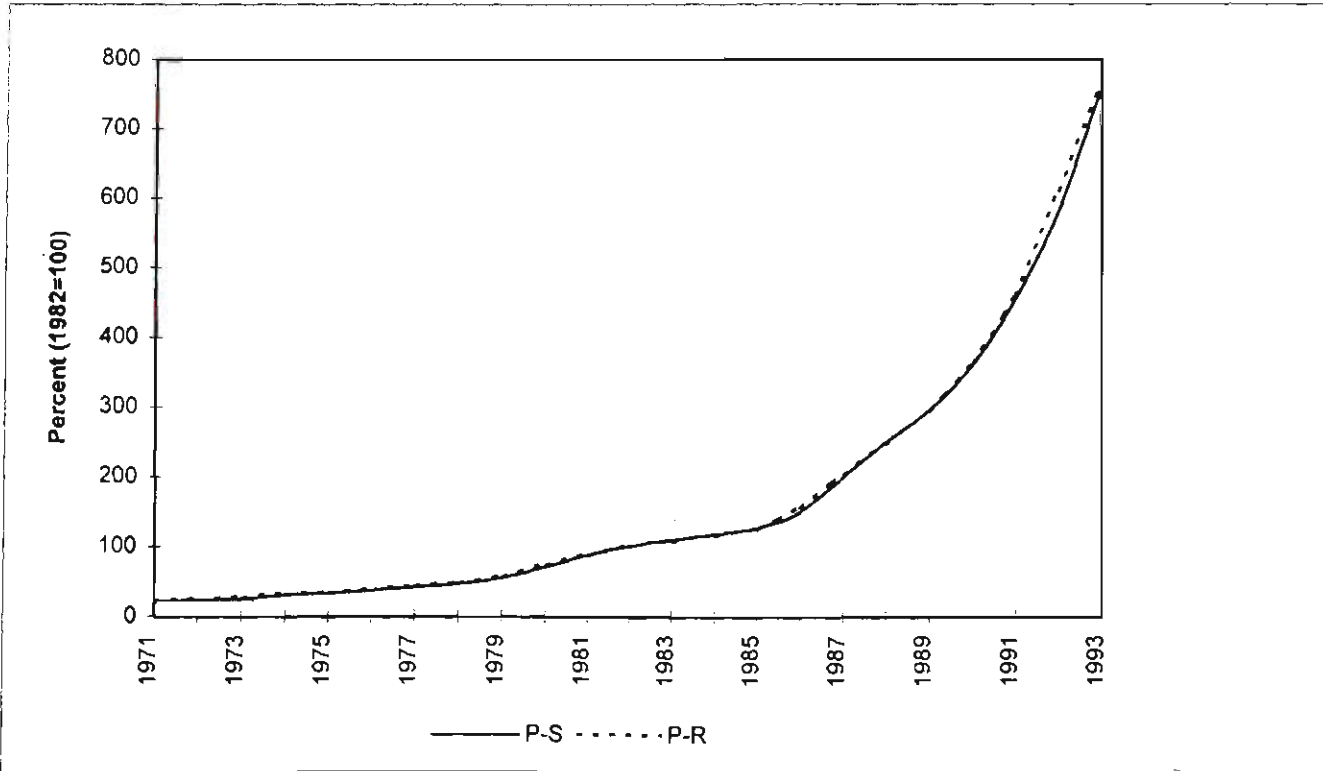


Figure 6.13. The Interest Rate Effect on Non-oil Aggregate Supply

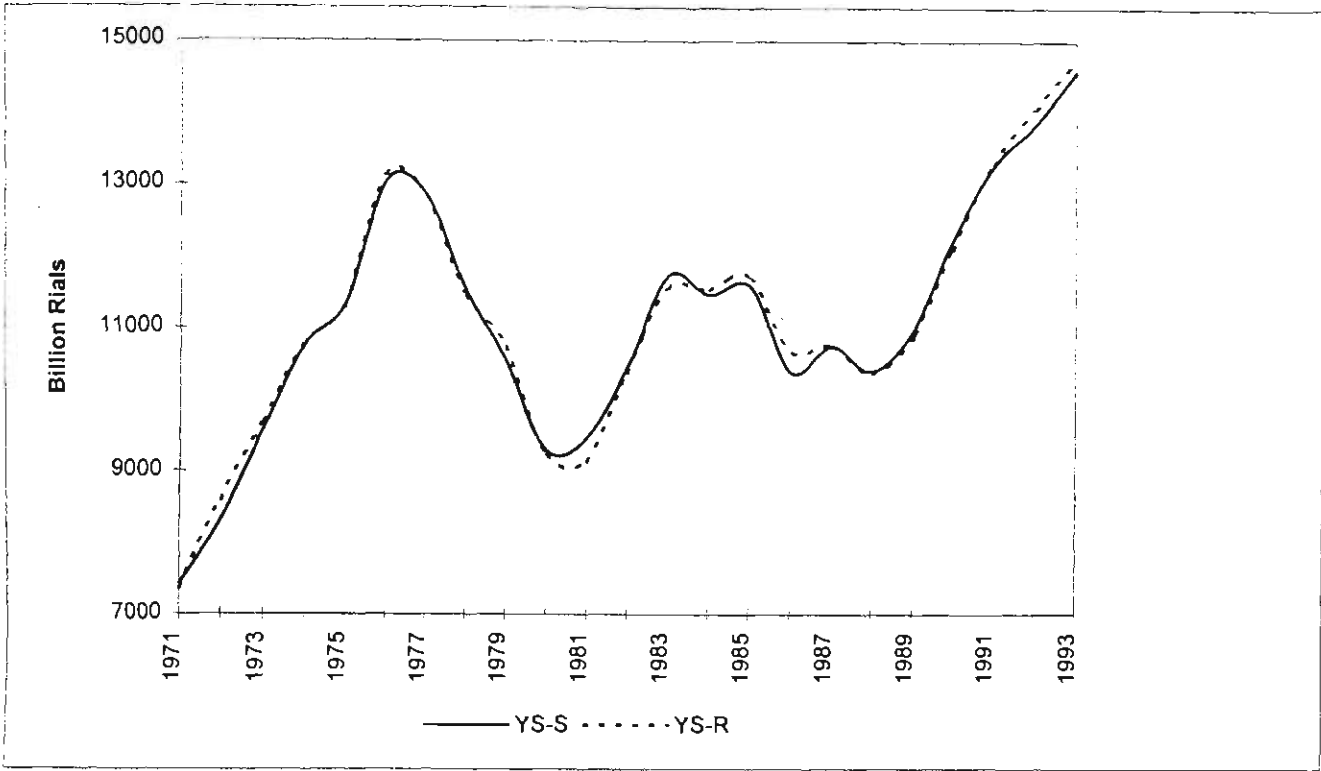


Figure 6.14. The Oil Export Revenue Effect on Non-oil Aggregate Demand

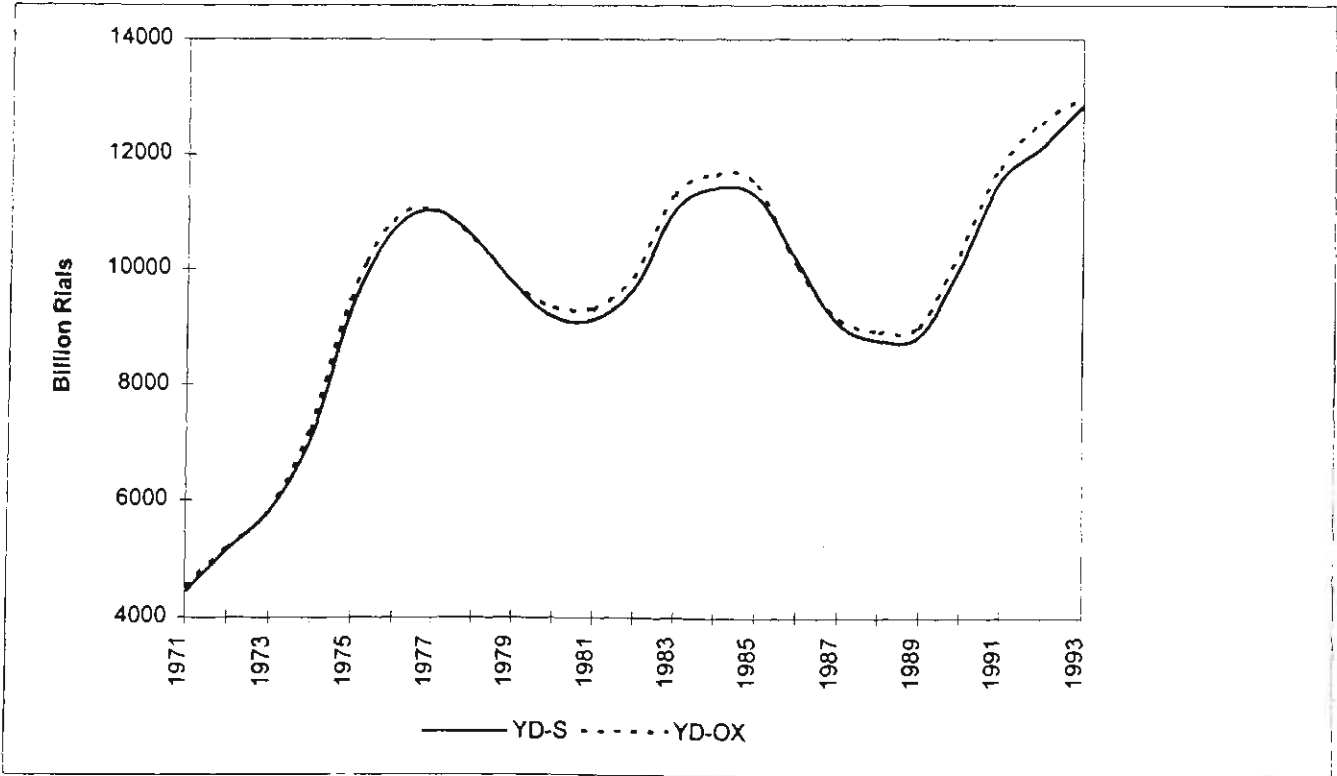


Figure 6.15. The Oil Export Revenue Effect on Public Investment

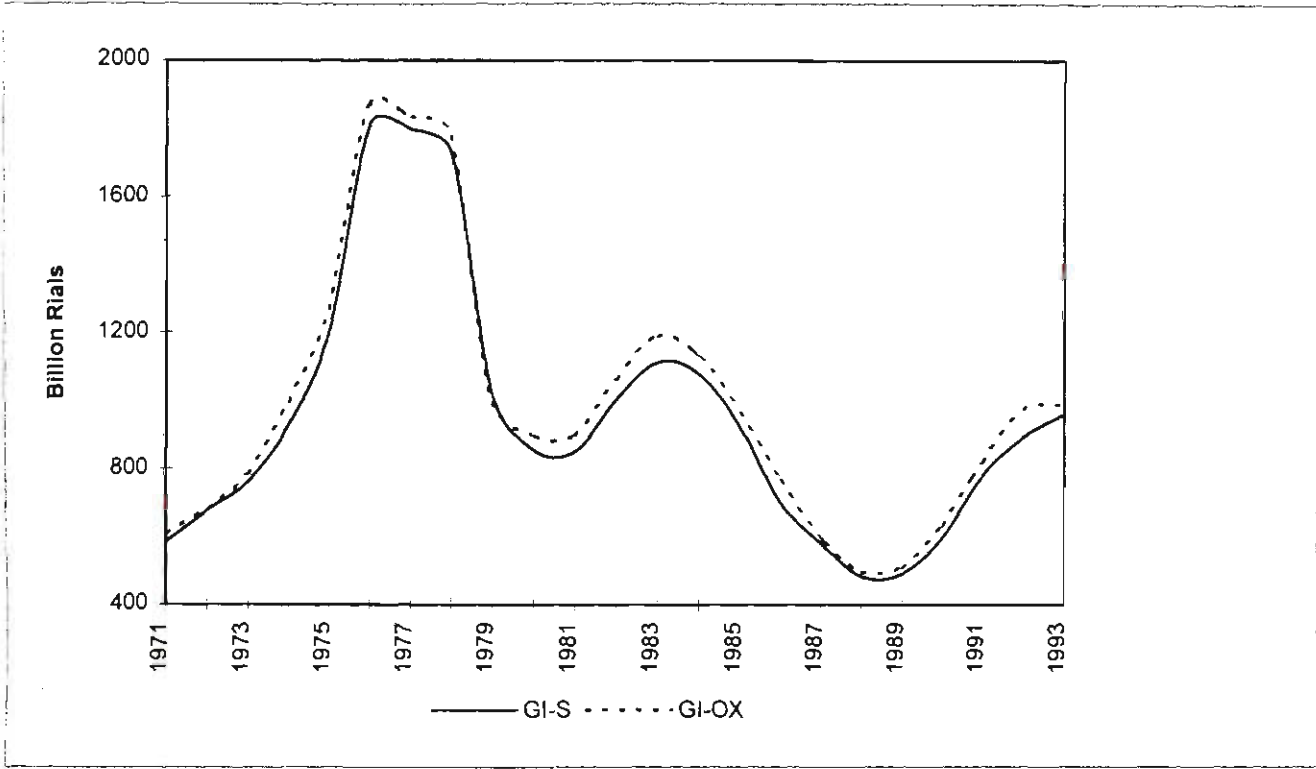


Figure 6.16. The Oil Export Revenue Effect on Public Current Expenditure

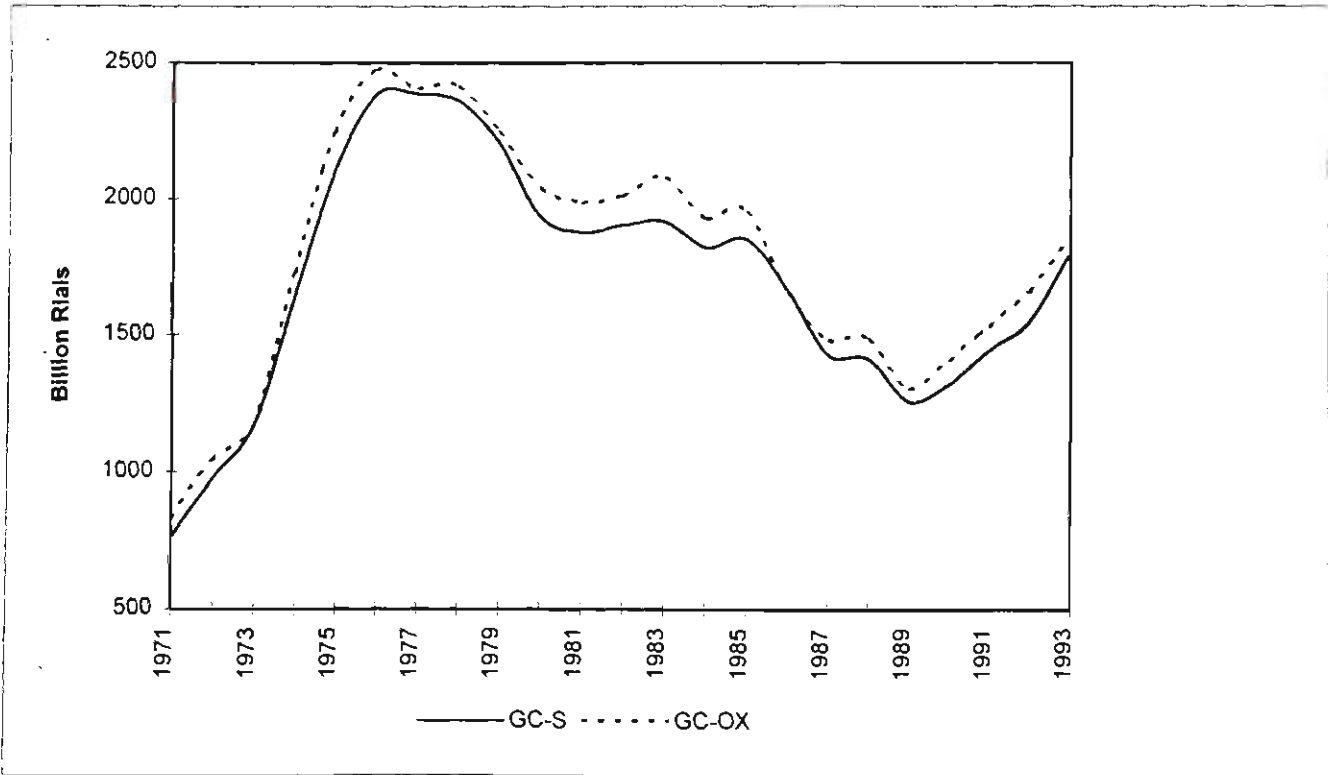


Figure 6.17. The Oil Export Revenue Effect on Private Investment

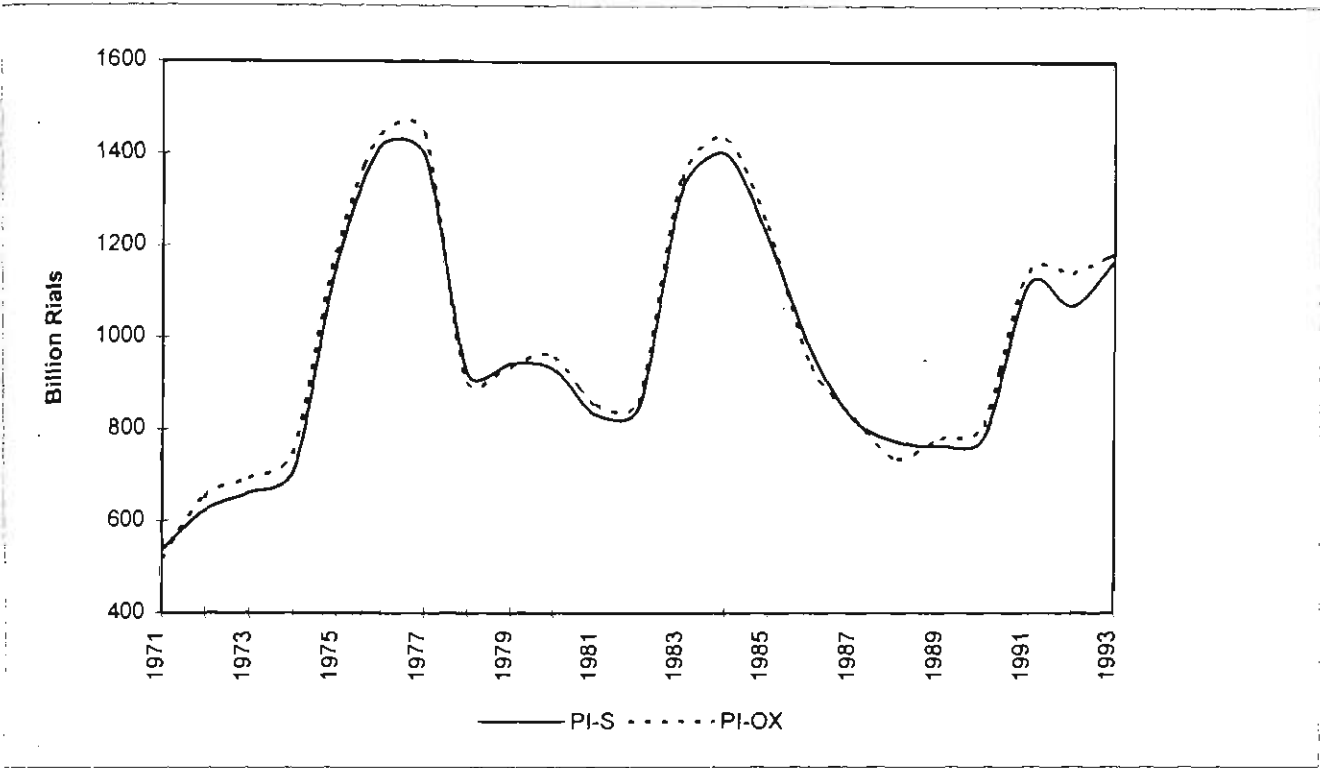


Figure 6.18. The Impact of OECD Income on Non-oil Net Exports

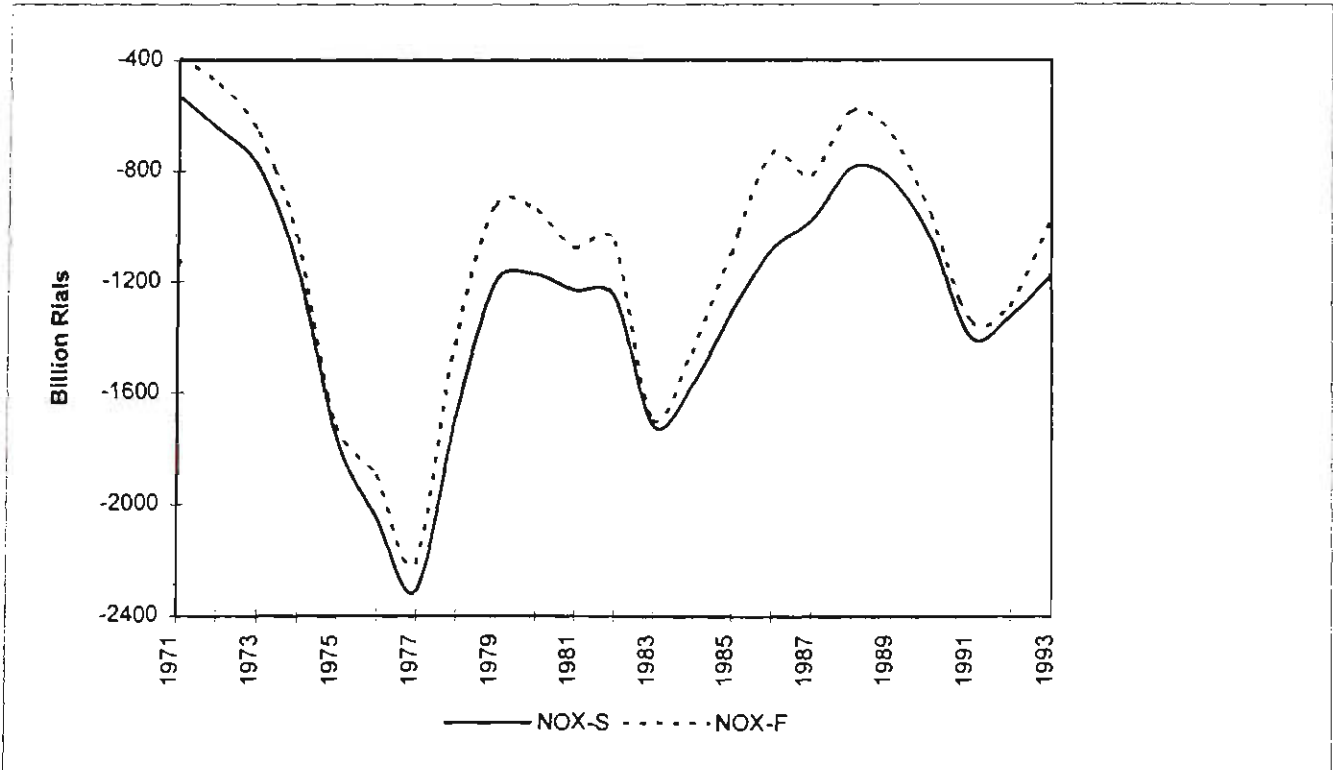


Figure 6.19. The Impact of OECD Income on Non-oil Aggregate Demand

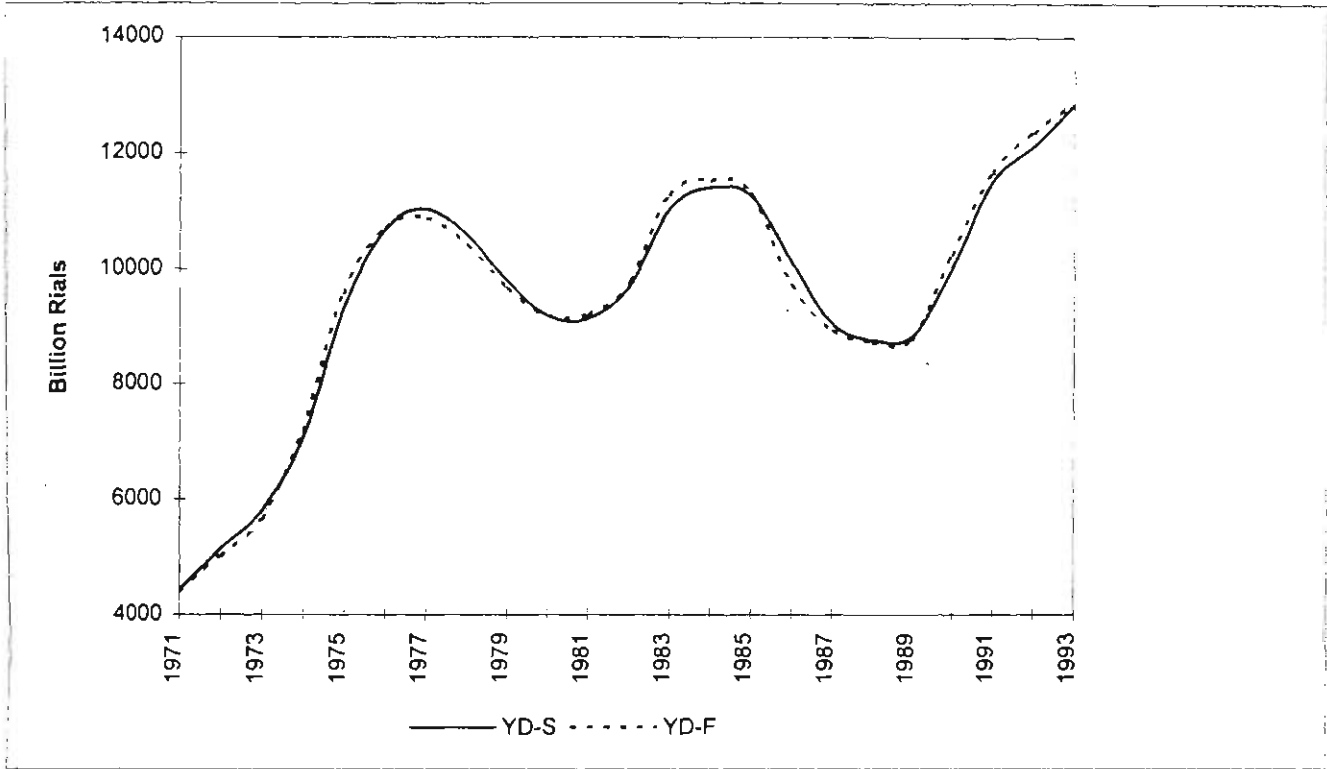


Figure 6.20. The Impact of Domestic Currency Devaluation on Non-oil Net Exports

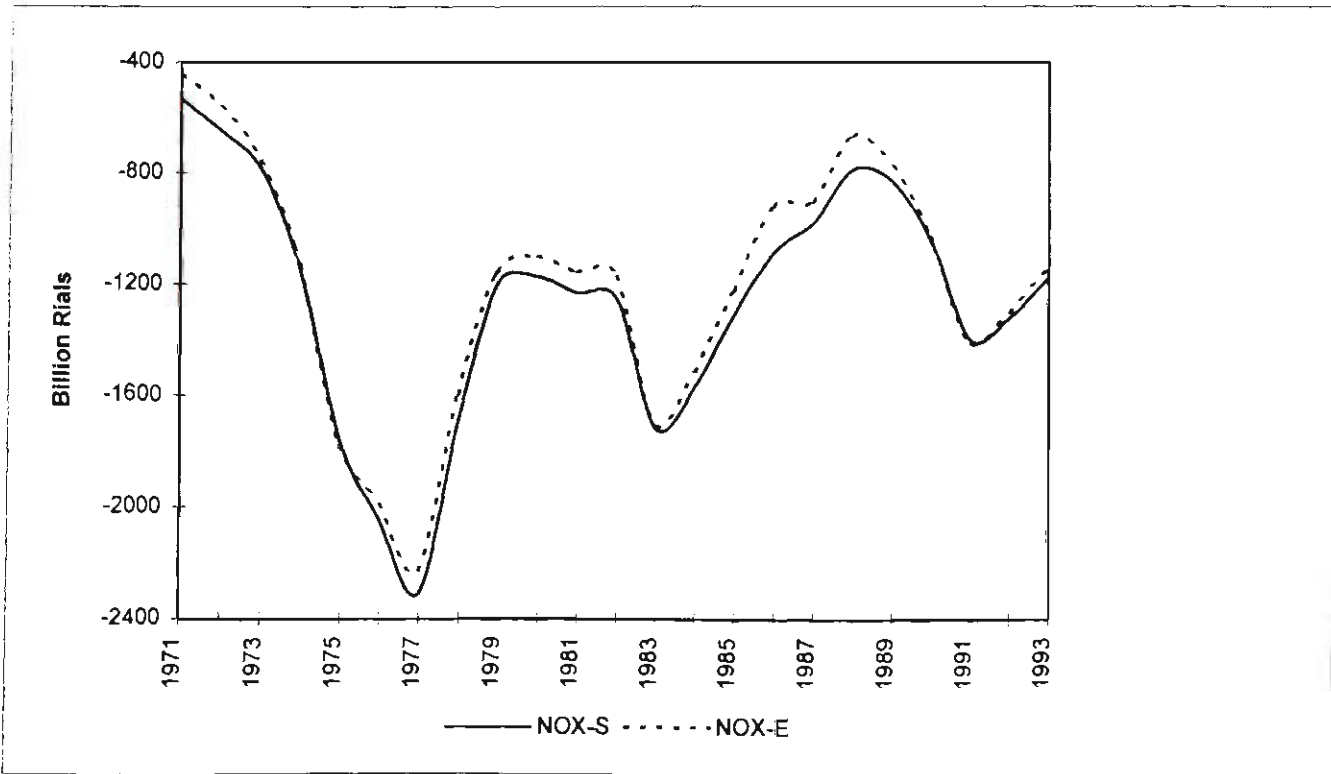


Figure 6.21. The Impact of Domestic Currency Devaluation on Private Investment

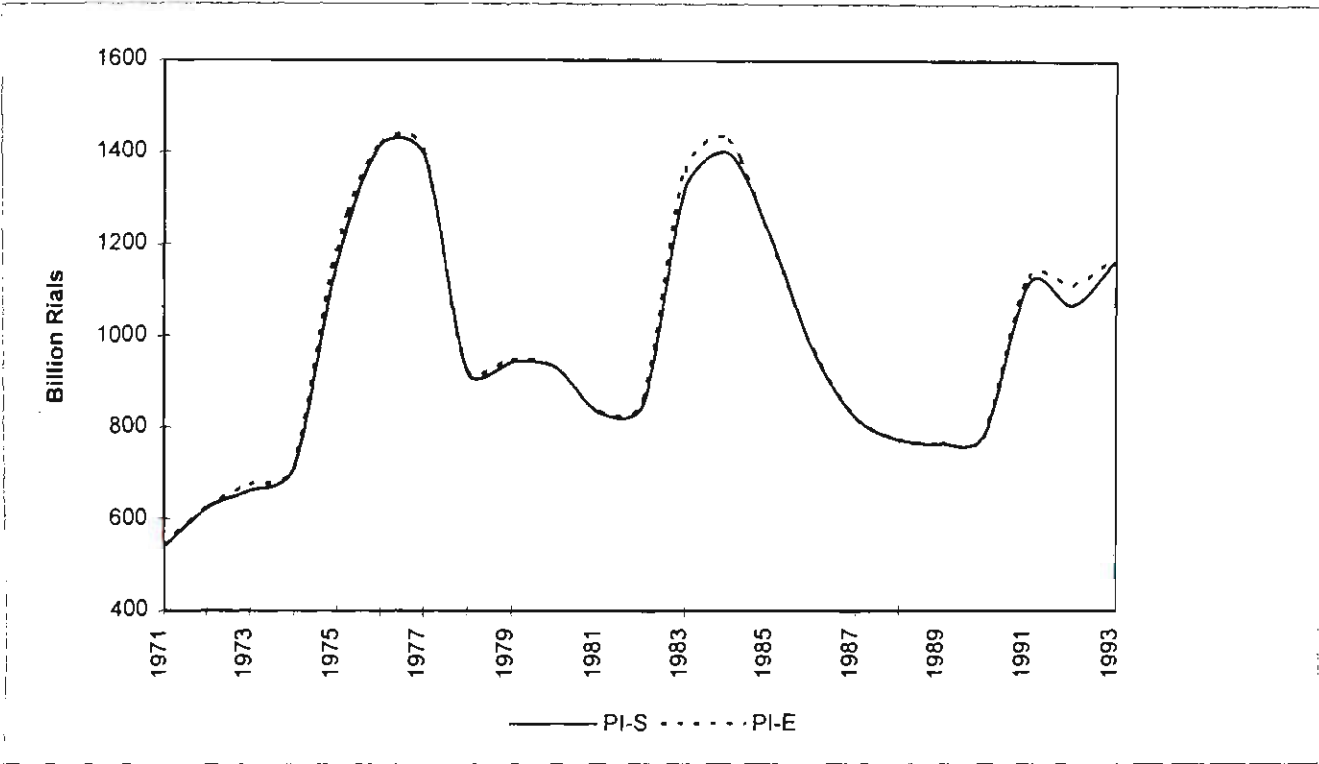


Figure 6.22. The Impact of Domestic Money Devaluation On Non-oil Aggregate Demand

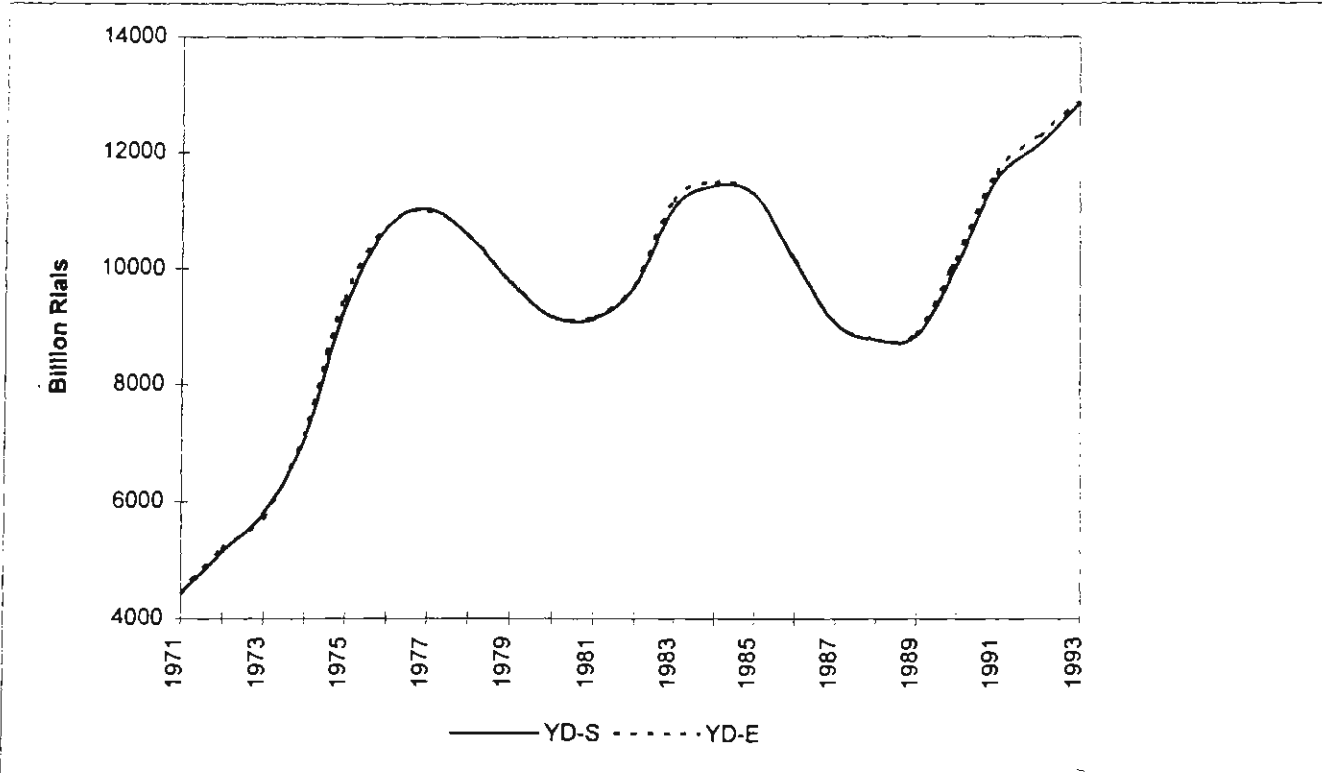


Figure 6.23. The Impact of Domestic Currency Devaluation on Real Money Balances

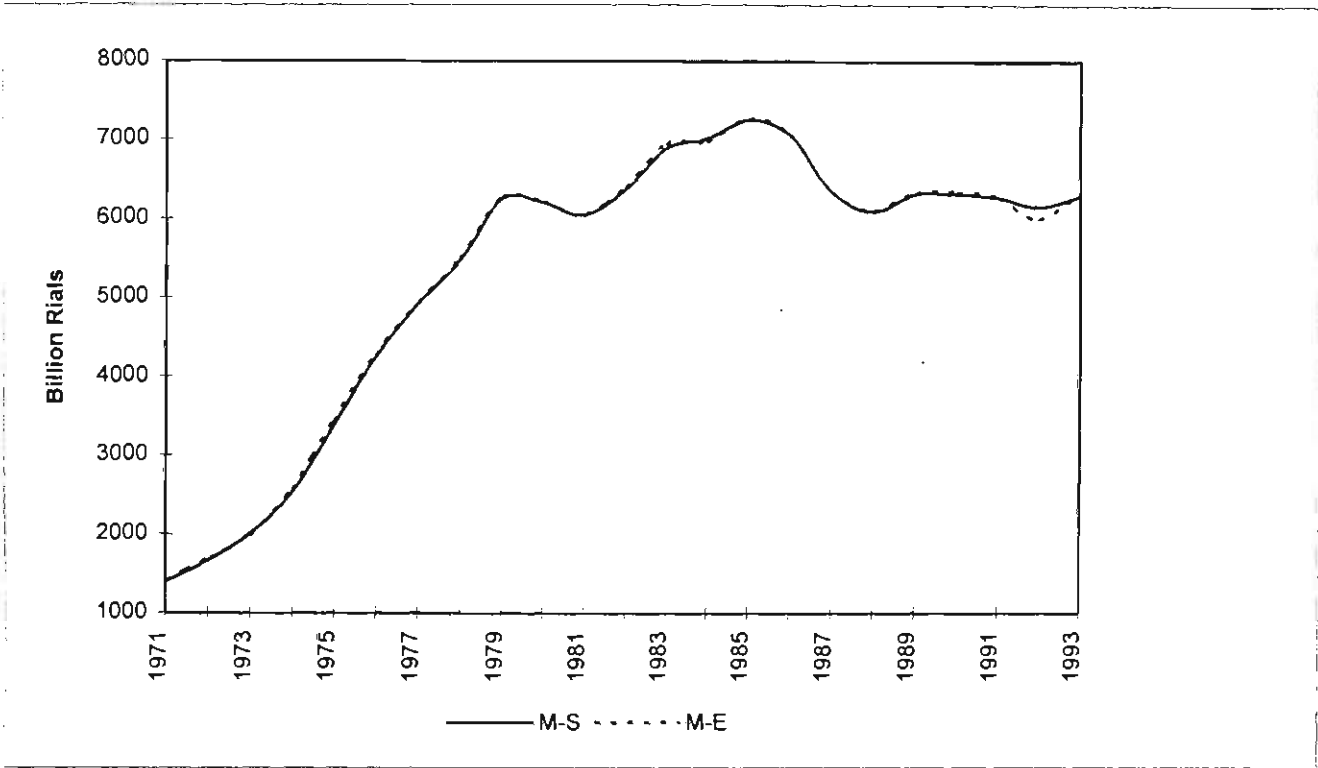


Figure 6.24. The Impact of a Wage Increase on Non-oil Aggregate Supply

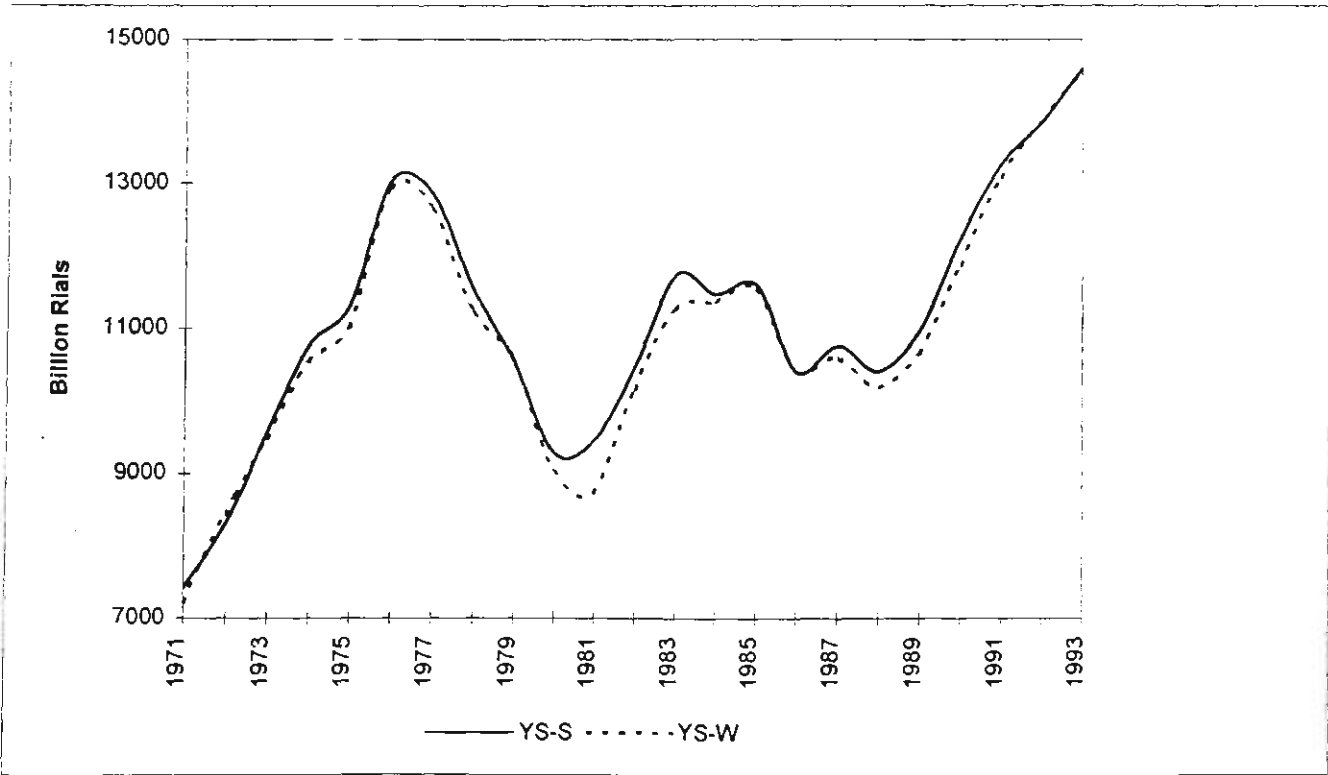


Figure 6.25. The Impact of a Wage Increase on the Domestic Price Level

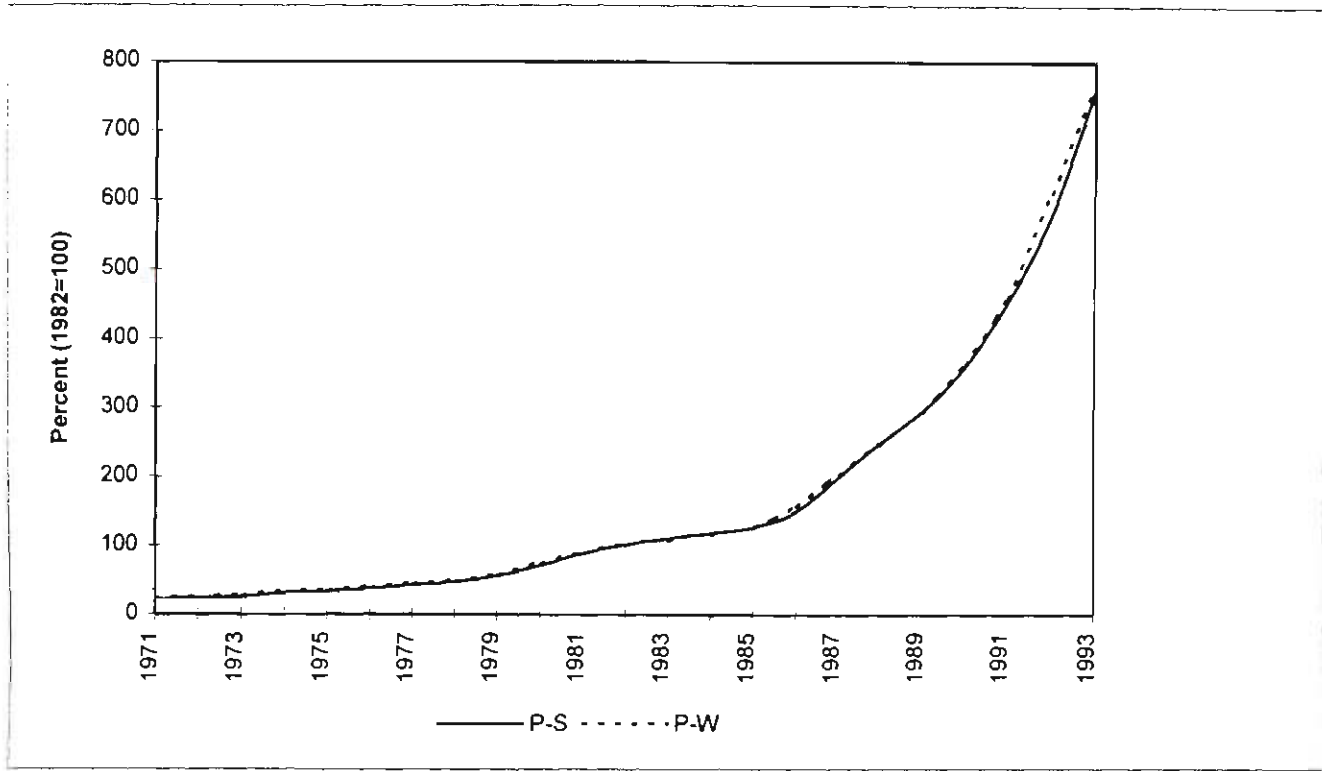


Figure 6.26. The Impact of a Wage Increase on Private Consumption

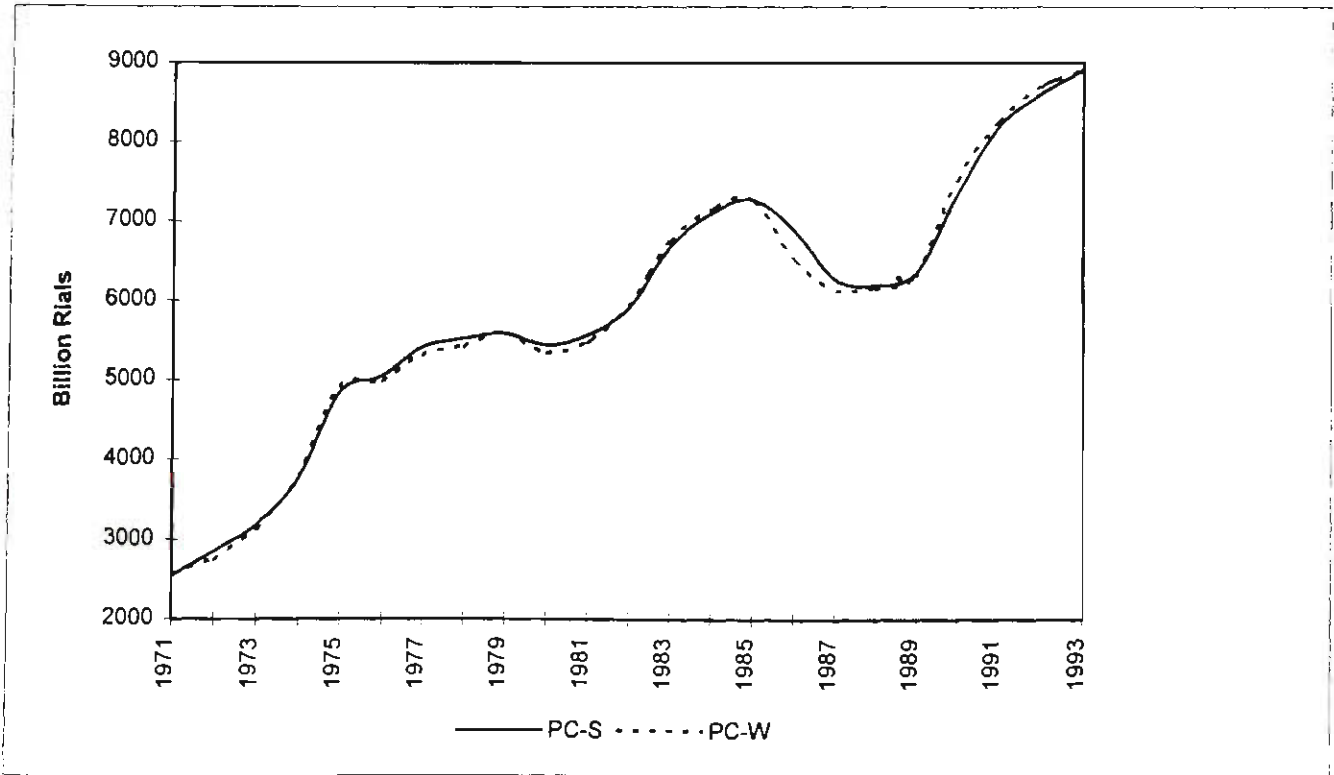


Figure 6.27. The Impact of a Wage Increase on Non-oil Aggregate Demand

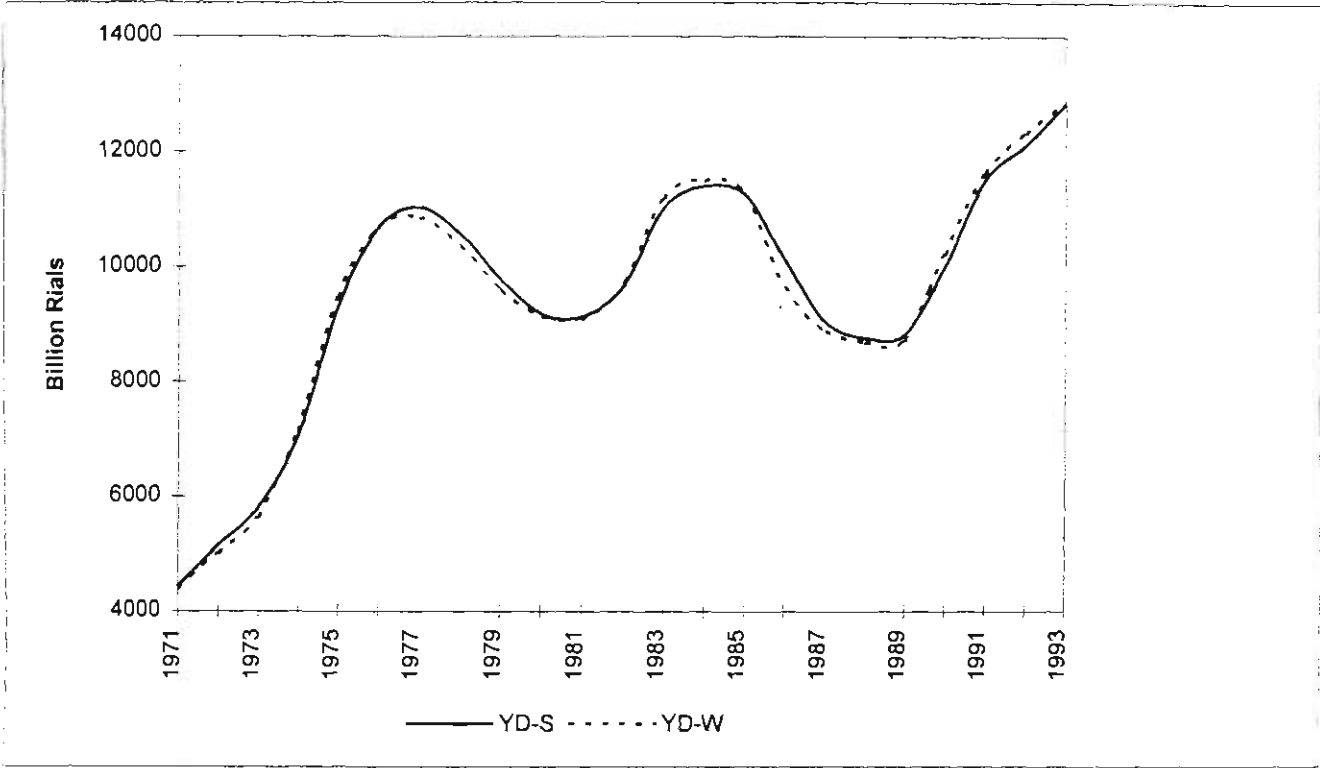


Figure 6.28. The Effect of an import increase on Non-oil Aggregate Supply

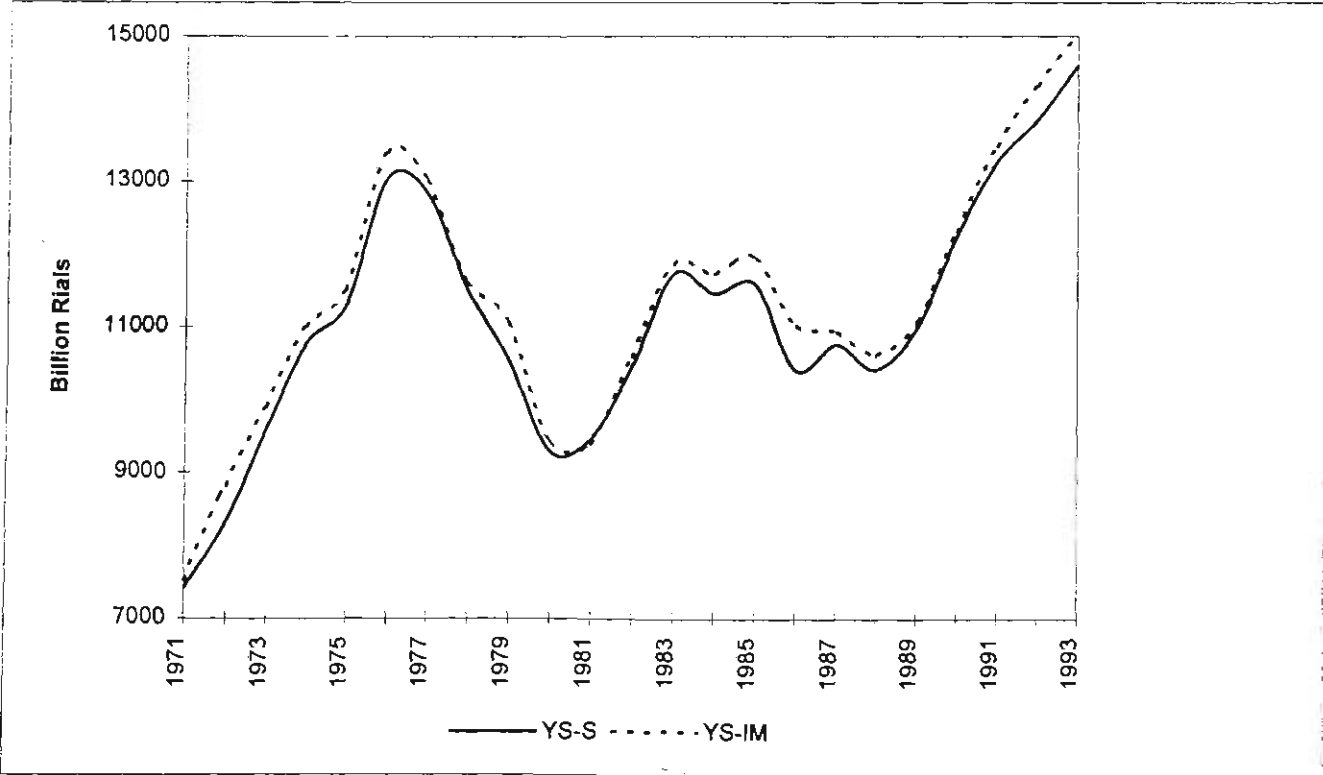


Figure 6.29. The Effect of an import increase on Private Consumption

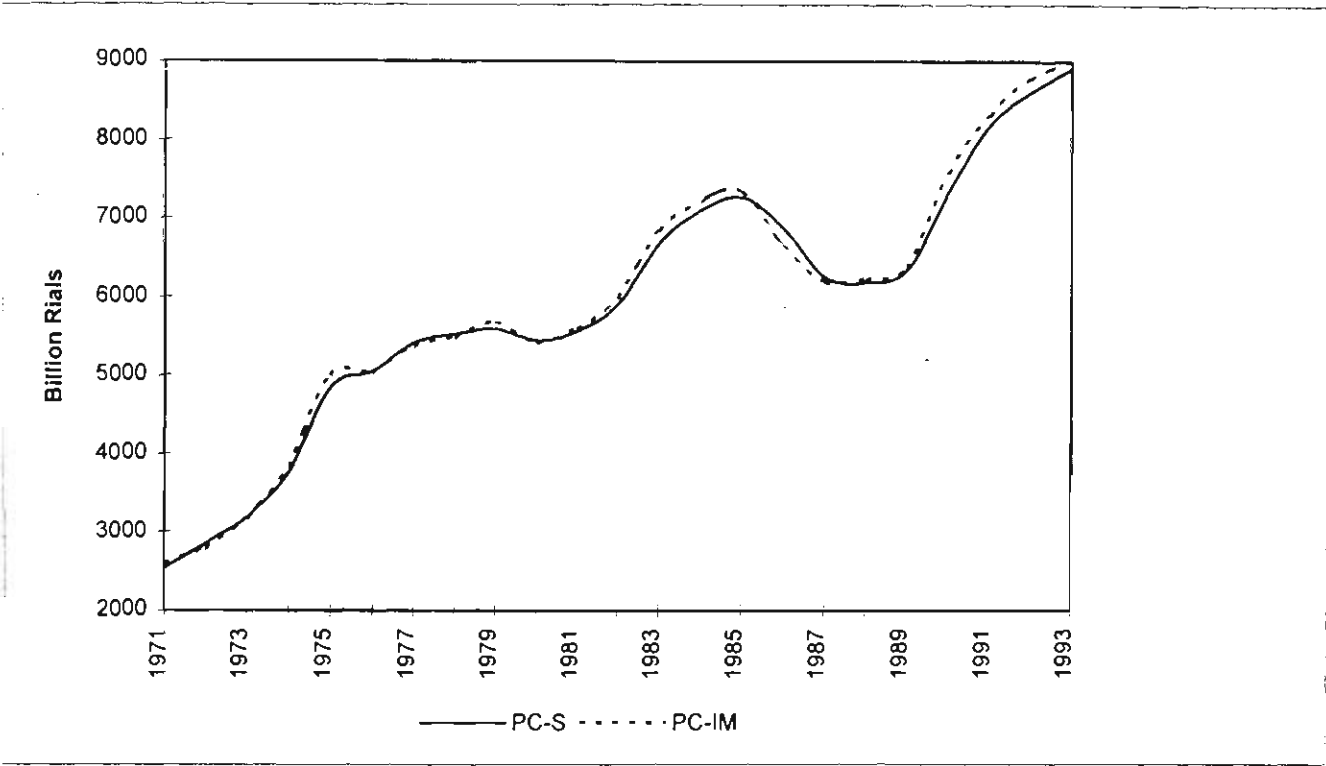


Figure 6.30. The Effect of an import increase on Private Investment

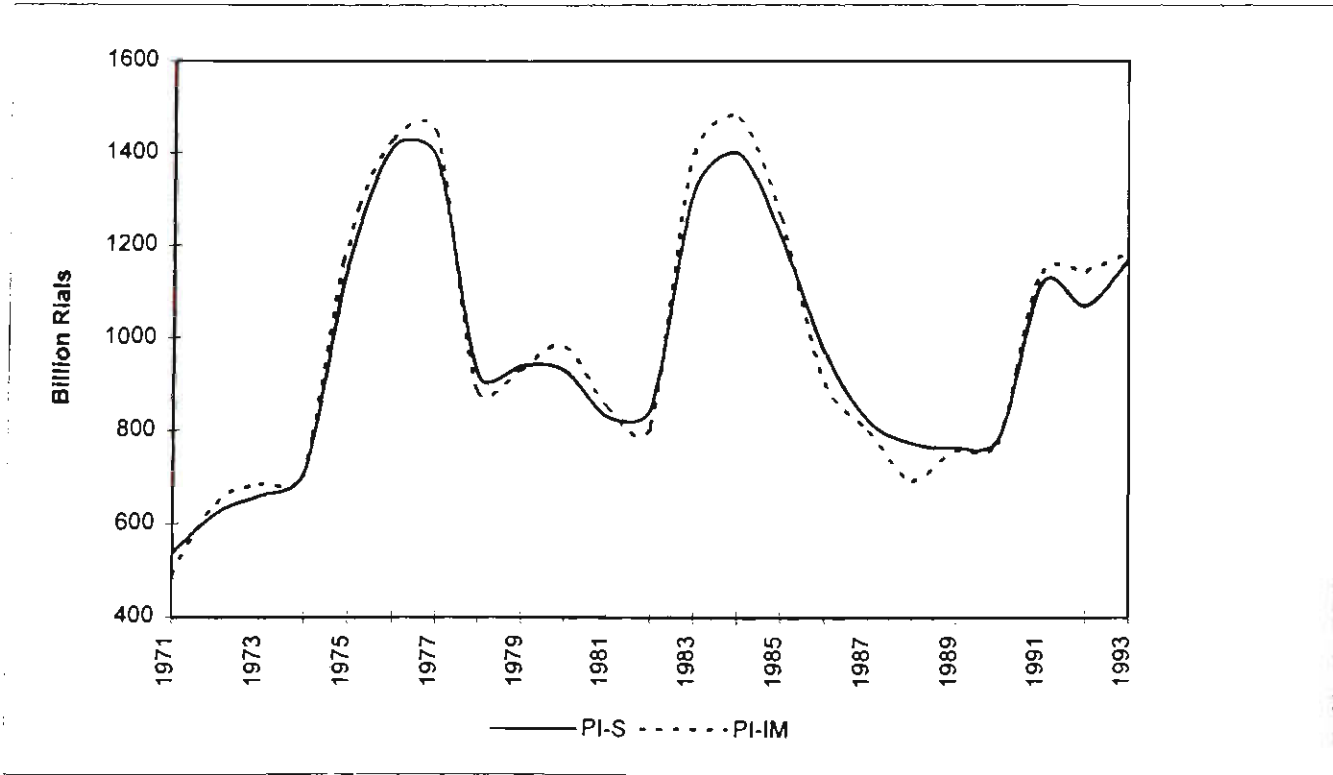


Figure 6.31. The Effect of an import increase on Non-oil Aggregate Demand

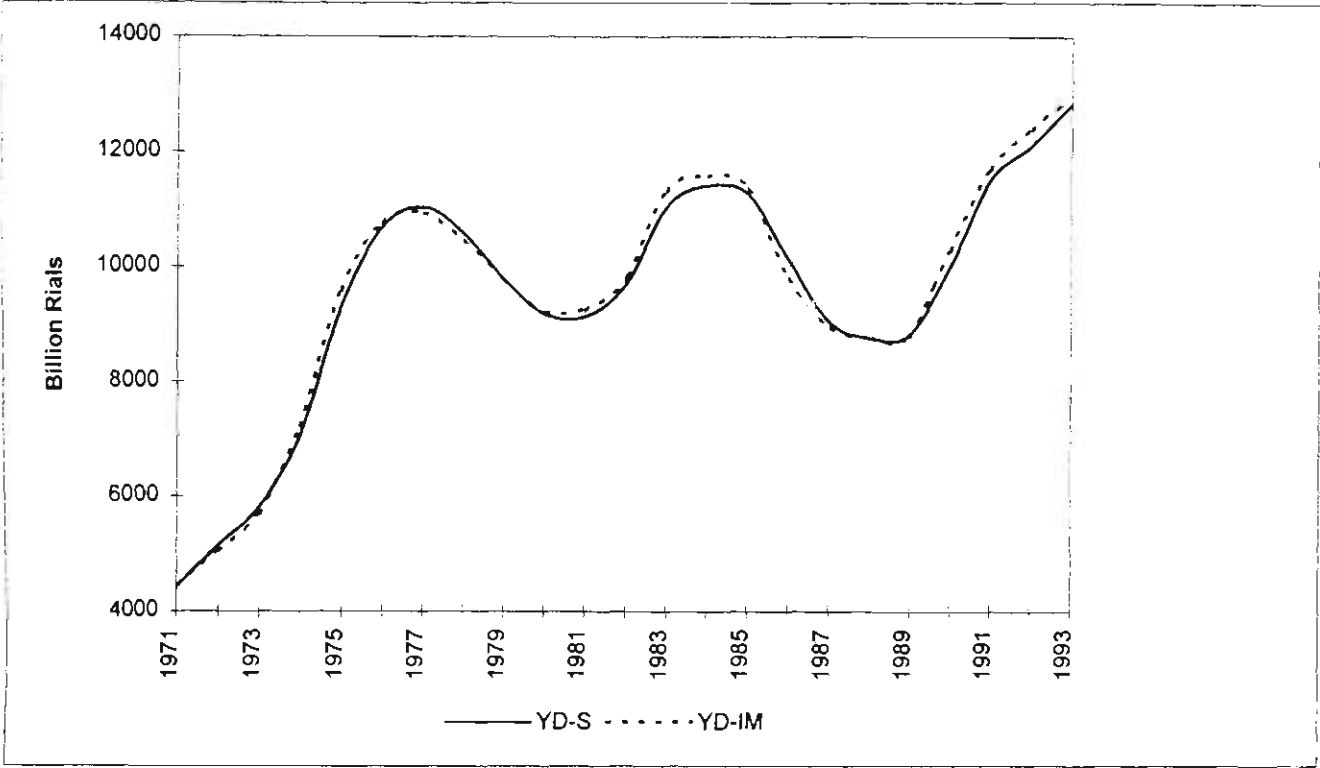
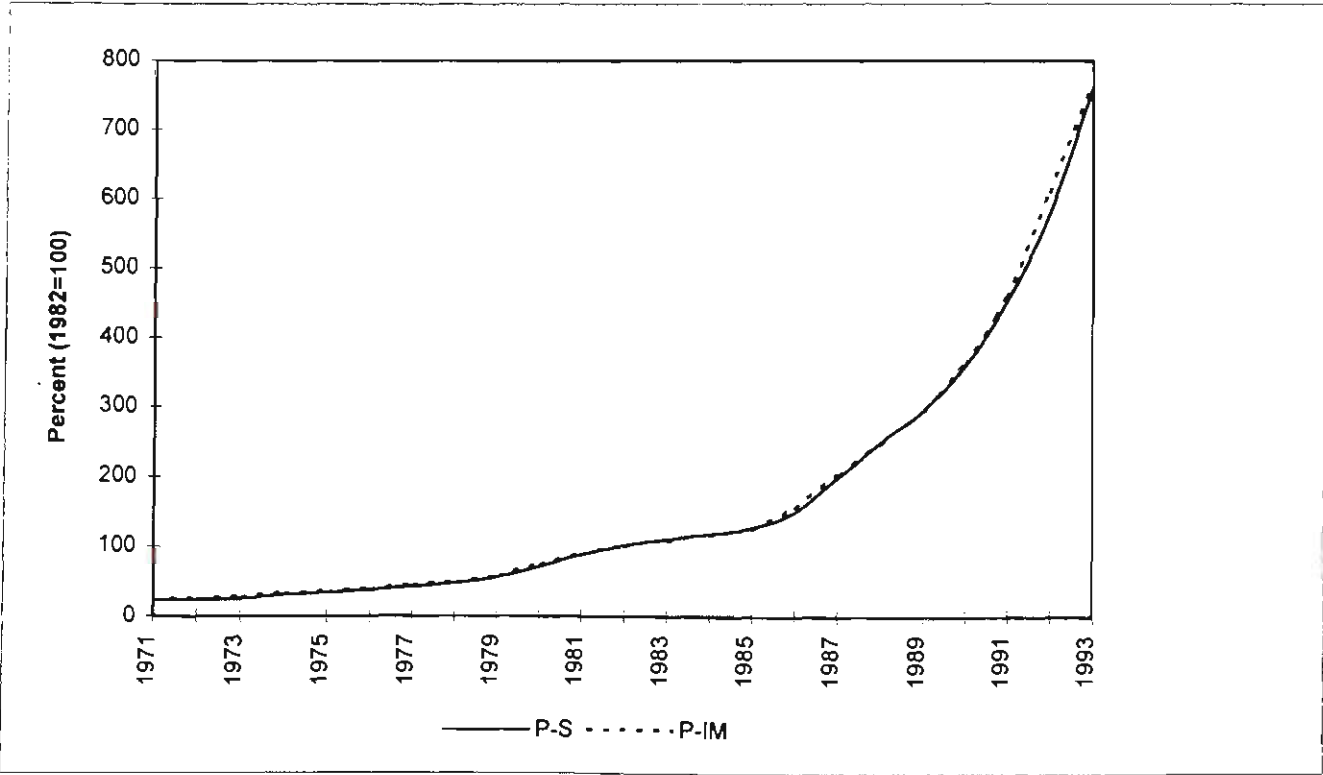


Figure 6.32. The Effect of an import increase on the Domestic Price Level



CHAPTER 7:

MICROECONOMIC REFORM

7.1. Introduction

The effects of government current and capital expenditure on the whole economy emphasising private investment, using a macroeconomic model, were discussed in the previous chapter. The results indicated that private investment is positively affected by non-oil aggregate demand and will be slightly stimulated by a lower rate of interest. The model shows the importance of government policy in allocating oil export revenue for current or capital expenditure. Any shift from current to capital expenditure reduces non-oil aggregate demand and eventually slows down the inflation rate. Government current and capital expenditure crowds in private investment through increasing aggregate demand. The domestic price level, as the current critical issue in Iran, is affected by the nominal wage and the domestic price level in the previous period rather than the real exchange rate plus the imported goods price index. Finally, non-oil aggregate supply was adversely affected by real wages while it was directly increased by the private sector capital stock and the volume of imports.

The model simulations in the last chapter indicate that a lower interest rate will encourage private investment and increase aggregate demand, and will not significantly affect the inflation rate. A rise in world income will sharply improve net

exports. The third major simulation of the model is related to the oil export policy. A rise in oil exports directly increases government revenue and its current and capital expenditure and indirectly non-oil aggregate demand and private investment. A devaluation of the real exchange rate increases non-oil net exports and private investment expenditure. A rise in the volume of imports increases non-oil aggregate supply and private consumption and investment expenditure. This increase in imports could not slow down the inflation rate due to inflationary expectations. In brief, a lower interest rate, oil export promotion, increase in imports and a devaluation of the domestic currency encourage private investment.

The results suggest a number of economic policies for enhancing private investment and diminishing the inflation rate. However, since there is not an open market economy, and the product, money and assets markets are locked in tight regulations, the above economic policies cannot be achieved without a number of microeconomic reforms in Iran. These reforms can provide a competitive economic environment by limiting government intervention in the economy. This chapter discusses the effects of government intervention after the revolution and during the war, as well as the necessity of eliminating many of those economic interferences to improve investment and economic development. These reforms are particularly essential in areas such as foreign trade regulation, foreign exchange market reform, attraction of foreign direct investment, privatisation of nationalised industries, deregulation of banking services and reforms in public enterprises.

The Iranian government realised the need to carry out these reforms to enhance the country's economic performance, soon after the ceasefire (1988) between Iran and its neighbour Iraq. The government attempted to meet the urgent need for a short-term economic reconstruction, repair of the war damages and adequate economic growth. The end of the war was an opportunity to offer an important reform package through the "Economic Adjustment Policy" (EAP) for the short term, which was followed by

a five year development plan. From the government's point of view, the EAP had the objective of opening up the economy to competition and deregulation.

A commitment to economic competition and free market rules dictate the necessity to abandon regulation and launch alternative economic policies, in order to generate a competitive environment. Pfeffermann (1988) believes that the essential components of microeconomic reform, or liberalisation, can be summarised in the following:

- Rationalisation of the exchange rate policy; proximate the official exchange rate to its market value.
- Import and export liberalisation.
- Deregulation of private economic activities as well as investment; i.e. easing industrial investment licensing in favour of private activities.
- Relaxing price controls through shifting to a market pricing mechanism.
- Diminishing subsidies for utilities, energy and other goods and services.
- Changing the role and relation of private and public sectors in the whole economy, in terms of giving the same opportunity to the private sector which the public sector already had.
- Deregulation of asset and money markets to enable the accumulation of private capital stock.
- Free interest rate determination policy by the banking system.
- Attraction of foreign direct investment.
- Establishing free trade and industry zones.

The above issues are expressed in the Iranian government's long term agenda. In the first five year plan, deregulation of trade and the economy was formulated. It was in the form of relaxation of statutory monopolies and easing the investment licensing arrangements that prevented the private sector, as well as foreign investors, sharing in products that were previously produced or imported by the public sector. It also

aimed at improving industry performance by increasing the role of market forces in the economy. However, the commencement of the plan was delayed because of a number of political considerations in recent years. This chapter attempts to analyse the aforementioned microeconomic reforms and their outcomes.

The reforms were projected to increase investment and output, improve public managerial procedures, eliminate the fixed official exchange rates and lift the government's pricing and distribution of goods and services. It was also aimed at decontrolling foreign exchange allocations and deregulating the banking system. Whether the government could achieve these objectives and whether the reforms were successful, will be discussed in the following sections. The next section contains the major economic reforms which have been enacted to achieve comparative advantages in foreign trade. Exchange rate reform, as a crucial economic policy, is considered in section three, followed by section four in which the attraction of foreign direct investment is discussed. The government's view on privatisation of the nationalised and publicly owned enterprises, and shortcomings of the capital market in Iran, will be reviewed in section five. Bank reforms, deregulation of banking services and opting for flexible monetary policies are considered in section six. Section seven reviews some major reforms in the management and human resources of the public sector in the post-war years. The major conclusions will be presented in the last section of this chapter.

7.2. Foreign Trade Reform

Government intervention in the economy diminished after the ceasefire (1988), when the new economic reforms in trade, investment, financing, pricing, distribution and other economic areas were introduced. This view also suggested to the policy makers that state enterprises should be able to survive in a competitive market without discrimination against private sector businesses. The government took further steps

to allow the private sector to establish businesses previously run by the public sector, encouraging the private sector to export and import goods and invest in mining, car manufacturing, cement factories, public transportation and foreign exchange dealerships.

Iranian exports have been dominated by oil exports, which are the monopoly of the government. The major non-oil exports consist of handmade carpets and handicrafts, fresh and dried fruits and caviar, manufactured goods and mineral products which form 2 to 15 percent of total exports. Consequently, the country's imports and foreign trade have been greatly affected by oil export revenue fluctuations. The Iranian economy has often been suffering from a lack of hard currency to finance the current needs of its industries and projects since the revolution. In this section, government policy to liberalise non-oil exports and imports to achieve a trade balance will be discussed.

For almost one decade, different rates of exchange were implemented to control different categories of imports of goods and services during the war. Certain food items or "essential goods" were imported under a highly undervalued foreign exchange rate to supply these goods more cheaply. For all imports and exports, obtaining permits from governmental bodies was required. With the execution of the first plan after the war, a series of trade liberalisation measures were implemented. Some of the permits for imports and exports were eliminated. Imports of authorised items were freed from quantitative restrictions if no foreign exchange was allocated by the Central Bank.

One of the goals of such liberalisation was to increase the supply of "essential" imported goods, which was financed through non-oil export revenues of the private sector. The outcome was an outstanding increase in non-oil exports which almost tripled in three years, from US\$ 1044 million in 1989 to US\$ 2988 million in 1992.

Another factor that contributed to such growth was the freedom of exporters to exchange their foreign income in the parallel market. They were then permitted to import goods of their choice with their foreign revenues, which previously were smuggled into the country (Amuzegar, 1993, p. 149).

The Central Bank made another attempt in March 1993 to further liberalise trade measures, through introducing one rate for all foreign exchange rates and floating all foreign currencies against the domestic currency. Although all currencies approached their market value in a short period, due to extraordinary demand for foreign exchange, and in particular the US dollar, this policy was abandoned within several months and the government was unsuccessful in fully eliminating different exchange rates. The wide gap between the demand and supply of the US dollar, was the main barrier for the government in liberalising trade and foreign exchange transactions in full.

In relation to imports, the government's policy encompassed a range of tariffs from 5 to 400 percent on top of customs duties after the revolution (Ministry of Commerce, 1988). There were also non-tariff restrictions which included outright prohibitions, quantitative allocations and various conditions attached to exports and imports of goods. This import cutting policy was also implemented through input subsidies, to give priority to certain production sectors and rebates to non-oil exports. However, an improvement in foreign exchange revenue, subsequent to an increase in the oil price, in 1983-84 and the government's liberalisation program through the economic adjustment policy after the war, helped the government to ease the foreign trade regulations. As a result the amount of imported goods increased to US\$ 29.9 billion in 1992 which was 265 percent more than the record figure in the last year of the war (US\$ 8.2 billion in 1987), and 75 percent more than the targeted foreign exchange budget (CBIRI, 1993). The oil crisis and foreign debt burden decreased this figure in

the following years. Yet, the availability of foreign exchange remained the major determinant to ease import and export regulations.

Foreign trade reforms which were planned to extend competition between industries, promote non-oil exports and lower the level of government intervention in the economy, have occasionally been affected by oil export crises, increases in the domestic inflation rate, external debt and political changes since the second half of the first five year plan. Before the end of the plan, the foreign debt burden undermined the credibility of the banking system and as a result foreign trade activities became more difficult. In short, the government implemented an import substitution development strategy after the revolution. This strategy was not successful in achieving all development goals. The past experiences indicated that by the import substitution path, domestic industries do not have the competitiveness and the incentive to compete in international markets. On the other hand, the Iranian economy is always threatened by fluctuations in the oil market. The government should gradually turn to an export oriented development strategy. This strategy could utilise the comparative advantages of the Iranian economy and stimulate non-oil exports. Also, it is foreseeable that joining the World Trade Organisation (WTO) will be inevitable for developing countries like Iran, to avoid trade isolation and to obtain bargaining power with the rest of the world. Pursuing an open market policy is the prerequisite for joining (WTO) and promoting Iran's trade with the region and the world. In the following sections devaluation of the domestic currency, attracting foreign direct investment, privatisation of the nationalised industries, deregulation of banking services and finally public enterprise reform, as major components of the economic adjustment policy for enhancing private investment, will be considered.

7.3. Foreign Exchange Market Reform

Before the revolution there was no informal market for foreign currencies in Iran. The government provided foreign exchange at the official rate throughout the country via banks and financial institutions. During, and in the immediate years after the revolution, demand for foreign exchange rose sharply, mostly for capital flight. The government, however, did not change the official rate for the Rial (about 70 Rials was equal to one US dollar) between 1976 and 1993.

Iranian monetary policy was influenced by the overvalued foreign exchange rate policy after the revolution. The policy reduced government development spending, and fuelled inflation as the government printed money to finance its deficit. It worsened the imbalance in foreign trade by encouraging imports and discouraging non-oil exports. The overvalued exchange rate automatically subsidised the consumption of imported goods, which primarily benefited the urban population, distorted the allocation of foreign resources in favour of commerce at the expense of production, and benefited well-to-do merchants against farmers and artisans. We discuss these issues together with present and alternative policies in this section.

The first consequence of the fixed exchange rate policy after the revolution was that the demand for foreign exchange remained higher than its supply, since the cost of the Rial was kept lower than its real price in the parallel market. This policy obviously led to a constant decrease of the value of the Rial in the parallel market. As can be seen in Figure (4.11) in the appendix of chapter 4, each dollar was sold for about Rials 365 in 1981, Rials 629 in 1984 and Rials 1136 in 1987 in the parallel market. Devaluation of the domestic currency in the parallel market during the study period is plotted in Figure (4.12) in the appendix of chapter 4. The figure shows that major devaluations of the Rial in the parallel market coincided with the revolution (1979), the freezing of Iran's assets by the USA in 1981, the last two years of the Iran-Iraq

war (1986-87) and the second half of the first five year plan (1989-93) when the Central Bank faced a shortage of foreign currency to pay its liabilities on time.

In 1983, the government levied a tax of roughly 100 per cent on the sale of foreign exchange for travelling and some other expenditures; the revenue from the tax was budgeted at Rials 206 billion for 1984. The government could have eliminated the entire budget deficit and doubled development spending, if the official exchange rate had been Rials 200 to one US dollar instead of Rials 87 (Lautenschlager, 1986, p.34); by reference, the parallel market rate was often more than Rials 500 equal to one US dollar in 1984. The ratio of almost two to twenty folds for the official and informal market rates was maintained throughout the 1980s. The government response to the growing gap between the official and black market rates of foreign exchange was to establish a number of different rates for different categories. Foreign exchange allocation for each sector, organisation and industry had a different rate according to government priorities. It was the first cautious step to set the value of the Rial to its real market value in 1985.

The IMF and the World Bank were invited to finance a number of development projects after the war. These organisations, as usual, offered an "adjustment-with growth" economic package as the prerequisite for obtaining funds. Obviously, one of these prerequisites was devaluation of the domestic currency and abandoning the official exchange rate policy. In this regard, the most outstanding government economic interventions, such as foreign currency allocation and low foreign exchange rate measures, ought to have been removed soon after the war.

In March 1993, the Iranian government announced a full float of the Iranian currency against all foreign currencies, including the US dollar, in the hope of improving the country's balance of trade and controlling the inflation rate. The government established a single-rate for foreign exchanges on the basis of free supply and demand

in the parallel market. According to this important economic event, each US dollar was exchanged for Rials 1610 in the banks while it was about Rials 1800 in the parallel market in March 1993. The floating rate had a short honeymoon. The Rial devaluations by the government almost tripled the value of the US dollar in the parallel market, due to a sharp increase in the demand of foreign currencies for importing goods and services. The Central Bank was pressed to intervene and stabilise rates of the US dollar and other foreign currencies against the Rial. The official exchange rates which were floated for a short period in 1993, were again fixed for all foreign currencies; e.g. Rials 1750 for one US dollar. At the same time, access to foreign exchange with official rates was again fully regulated. In early 1994 each US dollar was officially sold for Rials 2200, and sharply increased to Rials 4200 in the parallel market.

The new inflexible foreign exchange rate regulations boosted the value of the Rial and reduced the inflation rate at the beginning of 1995 for a short time. The Central Bank devalued the Rial against the US dollar by 42 percent (from Rials 1750 to 3000 for one US dollar) while one US dollar was exchanged for more than Rials 5000 in the parallel market a few months later (Reuters May 22, 1995). Any deal beyond the announced exchange rate (US\$ 1 = Rials 3000) was banned. Once again an official and fixed exchange rate has been enacted for an unpredictable period. As a result, all transactions of foreign currencies have been controlled and over regulated by the Central Bank. In such circumstances, demand for foreign currency could not be estimated and future expectations are ignored. This measure is inconsistent with a free financial market.

In summary, following a fixed exchange rate policy has been a political criterion rather than a macroeconomic factor since the revolution. Foreign exchange was often allocated in favour of domestic products and to imports of basic goods rather than investment, and also to state bodies rather than the private sector after the revolution.

The main motive behind this policy was to decrease the gap between aggregate demand and supply and to slow down the inflation rate, which was often the first priority of the government. On the contrary, the overvalued domestic currency widened this gap. This dual measure was eased by a multiple foreign exchange rate policy in the last years of the war, and a floating exchange rate measure from March 1993 until the beginning of 1995. Unexpected increases in the value of foreign currencies against the Rial in the parallel market, compelled the government to revise the floating exchange rate policy in the first half of 1995. According to this revision, all transactions of foreign exchange were again concentrated in the state banking system. For the time being three different foreign exchange rates (official, floating and black market) exist. The official rate of each US dollar equals Rials 1750 while the bank floating rate is Rials 3000. Yet, foreign currencies are not openly exchanged in the parallel market and information about their values is not available in the papers or other publications. To conclude, since the process of a floating foreign exchange rate policy was halted and reversed at an early stage, this policy still remains as one of the major issues that needs to be addressed if the government proceeds with market reforms in the future.

7.4. Attraction of Foreign Direct Investment

Prior to the Islamic Revolution in 1979, the number of multinational corporations operating in Iran were growing and almost one third were US based. They ranged in size from very small with a capital investment of less than US\$ 1 million to very large joint ventures, like a petrochemical complex in the Imam Khomeini (previously Shahpour) port on the Persian Gulf coastline, having a capital investment of as much as US\$ 5 billion. Foreign direct investment was US\$ 25 million in 1970, increased to US\$ 561 million in 1973 but slid down in the mid 1970s (after an increase in the oil price) to US\$ 324 and 141 million in 1974 and 1975 respectively. Total investment during the years (1970-1975) was US\$ 1207 million. There are no official records on foreign investment after 1975. By 1979, Iranian investors were supplying more than

half of the capital used in most of the joint ventures. Following the revolution most of the large multinational companies were nationalised, resulting in substantial losses to both foreign and domestic investors.

The government made some efforts to reestablish multinational manufacturing contacts to ease capital, raw material, and technical shortages a few years after the revolution. In spite of these attempts some believe (Bassiry and Dekmejian, 1985) it is unlikely that many foreign investors will be tempted to reenter Iran, and those who are allowed to return can be expected to do so through joint ventures with private or public investors. However, the government has also established several free trade and industrial zones as part of its effort for further economic development. It expects that Kish and Qeshm Islands, Sirjan inland and Chahbahar Port free zones will attract energy-intensive industries and export refineries, and become an important world financial centre in the Middle East. Still, a number of issues need to be resolved before foreign investors can determine whether it will be beneficial to site a facility in these zones. All investments in these free zones are to be guaranteed by the government against expropriation or nationalisation. While these free zones have a separate legal and social code designed for an international community, Islamic principles are expected to be observed. If successful, energy-intensive industries are expected to be the first drawn to the Qeshm Island, since natural gas is available at attractive prices (Buffington, 1991). However, the future of foreign direct investment in Iran is host to some economic reforms such as a floating exchange rate, deregulating the banking system in external transactions and easing industrial licensing.

7.5. Privatisation

According to the constitution of the Islamic republic of Iran article 44, "... the state sector includes all large scale and mother industries, foreign trade, major minerals,

banking, insurance, power generation, dams and large-scale irrigation networks, radio and television, post, telegraph and telephone services, aviation, shipping, roads, railroads and the like ...". Arguments in support of the state-owned and nationalised industries increased after the revolution and are still heard in government circles. The basic argument was that some believed a number of industries were best organised on a very large scale. Supply of electricity, telephones by several smaller companies was not efficient and caused multiple costs. These industries demanded such major investment that only government could provide their funds, as long as there was no efficient asset and money market. Therefore, in a developing country like Iran, water, electricity, communications, iron and steel mills, and oil refineries should remain in the hands of the government.

The existence of externalities was another issue mentioned by those who were pro-public enterprises. They believed industries created pollution and/or by-products which were dangerous for the public and environment. Yet these harmful effects could be controlled and decreased if they operated under the authority of government.

Those in favour of the nationalisation of industries also argued that public enterprises in oil, gas, electricity or public transport should ensure the interest of the public rather than private profit. These enterprises were actually an aid to the government to implement redistribution policies such as supplying essential goods at different prices for different areas, or under their costs to support lower income classes. A number of basic goods and services like bread, sugar, oil, meat, baby food, drugs and fuel were supplied to the public lower than their costs during the war. The pro-public enterprises lobby believed that the supply of the above goods are rarely attractive for the private sector. Another supportive argument in this regard was that the strategic and/or defence industries such as armaments, iron and steel, fuel and public transportation were vital for the security of the country and their guardianship should be by the government.

According to the 'Protection and Development of Iranian Industries Law' (1980), a range of Iranian industries were classified as "mother and/or big scale" industries. These industries were nationalised while other industries, that were not included in this classification, could be owned by the private sector after the revolution. The number of nationalised or confiscated industries reached about 1850 after the revolution (Golestani, 1994). These industries are often large scale industries managed by the National Iranian Industries Organisation (NIIO), the Iran Industries Development and Renovation Organisation (IDRO), Bank of Industry and Mine (BIM) and other nationalised banks and also several semi-public bodies (Foundations).

A large number of nationalised industries produced consumer goods and competed with small and medium scale industries belonging to the private sector in Iran. The above generation of public (nationalised) enterprises discouraged private investment after the revolution. Our study in chapters 3 and 4 showed that public sector activities in the production of consumption goods had negative effects on private investment, since it increased the cost of capital (interest rate) and competed with the private sector in the goods market. In addition, public activities in these fields created a shortage of bank credit for the private sector where the availability of finance was often a major shortcoming. The above results support the privatisation of nationalised industries as an alternative policy. The selling of the nationalised industries raises funds for the government. These funds should be allocated for public infrastructure investment to improve private sector productivity and decrease the cost of private investment. Obviously, privatisation of the large scale public enterprises such as oil and gas, electricity and water, post and telephone industries is unforeseeable in the near future. The lack of domestic funds and unwillingness to accept foreign ownership or foreign control, are the major obstacles for privatisation of these enterprises. However, these public industries urgently need a number of

major reforms to make them more efficient or to enable their sale to the private sector. These reforms are presented in section seven in this chapter.

The government envisaged public enterprises as being the engine of economic growth and an efficient tool for its policies. Nonetheless, the performance of public companies showed that they neither ensured economic growth nor raised employment as much as predicted in the 1970s and 1980s. There were serious questions about the productivity, efficiency and competitiveness of such enterprises during the war. Despite these shortcomings privatisation, as an alternative economic policy, generated significant debate, and has been a serious economic and political issue since the oil crisis in the mid 1980s. The objectives of privatisation are to promote industrial productivity in a competitive market economy. It could encourage the private sector to invest in manufacturing industries. Supporters of privatisation conducted strong arguments against public industries, blamed the problems on the lack of market discipline and insensitivity toward consumers' behaviour in an economy with high government intervention over a wide range of industries and services.

The main failure of the state-owned enterprises in Iran, was a dramatic drop in the productivity and efficiency of these industries compared to private enterprises in the last two decades. Nationalised industries were not sensitive to the need to minimise their costs and to maximise their profits. These fundamental economic rules which were often ignored by managers of the public enterprises, increased inputs and decreased both the quantity and quality of their output. Nationalisation of hundreds of industries and plants expanded the public body in the economic structure of the country, and created several new bureaucratic organisations in the public sector in Iran after the revolution. In reality, it was carried on after the revolution mostly as a political tool for political gain. Nationalisation of a wide range of private industries could not bring "self-reliance" for domestic industries and the whole economy and only impeded new private investments, at least in big industries and mines. The

reality of the economy at the end of the war created a new economic situation, and allowed the government to offer a privatisation policy within industries.

The main objectives of the privatisation policy in Iran were to improve industrial efficiency, eliminate government bureaucracy, job creation and the promotion of industrial exports. The government's privatisation policy was a vital part of the economic adjustment policy in the form of denationalisation of state controlled industries in the first five year plan (1989-93). On the basis of the plan, the government announced its intention of transferring 391 state companies (Iran Commerce, 1995). It included at least 80 of the 130 "heavy" industries affiliated to the Iran Industries Development and Renovation Organisation (IDRO), along with the majority of about 580 industries in the National Iranian Industries Organisation (NIIO) (Akhavi-pour, 1994). The government also believed that privatisation of these industries would develop the existing weak capital market in the country, and raise standards of industrial management and productivity within these industries. Selling nationalised industries could finance a number of unfinished or new public projects which were waiting for funds.

IDRO sold 50 factories through the Tehran Stock Exchange (TSE) in bilateral deals over three years to March 1994 (Hatami, 1995). Hatami believed that the remaining IDRO factories were very large in scale, and it was difficult to find bidders through offering public shares. The NIIO was only successful in selling tens of its factories to the public, which was much lower than its targeted figure in the first plan.

The trend towards privatisation of industries was halted by the Iranian parliament in 1994. The objections were that the economic adjustment policy and the IMF package were not as successful as forecasted and expected. Rising foreign debt, a high inflation rate and a sharp devaluation of the domestic currency in the parallel market, forced the government to retreat from the economic adjustment policy. In the second

five year plan (1995-1999) privatisation is not as strongly advocated as it was in the previous plan.

Another shortcoming for privatisation was created from the lack of a capital market. The TSE was set up in 1966 but remained dormant for most of the 1980s. The stock exchange activities were revived as a result of the privatisation of the public sector companies since the launch of the first five year plan. Private brokers were permitted to operate and the institution moved to larger computerised premises. The stock exchange traded both common stocks and bonds before the revolution. Its activities dropped after the revolution and even subsequent to the 1983 legislation on Islamic banking which confirmed the resumption of its operations, dealings in both securities were halted until after the end of the Iran-Iraq war. As soon as the first five year plan was launched and the privatisation program was initiated, the stock market was revitalised.

Although the new round of the stock market operation was a good and promising sign of promotion of free market activities, it has been experiencing a number of problems. The stock market organisation is a public organisation under the control of the Ministry of Economic and Finance Affairs and the Central Bank. This double supervision generated serious obstacles to a rapid privatisation program. Common stocks were issued within the context of the capital market rules. Political and legal risks associated with common stocks made their values largely fluctuate with a downward trend. In these circumstances, the above mentioned authorities intervened to control the prices of shares in order to prevent a likely crisis in their value. This kind of intervention in the stock market was inconsistent with a real privatisation program and had defeated expectations about a quick development of a securities market in Iran. Accordingly, the flow of accounting, micro and macro information was very deficient and impeded the quick decision making required in an efficient open market system.

The number of companies listed in the TSE has risen from 70 in 1989 to 204 in 1994, valued at Rials 793 billion with about 150 million share transactions a year. This volume of trade is still relatively low, although the volume and number of shares traded grew more than 53 percent in the year ended March 21 (Iran Commerce, 1995). In spite of a substantial increase in share offerings to the public, privatisation through the TSE has not been without its problems. The government planned to privatise 1850 companies during the first five year plan (1989-93), yet only 100 companies were completed due to bureaucratic delays in 1994 (Golestani, 1994). Privatisation was one of the focal points of the economic reform, since floating of the companies listed on the TSE was seen as the best alternative to channel funds to smaller and more innovative ventures. It was also expected that returning emigre industrialists and businessmen would bring a new dynamism to privatisation and the growth of the private sector.

In summary, privatisation as a component of the economic adjustment policy was enacted during the first five year plan. The government succeeded in selling a number of nationalised industries through the TSE to the public. This reform, like many other economic reforms, has been delayed for a number of political and social reasons since 1994. The lack of clear methods for selling the nationalised enterprises, weak capital markets and uncertainty in government economic policy were among those reasons. However, offering shares to the public is not the sole way to achieve privatisation. The government should introduce a number of well defined privatisation methods. They may include share offerings on the TSE, implementing flexible regulations for privatisation, setting up privatisation offices to market public enterprises which are not eligible to be listed on the stock exchange, upgrading domestic capital markets and encouraging the private sector and individuals to invest in industries.

7.6. Banking Deregulation

Islamisation of the financial and banking system was on the agenda of the Islamic government from the early months after the revolution. The Islamic banking law was passed by the parliament to abolish interest payments to abide with Islamic law in late 1983. Instead, it was considered appropriate to pay and charge "commissions" and pay "minimum guaranteed profit" to deposits and loans to bring the banking system within the Islamic law framework. The banking system operates under a nationalised system in which credit allocations are administered through a budgetary process. Interest rates or "minimum profits" are controlled by the Central Bank. This bank influences the flow of funds to the formal banking system and controls the growth of the informal financial sector. With the present financial system, competitive forces do not exist and non-banking financial institutions are virtually absent from the market. Nationalised banks are also experiencing low productivity due to unmotivated staff who do not have the necessary training to offer good customer service as part of the competition between banks. Currently, both bank employees and customers are not satisfied with the level of rewards and services rendered (Rudnick, 1993). Within the context of the structural adjustment program, investors and industry officials often complain about the lack of financial services in the banking system as well as them being too inflexible and implementing inconsistent policies in their credit allocations.

It is necessary to promote competition in the banking system to increase its efficiency and productivity. A fundamental attempt should be made to change bankers' attitudes towards customer service and to increase customers' satisfaction. In this respect, bank employees' motivations and productivity should be improved. The introduction of private financial institutions and the movement away from the present centralised banking activities will encourage privatisation and competition in bank services. The Central Bank should also conduct a program to establish non-bank financial organisations and non-public financial institutions including savings, loans and other

credits to facilitate money and financial movements in the market. Behkish, secretary-general of the Iran Chamber of Commerce argues that the overall privatisation program could not succeed without a private financial sector (The Banker, 1992). To make the flow of funds smooth in the banking system, interest rates must be adjusted according to inflationary expectations. It will eliminate the real negative interest rates for most of the savings that contribute to the growth of the informal financial market and the inflation rate. This is an essential monetary policy to stimulate domestic savings and investment.

To consider the effects on investment, the present banking system has caused uncertainty for investors. Credit regulations, monetary and financial policies, industrial relations and in particular the "Labour Law", "Commercial Law", justice and judiciary order, and property registration arrangements are other elements that contribute in one way or another to discourage investment. Also, there is a lot of controversy about the foreign exchange allocation system which is presently administered through a planning process. In addition to the above factors, bank branches do not have enough authority to finance projects or allocate credits for industries without permission from their headquarters, central branches or even the Central Bank. This procedure is often time consuming and costly for investors.

Another element which had effects on the banking system was the long term compensation of the government budget deficit by printing money. In real terms oil revenues declined after the revolution. The government had three options which were not mutually exclusive; to cut expenditures, raise taxes, and/or borrow to finance the increasing budget deficit. The war economy did not allow the government to diminish its current spending and the expenditure had to be financed. To some extent, the loss of oil revenue was met by raising taxes and increasing the money supply. However, the efficiency of the tax collection system declined, partly due to the turmoils in post-revolutionary Iran. The statistics published by the Plan and

Budget Organisation show regular annual increases in lending from the banking system to the government. In 1977 the budget deficit was Rials 366 billion while current liquidity was Rials 2097 billion in current terms. Eleven years after (1988), these figures were Rials 2146 billion and Rials 15688 billion respectively. The budget deficit was more than 50 percent of the total budget in that year. The current liquidity or money supply was increased more than seven times while GDP decreased by 20 percent in the aforementioned period (PBO, 1994, p. 21). In brief the budget deficit was basically financed by borrowing from the banking system, which was the equivalent of printing money without adding output. More money and no increase in output to spend it on is the classic recipe for inflation.

As long as banks remain state-owned with limited ability to move into new services and products, the creation of private non-bank financial institutions will provide competition with banks and cause greater flexibility for them. Some banks have already take advantage of the booming stock market and set up their own investment companies. They have also computerised most of their urban branches and are introducing new products like cheque-guarantee cards and travellers cheques. Bank Tejarat offers a credit card. Foreign banks are still not allowed to operate directly in Iran. However, there are almost 20 foreign banks with representative offices in Tehran. Encouraging competition between commercial banks is one of the Central Bank's cardinal aims, and giving them more discretion in determining rates and spreads is an obvious way of achieving this.

In short, nationalisation of banks and concentration of monetary and financial regulations in the hands of the Central Bank, expanded an unofficial money market and restricted asset markets in Iran after the revolution. Iran's banks are constrained by the lack of trained managers, shortage of skilled staff and outdated banking technology. The official interest rate, replaced by "commission or minimum profit rates", was often tens of percent lower than the inflation rate, thus these rates could

not attract the public to save in the banks. As a result, public savings were linked to goods, real estate and/or informal money and asset markets such as home appliances, gold, cars and foreign exchange at the cost of the capital market. In such circumstances, permission to establish financial dealerships in the private sector, deregulating the banking system and balancing the budget as a part of microeconomic reform should be applied to strengthen the money and asset markets and present better banking services. Among policy makers there is still opposition to privatising bank services. It can be expected that privatisation of the nationalised banking system will come in time as the policy in nationalised industries is successful.

7.7. Public Enterprise Reform

"Government in most of the developing countries look(ed) to the public enterprises as the engine of economic progress" (Shirley, 1991, p. 5). Authorities in these countries hoped that public enterprises would help to develop and fill the gap of the private sector in the economy. However, the era of public enterprises have largely come to an end, since the governments of these countries have often launched reforms on their public enterprises since the 1980s. They have acknowledged that some social objectives are beyond their means and state firms are not the best vehicle for the pursuit of such goals. Once governments have assessed the fundamental objectives for which the public enterprises were established, they can determine whether these objectives are still valid, and whether these enterprises need restructuring, privatising or even liquidating. In the following section we seek the answer to these arguments with regard to the results of this study.

The majority of imported capital goods and machinery was allocated to the state enterprises since the 1970s. The imported capital goods were used to establish a wide range of Iranian state enterprises in oil and gas, petrochemical, electricity and water, ferrous and non-ferrous metals industries. Firms belonging to these industries are more capital-intensive than private firms, which are mostly concentrated in medium

and small scale consuming industries. Consequently, public enterprises have not contributed greatly to employment. Iran's oil industry, with a 25 to 50 percent share in GNP, employed 90 to 110 thousands employees which was always less than one percent of the labour force in Iran (PBO, census, 1976 and 1986). The implication of the above figures is that job creation, as a part of the government's agenda, has not been fulfilled through the expansion of public activities in industries, which were mainly capital intensive in nature.

On the other hand, the administration in the public sector employed a large proportion of skilled and unskilled human resources. To look at the administration in general, it is significant that a large number of employees in this sector were not satisfied with their salaries. This situation led to an unstable human resource pool in the public sector. Public employees would often gain experience and training in public enterprises before moving to the private sector when they were efficient and productive. In the long term, the public sector retained a few experts and a large number of unskilled employees.

Reform of public enterprises should be commenced by a restructuring of enterprises that can actually or potentially be managed independently from government funds, and are competitive in domestic and/or international markets. This reform should be based on the view that the market mechanism would allocate limited resources economically and efficiently. In that case, the reform will increase market forces through decentralisation of economic decisions, strengthening managerial capabilities and dividing the large multi-operational enterprises where technologically possible. Dividing the overall electricity industry into several regional electricity companies within the country, or dividing the city municipality into several autonomous suburban municipalities with almost full authority in a number of large cities are two successful examples in Iran.

One of the first decisions that affected managers in public enterprises was payments and the remuneration package at the executive and managerial level. Since the revolution, there has been upward pressure on wages at the lower levels so as to narrow the differences between the top and the lowest grades. State bodies raised payments to the lower layers of unskilled employees and froze salaries at the top in the first years after the revolution. The salary of senior executives in the public sector was limited to Rials 150000 per month (about US dollar 2000 at the official exchange rate) while the minimum wage per month was defined as being Rials 24000 (about US dollar 320 at the official exchange rate).

By setting a ceiling for salaries specifically in the public sector, top managers and executive professionals in state bodies earned less than their counterparts in the private sector, whereas unskilled employees in this sector earned about as much or more than those in the private sector. Many public enterprises also rewarded their managers poorly and did not compensate successful managers appropriately. On the other hand, public enterprise managers were not expected to take risks and responsibilities and were not penalised for weaknesses and mismanagement conduct. By and large, good or poor management was equally rewarded in public enterprises for more than a decade after the revolution. Obviously, management and human resource issues in the public enterprises require major reconstruction. To become efficient, the government should abandon the long term fixed salary policy and design a flexible administration with appropriate and well defined rewards and penalties for both employees and managers.

Generally, governments are presumed to foster both private firms and public enterprises in developing countries. Bureaucratic rules and political objectives of public enterprises compel the government to allocate more funds with a lower interest rate and easier foreign currency for imports, donate state land, supply cheap public

goods and services to public enterprises rather than the private sector. Besides, governments tend to pursue other socio-economic objectives through public enterprises. Regional development, income redistribution and job creation are a number of these objectives. In addressing these objectives, the Iranian government was no exception. A number of publicly funded industries were established in underdeveloped areas to improve economic conditions as well as the employment level, where the private sector was not prepared to invest. Iran's government founded a wide variety of industries in the impoverished southern and central regions. "Baft Balooch" a large textile manufacturing plant in Sistan and Baloochestan province in the south east of Iran and ten cement projects with a total 20900 metric tons per day in ten less developed provinces, are examples in this regard (MOI, 1995).

These public industries which were occasionally cost efficient in developed regions, were more costly under public management in the less developed provinces. The lack of skilled human resources and insufficient infrastructure facilities such as water, electricity and roads are the major factors which increase investment expenditure and increase the cost of production in less developed provinces. The official foreign exchange rate allocation for importing machinery and low interest rate credits for financing the public enterprises, were the ways of reducing their establishment costs and in some cases even made them profitable. These concessions rarely existed for private ventures. With the devaluation of the domestic currency (from Rials 70 to 1750 for each US dollar) and the increases in the banks' interest rates to close to the market rates in recent years, the above concessions have been substantially reduced for public enterprises. In other words, public enterprises are hardly cost efficient in the new economic environment. This environment requires organisational alterations to be made in public enterprises, especially in less developed provinces and to limit public investment to infrastructure rather than competitive industries in these areas.

Income redistribution is certainly placed in the mission of state enterprises. This often involves taking on or maintaining redundant workers, supplying goods and services below the market price and some times under their production cost. Public enterprises in Iran were required to keep prices deliberately low which caused losses for the enterprise and/or increased the government budget deficit. The supply of a variety of goods and services such as fuel, electricity, water, wheat flour, sugar, cement, vegetable oil, travelling charges and many other basic needs were supplied below their costs of production. Distribution of these goods and services were mostly within the government distribution channels and controls such as food rations, coupons and vouchers lasted more than one decade after the revolution. The easing of controls over the distribution system and pricing regulations slightly decreased the role of such enterprises in the Iranian economy after the war. However, the role of public enterprises has still remained a controversial issue which needs to be discussed in detail.

Public investment expenditure is determined by government while private investment is an economic factor which is closely related to the market economy (Greene, 1991). This argument is supported in Iran's economy. Public investment in Iran is mostly determined by the development plans. This investment was incurred by the central government, public enterprises and regional authorities. The overall public investment has been fairly dependent on policy commitments by the central government. Public enterprises and the nationalised industries which were formed by the revolutionary government in 1980, were the major financiers of public investments after the revolution. These investments were not necessarily related to the capacity, productivity or financial position of the public or these industries. Investments by the regional authorities were more complicated. They were determined by the provincial authorities who considered regional factors, and these sometimes differed from central government priorities.

Public investment was sharply increased when the government earned an unexpected oil export revenue boost in the mid 1970s, and when the private sector was not encouraged to invest in the first years after the revolution. The oil crisis in the 1980s and the ceasefire were the landmarks in this regard. Although the volume of public investment was increased in the first five year plan (1989-1993), the government insisted on encouraging private rather than public investment. The main reason for this policy was the view that the state enterprises could not provide effective management and upgrade their economic performance. The notion was prevalent that public enterprises had received a wide range of subsidies from government, but they could not raise national production. These firms suffer from lack of market discipline and low levels of productivity. Public management turned a blind eye to market signals and consumer behaviour.

On the whole, public enterprises should allocate their resources subject to market forces rather than politics. Government subsidies to public enterprises ultimately increased the budget deficit. When the government pursued social objectives in establishing and supporting public enterprises without paying subsidies, these enterprises will be forced to cover their costs through increasing prices. The Iranian government often allowed public enterprises to follow cost-plus pricing for their products. This policy decreased efficiency since cost-plus pricing was rarely feasible and this inefficiency was paid for by consumers in the form of higher prices. The outcomes were economic and industrial inefficiencies, shortages of goods and finally a higher inflation rate in the economy.

The government could raise the efficiency of their enterprises through increasing the responsibilities of public managers. In this case, the role of the government should be altered from control to evaluation of the performance of public enterprises in the economy. It is equally important that the government gives a high level of autonomy to public managers. Pfeffermann and Madarassy (1991) believe that a well-informed

public manager with enough autonomy could survive in a competitive market. However, without overall microeconomic reform, organisational changes could increase the bureaucratic chains rather than achieving autonomy in public enterprises. The experience of establishing the National Iranian Industries Organisation, expanding the responsibilities of the Industrial Development and Renovation Organisation and transferring many nationalised companies to the banking system and semi-public foundations support this argument.

In brief, a few nationalised companies have been privatised during the first five year plan, but still the main industries remain in the public sector and are not subject to privatisation in the foreseeable future. The government's agenda in economic development and employment have not been fulfilled through the expansion of public activities in the last two decades. Deregulation and autonomy to public management are key elements that can establish the market discipline in these firms, and decrease government expenditure and promote public satisfaction. New public investments should be limited to complementary and infrastructure industries which are not attractive for private investors. Finally, it is important to reengineer organisational practices in the public enterprises and introduce appropriate mechanisms of promotion and penalties for employees and especially public managers.

7.8. Conclusion

Economic stimuli often determine political relationships. Yet in the post revolutionary Iran, the government pursued policies which were focused on non-economic factors for more than a decade. The new economic environment after the war and at the beginning of the first five year plan (1989-1993) provided the opportunity for a restructuring movement. After the war, the government encouraged domestic investors, and at the same time, advocated foreign investors to invest in Iran. The government could not succeed in obtaining this opportunity for

economic and political cooperation within traditional economic and foreign policies during the Iran-Iraq war. The war lasted for eight years, and halted any further economic reforms until the end of the war. By introducing a reconstruction package, the government delivered the first step towards a comprehensive reform of the Iranian economy. The outlines and projected procedures of this reform were indicated in the first economic, social and cultural development plan (1989-93). Liberalisation of the economy and trade, unification of the foreign exchange rates, privatisation of nationalised industries, external financing for incomplete or new industrial projects, attracting foreign direct investment, banking deregulation and public reform were among the articles of this plan. Government programs were concentrated on easing economic controls and applying free market rules after 1988. Price controls, the public distribution system and import-export barriers have been gradually diminished. These decisions were more economically motivated, aimed at generating better economic performance and efficiency.

The exchange rate has always been a major financial issue since the revolution. Demand for foreign currencies, and in particular the US dollar, were more than their supply due to the fact that the official exchange rates were considerably less than their values in the parallel market. The government had to adjust the gap in this market through several steps to diminish the imbalance of trade. However, the government was not successful in fully floating the exchange rate or introducing a unique rate, and had to intervene and fix the value of the domestic currency against the US dollar from time to time. A unique exchange rate lasted only a few months in 1993-94 and the Central Bank once again switched to a multiple exchange rate policy. By mid 1995, there were at least four different exchange rates in Iran. One US dollar was exchanged for Rials 1750 for the import of essential goods and services which was known as the official foreign exchange rate. Non oil export revenue was exchanged at the export rate which equalled Rials 2350 for each US dollar. The official floating rate for travelling and other authorised purchases was Rials 3000 for each US dollar.

Finally, there was a parallel market for foreign exchange which has been banned by the government since June 1995. The role of government in the foreign currency market is a major economic issue where the economy suffers from a wide gap between aggregate demand and aggregate supply, and substantial excess of money supply related to the long term government budget deficit.

The nationalisation of a wide range of industries was considered a revolutionary act, and survived during the war. It was mostly a political decision rather than an economic solution since the revolution, and could not continue in the new economic environment. Nationalised companies were offered to the private sector for take over once again. The privatisation of nationalised and confiscated companies was a lingering process and a number of factories were bid for by private investors. The process was halted and the previous selling of nationalised companies through negotiation came under question by a number of the members of parliament, who believed nationalised factories were undervalued and the national interest was not safeguarded from profiteers in the privatisation procedure. Consequently, privatisation which had been enacted by the first five year plan has been cut back by the parliament since 1994. In such circumstances, promotion of the Tehran Stock Exchange activities through the supply of shares of public enterprises to the public could be the likely alternative policy for privatisation to proceed.

The banking system has remained a centralised nationalised system and permission of a number of private financial institutions to undertake financial activities has stalled. Resuscitating the Tehran Stock Exchange helped to revitalise the domestic capital market and investment, but still it has a small share in the asset and money markets in Iran. These arrangements are taken cautiously to promote the capacity of Iran's financial market.

A number of obstacles against foreign direct investment were removed but still a few restrictions exist, mostly over difficulties in relations with a number of developed countries. While the US embargoes any trade and investment, Iran is improving its relations with Europe, Japan and newly developed countries to guarantee Iran's future trade and foreign direct investment. Iran, with several geographic, strategic and economic advantages in the area, is establishing close relations with the new central Asian republics. The long term industrial experience of Iran in the oil and gas industry enables Iran to invest in the exploration, refining and exporting of oil and gas in these republics. These new countries can access international seas through Iran much easier than any other country. Iranian industries can establish long term bilateral trade with these countries through the export of manufactured goods and the import of agriculture, mineral and intermediate products. The Iranian government should realise and take advantage of these international opportunities, and attempt to strengthen its economic ties with all of these countries.

Iran's economy has suffered from inconsistent policies, inefficient management in public enterprises and low quality in most manufacturing industries. This is partly because of the wide gap between supply and demand, the centralised economy and heavy trade restrictions. Liberalisation of the economy and trade, decentralisation of the economy, restructuring industries and privatisation of nationalised industries can alter this situation. Promoting non-oil exports, and especially manufacturing exports, and encouraging foreign direct investment are other alternative policies which can change the industrial sector from an importing sector to a net exporting one in the long term. It is sometimes a hard and painful process which needs insight, meticulous planning and a long term commitment.

CHAPTER 8:

CONCLUSIONS AND RECOMMENDATIONS

This study has investigated the behaviour of investment in Iran. Only a few studies have analysed investment behaviour in Iran, due to data deficiencies and difficulties in applying classical investment theories or macroeconomic models. The absence of a relatively open market, lack of asset and money markets, the overvalued domestic currency and over regulated foreign trade are some deficiencies in this regard. Unavailability of some data such as the real return on private capital, Tobin's q ratio, volume of private and public capital stock, private wealth, foreign assets held by the private sector domestically, and nominal wages were other restrictions for adopting a more reliable macroeconomic model in this regard. In spite of the above deficiencies, this study has adopted an empirical investment model, a model for studying investment by industry, and also a macroeconomic model, to identify the major elements which influence private investment behaviour in Iran as a developing country and member of OPEC. The empirical investment model which is estimated in this study, was based on the latest studies of investment in developing countries; i.e. Sundararajan and Thakur (1980), Tun Wai and Wong (1982), Blejer and Khan (1984), Khan and Reinhart (1990), Faini and Melo (1990), Greene and Villanueva (1990,1991), Pfeffermann and Madarassy (1991), and Serven and Solimano (1992).

The behaviour of gross domestic investment in major economic activities in Iran such as agriculture, oil and gas, water and electricity, industries and mines, housing and services was investigated by a flexible accelerator model. Finally in spite of the shortcomings in the above data and other required information, a macroeconomic model was adapted for the Iranian economy by using data between 1970 and 1993 in this study. The estimation and simulation of the macroeconomic model made possible the identification and analysis of a number of economic policies essential for economic development, economic stability and enhancing private investment. These policies will not necessarily achieve the above objectives and could not encourage private investment unless the government enacts some microeconomic reforms such as trade liberalisation, floating foreign exchange rate, privatisation of nationalised industries as well as restructuring public enterprises and improving banking services. A summary of the results of the estimations of the empirical investment model and the macroeconomic model are discussed in the next section. Section 8.2 summarises the major economic policies for enhancing private investment and economic development based upon the above model estimations. The last section suggests a number of issues for future study.

8.1. Summary of the Study

This study commenced with an essential overview of the Iranian economy in chapter 2. This overview showed that Iranian industrialisation has been built on seven mid term economic development plans over about half a century. The plans before the Islamic revolution in 1979 focused on infrastructure, land reform and creating a wide range of industries to produce consumer goods, and to achieve an import substitution goal by using the substantial oil export revenues.

The fifth development plan (1973-78) was revised because of unexpected oil export income in 1974. The revised fifth plan sharply expanded public current and capital

expenditure and increased aggregate demand dramatically. The plan was halted by a rise in inflation and economic mismanagement after 1977, and was finally terminated by the Islamic revolution with many unfulfilled objectives and hundreds of unfinished industrial projects and plants. The development of fuel and petrochemical, water and electricity, ferrous and non-ferrous metals in the public sector as well as a wide range of consumer goods industries in the private sector were the major results of the five plans before the revolution. These industries were more capital intensive and, with few exceptions, all were established with imported machinery and capital goods. Also, utilisation of many of these industries depended on the import of basic necessities such as raw materials and intermediate goods.

The above development path was smoothly changed in favour of labour intensive industries, and replaced by domestic raw materials and intermediate goods and partly internally made machinery after the revolution. The revolutionary turmoils were followed by a protracted war with Iraq which delayed economic liberalisation. The first five year plan after the war targeted a number of major economic reforms soon after the war. Unification of the foreign exchange rates, eliminating the government's foreign exchange allocation, encouraging private investment and liberalisation of imports and exports of goods were some external reforms in this plan. Abolishing the public pricing and distribution system in the goods market, taking steps to balance the budget through reducing public expenditure, privatisation of nationalised corporations and restructuring of public enterprises were other goals of this plan. In brief, the plan compelled the government to abandon a number of its interventions in the economy. This plan also addressed some reforms in banking services and rationalisation of 'profit rates' (the interest rate) of savings and bank credits. Protecting and attracting foreign direct investment, promoting the capital market through the Tehran Stock Exchange and finally, replacing the government pricing system with an open market price mechanism for public goods and services were other agenda items of the plan.

Three economic booms and two recessionary periods were recorded over the study period. The first economic boom coincided with the unexpected oil price increases in the first half of the 1970s. This economic expansion slowed down in 1977 and this trend continued during the revolution in 1978-79. The revolutionary upheaval caused some internal and external side effects on the economy including private investment. The victory of the Islamic revolution coincided with the departure of thousands of entrepreneurs who were owners and/or managers of a large number of private enterprises active in industries, mines and services. The revolutionary turmoils were also followed by labour unrest, financial shortages and managerial problems in many public, private and multinational enterprises. Property rights and the role of the private sector in the economy were under question. This uncertainty negatively affected economic activities and capital investment of the private sector after the revolution. The Iran-Iraq war, fluctuations in the oil market, western countries' economic sanctions against Iran and the freezing of Iranian foreign assets and, finally, a high capital flight were other external elements for this economic chaos.

The second economic improvement commenced in early 1980 and lasted until 1984, when an increase in oil exports increased imports and government expenditure. In the second half of the war a sharp decrease in oil exports occurred and interrupted private investment and many other economic activities. In short, the Iranian economy suffered from a number of international and political obstacles in this period. Continuation of the Iran-Iraq war, the western countries' economic sanctions and the oil export crisis accompanied with the low productivity of industries and mismanagement of economic activities were the major obstacles in this regard. These impediments caused low or negative growth rates in the years after the revolution and during the war. In five years after the revolution (1979-81, 86, 88), the economy experienced negative growth (between -2.2 and -2 percent) and in the other three years (1984, 85, 87) the real economic growth rate was less than 2 percent. Real GDP per capita was negative in seven years (1979-81 and 86-89) after the revolution.

It would have been worse if the real GDP per capita had been calculated in US dollars, based on the real exchange rate in the parallel market. The first five year plan after the ceasefire was launched at a time when an economic boom was under way and all aggregate demand and supply factors, including private and public investment, increased and GDP and general consumption became higher than ever.

The impact of government fiscal and monetary policies on private capital formation from a number of investment studies in developed countries, was examined in chapter 3 as part of a review of the theoretical literature. The review commenced with the classical and Keynesian investment approaches as well as a macroeconomic model. This chapter also reviewed investment studies conducted in the context of developing countries. Amongst others, the views of the International Monetary Fund and the World Bank regarding the investment function in developing countries were considered in this chapter. The most influential factors on private investment, both in developed and developing countries, are summarised in two comprehensive tables in the appendix of this chapter. In the above mentioned literature, the real interest rate, output, income per capita, availability of finance, the inflation rate, cost of capital, private and public capital stocks, public current and capital expenditure, the real exchange rate, foreign direct investment, foreign debt burden, economic and political instability were the most influential factors on private investment behaviour.

The empirical investment model based on an accelerator model studied by Jorgenson (1967, 1971), Ott et al (1975), Haines (1978) and Monadjemi (1993) for developed countries and also by Sundararajan and Thakur (1980), Tun Wai and Wong (1982), Blejer and Khan (1984), and Greene and Villanueva (1990) for developing countries, was adopted in chapter 4 to clarify private investment behaviour in Iran. The reasons for this preference were mentioned in detail in both chapters 3 and 4. In brief, the traditional model of investment assumes little government intervention and free market conditions, which could hardly be applied to an oil exporting country like

Iran. The absence of an asset and money market, the strong role of government in the economy through the allocation and management of the enormous oil export revenue, government intervention in the money market through offering lower interest rates and maintaining an overvalued domestic currency are other reasons for this preference.

The empirical investment model evaluated the impact of private consumption, public current and investment expenditure, the non-oil net exports and the interest rate on private investment. The results confirm that an increase in private consumption significantly contributed to an increase in private investment. Also, the interest rate and public current expenditure negatively affected private investment, while public investment has a positive impact on this variable. However, the positive effects of private consumption and/or public investment are about two times greater than the negative effects of public current expenditure.

The above result supports the crowding out effect of public current expenditure and crowding in effect of public investment on private investment. Yet, the net effect of total public current and investment spending was a crowding in of private investment during the sample period. An increase in oil exports raised the imports of goods and services and contributed to an increase in public and private investment. Although this study can support the view that public investment crowded in private investment in the study period, private investment was gradually replaced by public investment after the revolution. This study does not support the crucial argument that the official or the real exchange rate in the parallel market had a significant effect on private investment during the study period.

Chapter 5 analysed the fluctuation of production and investment in the major economic activities; agriculture, oil and gas, industries and mines group, and services in Iran during the study period. In this chapter an explanation for most of these fluctuations

through the effects of oil export revenue, public investment and the real exchange rate in the economy, especially in the post revolutionary and the war period, can be found. A single equation function defined for domestic investment behaviour by industry is used in this chapter. Estimations of the investment function for different sectors show that a higher level of product, bank financing, oil exports and/or public investment often encourage private investment. On the other hand, capital stock accumulated by investment in the previous periods often decreased new investment in most sectors. The real exchange rate in the parallel market has a positive but weak effect on investment in all sectors, except that of the housing industry.

A macroeconomic model for Iran was introduced in chapter 6 to study the effects of government intervention in the product and money markets. The model also emphasises the significance of Iranian oil export revenue and its expenditure on the whole economy, as well as private investment. This model has been estimated with two stage and three stage least squares methods. Both results defined the behaviour of the endogenous variables well with a high level of R-square, acceptable level of the Durbin-Watson statistic and significant t-values at the 95 percent level for most of the equations and parameters of the model.

The results show that non-oil aggregate demand is increased by a higher level of investment and consumption by the private sector and public current and capital expenditure, but not by a rise in non-oil net exports. The results show the importance of the role of government policy on private investment behaviour through allocating oil export revenue for current or capital expenditure as well as financing private investment by the banking system. Both public current and capital expenditure crowd in private investment. Any shift from government current to capital expenditure reduces non-oil aggregate demand, and eventually slows down the inflation rate.

Private investment was positively affected by non-oil aggregate demand and negatively by a higher rate of interest. Both public current and capital expenditure were directly related to oil export revenue. Non-oil net exports was directly affected by OECD income and/or a devaluation of the domestic currency in the parallel market. Since the Central Bank of Iran determined the interest rate at a much lower level than the market interest rate or even the inflation rate, a higher interest rate decreased real money demand. A higher level of aggregate demand or private wealth increased real money demand during the study period. The domestic price level was hardly affected by nominal wages and/or the real exchange rate plus the imported goods price index. The gap between aggregate demand and aggregate supply and the expected inflation rate positively affected any increase in nominal wages. Finally, non-oil aggregate supply was directly increased by the private capital stock and volume of imports. An increase in nominal wages decreased aggregate demand and vice versa. This estimation did not support the argument that the public capital stock promotes productivity of the private capital stock, and increases private capital returns. The above results show that although public investment crowds in private investment in the short term, the accumulation of public investment (i.e. public capital stock) does not contribute to increased productivity and returns to private capital or aggregate supply. This is due to the fact that a vast number of public projects, which had been started before the revolution (in the early 1970s) were not completed during the study period. The low productivity of the public sector compared to the private sector is another explanation for the negative effect of the public capital stock on aggregate supply. The above result urges the necessity of public enterprise reform and/or privatisation of public companies, as discussed in chapter 7.

In chapter 7 it was argued that the government partly succeeded in implementing a microeconomic reform package after the ceasefire, and in the first five year plan (1989-1993). This package of reforms eased non-oil export and import regulations, devalued the domestic currency and unified the foreign exchange rates, and privatised

a number of nationalised enterprises. In the meantime the reforms encouraged private investment, ensured the completion of a number of incomplete and new industrial projects partly by external financing and eased controls on foreign direct investment. Price decontrolling, banking deregulation and public enterprise reform were other reforms which liberalised the economy. The above microeconomic reforms have been slowed down by the parliament and other political bodies, in order to decrease the rise in the inflation rate, avoid further devaluation of the domestic currency, protect citizens with fixed and low incomes and finally to protect the economy from the US trade and investment sanctions against Iran. With regard to the political and social context in Iran, the government should deepen the above economic reforms in favour of a market economy to enhance economic development as well as private investment. These issues were discussed in detail in chapter 7.

8.2. Policy Implications from the Major Results

This study suggests that oil export revenues, as the main foreign exchange source for imports of goods and services, should mainly be allocated to the importation of machinery and capital goods rather than consumer or intermediate goods. Oil export revenue should be allocated for infrastructure industries in the public sector and in the form of bank credits to private investors. In viewing the problems of the oil market in the last ten years, diversifying the economic base of the economy as well as the promotion of non-oil exports should be the focus of private investment. Public current expenditure should be limited to what can be financed from taxes and other public revenue rather than from oil export revenue.

The macroeconomic model developed was used to simulate the effects of a number of alternative policies for the Iranian economy. These simulations indicate that a lower interest rate can encourage private investment while it hardly increases the inflation rate. Oil export promotion directly raises public current and capital expenditure, and

indirectly raises non-oil aggregate demand and private investment. A devaluation of the domestic currency in the parallel market increases non-oil exports and adds to the cost of investment for the private sector. Although a rise in the volume of imports increases aggregate supply more than aggregate demand and makes the gap between these two variables smaller, the inflation rate will not slow down because of inflationary expectations. While capital goods formed a few percent of total imports during the study period, a change in government policy which increases total imports will also encourage the import of capital goods and thereby private investment. In fact a lower interest rate, an increase in oil exports or imports or a devaluation of the domestic currency in the parallel market encourages private investment.

Since there is not an open market economy, the above economic policies to improve the performance of private investment cannot be achieved without a number of microeconomic reforms in Iran. These reforms can provide a competitive economic environment which encourage private investment by limiting government intervention in the economy. These reforms are particularly essential in the areas such as liberalisation of foreign trade, floating the foreign exchange rate, attracting domestic and foreign direct investment and banking deregulation as well as privatisation and reform in public enterprises. Devaluation of the domestic currency should decrease the demand for imports and positively affect the demand for domestic products through a higher cost of imported goods and thereby encourage private investment. The impact of public investment on growth depends on the marginal productivity of capital in the public and private investment sectors (Sundararajan and Thakur 1980). To expand managerial authority and autonomy by conducting organisational restructuring of the public enterprises increases productivity of the public sector and raises aggregate supply. Such improvements also have a key role to play in slowing down the sharp inflation in developing countries other than Iran.

A number of obstacles against foreign direct investment were removed but still a few restrictions over relations with some developed countries exist. While the US economic and trade sanctions are continuing, Iran should improve trade relations with Europe, Japan and newly developed countries to guarantee Iran's future foreign trade and direct investment. Iran, with several geographical, strategic and economic advantages in the world and in the region, should take advantage of these worldwide or regional opportunities and attempt to strengthen its economic ties with all of the above countries as well as the new central Asian republics. These improvements in the Iranian foreign economic and trade policy are the prerequisite for attracting the private sector to invest in the areas that promote non-oil exports.

Iran's economy suffered from inconsistent policies and inefficient management in the public enterprises. The quality of most of Iran's industrial manufacturing output is low. This is partly because of the wide gap between supply and demand, the centralised economy and heavy trade restrictions. Liberalisation of trade, decentralisation of the economy, restructuring and/or privatisation of nationalised industries can alter this situation. Promotion of non-oil exports, especially manufactured exports, and encouraging foreign direct investment are other alternative policies which can change the function of the industrial sector from an import substitute sector to a net exporter in the long term. These policy applications often go through difficult and complicated processes that require a great deal of sacrifice and commitment.

This study indicated that economic development can hardly be achieved in Iran without the contribution of the private sector via capital investment. An increase in private investment will improve the national capacity and output for domestic needs and exports. This measure is even more important in the context of the Iranian economy where the availability of finance emerges as one of the main economic bottlenecks. On the other hand, private investment is a volatile component of

aggregate demand and sharply decreases when the government offers no sustainable economic development policy. Macroeconomic instability, a sign of the government's inability to control the economy, will adversely influence private investment activity by increasing the riskiness of long-term investment projects. A high level of uncertainty about the future will reduce the incentive to invest. Under these circumstances, investors prefer to wait and watch rather than to invest today. In brief, uncertainty about the future plays a key role in investment decisions and leads investors to adopt a wait-and-see attitude. To rule out such uncertainties the government should deepen the microeconomic reforms which were introduced after the war in favour of an open market economic policy in which private investment plays a major role.

8.3. Suggestions for Future Study

For more than a decade, decreases in oil export revenue struck the Iranian economy. As a result the economy has suffered from a chronic inflation rate, low share of investment in GDP, sharp depreciation in the real exchange rate and recently a rising external debt burden. However, the depreciation of the real exchange rate was clearly at the heart of the economic adjustment packages which were supported by the International Monetary Fund and the World Bank. This policy, and the effect of its enactment on the economy, including private investment, since 1993 should be studied more closely in the future.

The new external debt and debt-service payments have affected the whole economy as well as private investment since 1994. Borensztein (1990) believes that the debt-service payments diminish investment return. Serven and Solimano (1992) argue that the debt burden is a source of instability and acts like a tax on the proceeds of private investment. The external debt and its servicing will become important issues in the Iranian economy, and may have an adverse effect on private investment behaviour in

the future. The effects of external debt and debt-service payments on the economy as well as private investment are other issues which are suggested for future study.

Iran is considering becoming a member of the World Trade Organisation (WTO). Given Iran's economic structure which is geared toward a liberalised economy and the promotion of non-oil exports, the government realises the necessity of this membership. As a prerequisite to this membership, Iran has to eliminate many of its trade barriers and regulations. Membership of WTO is a major step to utilising the comparative advantages and compatibility of the Iranian manufacturing sector and realising the gains from a liberalisation policy for imports and exports. This important economic transitional phase is not simple and has several impacts on the country's economy and private investment. To examine the economic aspects of this membership is another important issue which is recommended for future study.

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