SOCIAL INSURANCE SYSTEM OF GREECE

- A comparison with British, American and Spanish social security systems

- An econometric model

by

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To the memory of the unforgettable and outstanding Greek

Statesman G E O R G E G E N N I M A T A S

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DECLARATION

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CONTENTS

SOCIAL INSURANCE SYSTEM OF GREECE

- **A comparison with British, American and Spanish social security systems**
- **An econometric model**

PART ONE

THE SOCIAL INSURANCE SYSTEM OF GREECE

Chapter 1.

THE DEVELOPMENT OF THE INSTITUTION OF SOCIAL INSURANCE IN GREECE

Chapter 2.

PRESENT SITUATION AND PROBLEMS OF THE MAIN AND COMPLEMENTARY SOCIAL INSURANCE

PART TWO

A COMPARISON OF THE GREEK SOCIAL INSURANCE SYSTEM WITH THE CORRESPONDING BRITISH, AMERICAN AND SPANISH SYSTEMS

Chapter 3.

THE SOCIAL SECURITY SYSTEM IN THE UNITED KINGDOM

Chapter 4.

THE SOCIAL SECURITY SYSTEM IN THE UNITED STATES

Chapter 5.

THE SOCIAL SECURITY SYSTEM IN SPAIN

Chapter 6.

REVIEW OF ECONOMIC INDICATORS OF THE SOCIAL SECURITY PROVISIONS OF GREECE, SPAIN, U.K AND U.S.A.

PART THREE

THE GREEK SOCIAL INSURANCE SYSTEM :

AN ECONOMETRIC MODEL

Chapter 7.

THE CREATION OF THE MODEL

Chapter 8.

ESTIMATION OF THE MODEL SIMULTANEOUSLY

ABSTRACT

Development of social security is unfortunately conditioned by restrictions of an economic nature follow principally from the inadequacy of available resources. Social insurance is therefore facing serious problems in redistributing resources and it has a need to redefine its field of action in a manner which takes into account the different economic situations.

The rapid development of Greek social insurance and particularly of pension benefits, which have occurred over the last decade, cannot be maintained. The problems facing the Greek social insurance system are easy to identify, but for political reasons, nobody has been prepared to face them and take the necessary action.

My aim is to contribute to the knowledge of Greek social insurance problem-solving.

I find that writing about the British, American and Spanish social security systems is a good way to gain perspective on one's own and I have learned a good deal about my own country's social insurance system from these comparisons.

My long standing research interest in the economics of social insurance in Greece is reflected in the last and most important part of my thesis

THE AIM OF THE THESIS

The social protection in Greece and particularly the social insurance constitutes the main element of the general programme of economic policy. The Greek economy and the social insurance system influence each other and they cannot be considered separately. The deficit in the social insurance system creates problems in economic development. These problems certainly demand a solution.

It is believed that solutions for the problems of social security, will assure the modernization of the social insurance system on the basis of the social principles of repayment and social solidarity and will not influence negatively the economic development.

To attain this we need to have :

a) very clear and steadfast political volition and a wide social consent of all sections of the society and

b) Thorough understanding of what must be done from the economic point of view and what ought to be done from the social point of view, as well as clear assessment of the economic role of social insurance.

Both objectives can possibly be achieved if they are based on scientific research and studies which deal with economics of social insurance. Unfortunately, in my view, Greece lacks such research and studies.

The purpose of the thesis is to help to cover this gap by producing an econometric model which will be dealing with the expenditure and the revenue of the Greek social insurance system. Particular emphasis will be given to the main and

complementary social insurance consisting of pensions, which are financed from public sources and not from private funds. For these pensions the employees are compulsorily insured and the expenditure required for these pensions is about 75% of total sum for social insurance in Greece.

The model will have to be developed as, at present, no such econometric model exists in Greece , which is suitable for exploring the effects of the insurance changes on the Greek economy. I hope such a model will help understanding equilibrium may exist between economic reality and social necessity.
This point of equilibrium must be the starting point for any future step in social insurance and for any long term changes, which will be adjusted to contemporary social necessity and economic reality.

The idea of creating the econometric model has been based on an article by Edward E. Palmer and Marten Palme[90] about "Macroeconomic Analysis of Employer-Contribution Financed Social Security" in Sweden.
The philosophy and structure of the adopted model was a modification of the Swedish model to reflect the principals and reality of the Greek economy. The Greek econometric model will study the effects - of increases or reductions of the employers' contributions as well as of pension benefits - on the macroeconomic dimensions.

Hopefully, this econometric model may help in estimating the effects of policy changes regarding the economics of the main and complementary social insurance.

SUMMARY

The thesis "Social insurance system of Greece- a comparison with the British, American and Spanish systems and an econometric model" includes three parts.

The first part describes the development of the institution of social security in Greece; the situation until July 1992 and problems of the main and complementary social insurance, as well as some general proposals are mentioned for consideration. These are tested by comparing the Greek system with other systems and with the experience from other countries.

The second part describes the similarities and the differences between the Greek social insurance system and the British, American and Spanish systems. From these comparisons the conclusion is that firstly the Greek system needs reform, so some measures must be taken. Secondary after this point a question is raised: what will be the influence on the Greek economy from such measures?

The third part will include an answer to the question: if there are policy changes regarding pensions benefits and their financing what are the direct and indirect effects on the Greek aggregate economy?

An answer will be given by implementing policy simulation exercises in a macroeconomic model which will be created.

PART ONE

THE SOCIAL INSURANCE SYSTEM OF GREECE

Chapter 1

The Development of the Institution of Social Insurance

Chapter 2

Present Situation and Problems of the Main and Complementary Social Insurance.

THE SOCIAL INSURANCE SYSTEM OF GREECE

The Greek Constitution in article 22 and paragraph 4 refers to the social insurance protection of employees. This is the basic provision of the Constitution for social insurance but there are more provisions that bear general or special significance to social insurance. All these provisions form, the constitutional rights of social insurance for Greeks.

The principal features of social insurance in Greece are:

(i) Social insurance is an institution, which covers the risks arising from events that put into jeopardy a person's life or living conditions.

(ii) Institutional organizations of social insurance belongs to the State.

(iii) Social insurance is compulsory for employees.

(iv) Social insurance operates on a legal basis by statutory insurance relations.

The level of the social insurance protection in Greece comes very near to that of the developed countries. However the Greek social insurance system is in crisis, both economically and organizationally. This point will be clear from the following discussion.

CHAPTER 1

THE DEVELOPMENT OF THE INSTITUTION OF SOCIAL INSURANCE

THE DEVELOPMENT OF THE INSTITUTION OF SOCIAL INSURANCE IN GREECE

1.1 Introduction

A few decades ago, the institution of social insurance was met with reservations by the majority of the Greek population[1]. Today, Greeks lay their hopes for the future on social insurance, because Greeks expect social insurance to provide for their old age, possible disability or loss of breadwinner and because they know that the more secure they are the more they cling to their jobs by refusing to accept compromises. Therefore social insurance provides a liberating experience for the individual and the society as a whole.

The institution of social insurance first appeared during the early years of Modern Greece. In the beginning, it operated in the form of providence given to the members of the family in the case of death of the working member. It gradually developed into its present form, that is, it covers the risks of old age, death, disability, illness and unemployment.

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1 Ministry of Social Insurance, "Suggestions on the themes of the social insurance", National Printing House, Athens 1984.

The social insurance consists of the :

- main insurance (pensions and health),
- complementary insurance,
- insurance against unemployment and
- family benefits.

1.2 Main Social Insuranse - Main Pensions

The main insurance is divided into two branches :

a) main (principal) pensions and b) health insurance.

All employees (the waged and salaried individuals working for the private sector, civil servants, self-employed, farmers and professionals) are obliged to insure for main pensions.

The Greek social insurance system insures any type of employment and some professions. This means, that if a professional person has a self-employment he/she will be insured twice (on one hand because he/she is an employee and on the other hand because of his/her professional capacity) and he/she will have two main pensions.

Those persons who were not employed in the past and were not insured and do not currently have sufficient means to support themselves are entitled to state pension provided they are above the age of 68.

As the structure of the insurance for main pensions is dealt with in chapter 2, it is useful to state the most important steps of the main insurance for pensions. These steps are the formation of the major insurance organizations.

The first fund that was created was the Seamen's Retirement Fund (NAT), which was founded in 1836 and operated under the Law XAO of 27/7/1861.

There followed the foundation of other insurance organizations in different professions (1853 Army Officers, 1861 the Pension Fund of Civil Servants and 1866 Naval Officers).

The fund of owners of small and medium firms (TEBE) was created in 1934.

The fund of those working (waged and salaried earners) in the private sector (IKA) was founded in 1937. This is the biggest of main insurance funds.

The insurance cover of almost the entire population of the country was completed under the Law 469/1961 and the formation of the Agricultural Insurance Organization (OGA), it covered everybody who was involved in work of agricultural nature, which is a substantial proportion (about 1/3) of the population.

1.3 Complementary Social Insurance

In a parallel manner to the creation of the main social insurance bodies, organizations providing complementary social insurance were founded to pay extra benefits (periodic or lump sum).

Amongst the bodies of complementary insurance which today are under the auspices of the Ministry of Health, Welfare and Social Insurance the oldest is the Fund of Employees of Commercial, Industrial Work Shop and Professional Associations, which dates from 1925.

Since 1979, several bodies were founded so that the total of the complementary social funds comes up to 162. After 1979, it was decided that no more complementary funds to be established.

Decisive steps in this extension of the institution of complementary social insurance was:

In 1983, the "Private Sector Complementary Fund (IKA-TEAM)" insured all non-insured salaried persons, it covered about 900,000 employees or 24% of labour force.

In 1988, the Agricultural Insurance Organization (OGA) insured all farmers with complementary pension.

1.4 Health Insurance

Health insurance covers the risk of illness which on one hand requires treatment or hospitalization therefore implying bigger expenses, on the other hand the sick person being unable to work, in most cases, is deprived of his/her wages.
Sickness is covered with the insurance point of view by providing reliefs as medical and dental treatment, free prescription, hospitalization, etc. Deprivation of wages is covered by cash contribution to the sick person.

Health insurance in Greece is covered by various bodies which have adopted rather different systems. These systems covered the population gradually and were put into force without a well planned program. As it happens with social insurance in general, it all started and continued in a rather experimental manner.

Until 1937, only a small percentage of the population was covered, no more than 15%, by various health funds.
From 1937 onward IKA has covered the large number of waged and salaried workers of private sector.
In 1951 the "Code for Civil Servants" produced a systematic plan for the health coverage of civil servants.
The agricultural population acquired health cover in 1951 with the Law 340/1951, which was put into a systematic form with the founding of OGA in 1961.

Also citizens who are not insured or those who don't have sufficient means are covered by public sector too.

There are special systems operating for the seamen, bank clerks, professional people and other categories of the population.

Most health insurance bodies cover the whole spectrum of services available. The reliefs that are envisaged in Greece by the biggest social insurance funds are similar to the reliefs of general systems in the EU countries.

1.5 Unemployment and Family Benefits

Insurance cover of unemployment was introduced in 1945 with the foundation of the unemployment organization. In 1958 the account "Family Benefits of the Salary Earners (D.L.O.E.M)" came into existence. In the end, this organization was renamed "Organization of Employment of the Labour Force (O.A.E.D)", which is still functioning today. The OAED covers the risk of unemployment and provides benefits for the salary earners of the private sector as well family benefits.

The insurance cover of unemployment by benefits is one side of the given protection. The other side is a series of social and economic policy measures to prevent and decrease the size and duration of unemployment.

Family benefits are given (except the OAED) by the state to the families according to the number of children. OGA pays money to families which have three or more

children. Extra money is also given to employees (by employers) and to pensioners (by insurance organizations) who have children below the age of eighteen.

The contribution of employees and employers to the OAED for the insurance cover of unemployment and family benefits is a percentage of their salaries.

% **Contributions / Salaries:**

	Unemployment	**Family Benefits**
Employees	1%	1%
Employers	2%	1%

1.6 Social Insurance Funds

Social protection was developed in a random manner without a clear cut program and took place within a multi-faced system.

As a result we have the impossible situation, where we have 325 social protection funds, 238 of them belonging to social insurance.

219 funds are within the jurisdiction of the Ministry of Health, Welfare and Social Insurance.

86 the Ministry of Labour

10 the Ministry of National Defence

5 the Ministry of Commercial Shipping

5 other Ministries (Finance, Industry, Agriculture, e.t.c)

I think, it is obvious that the social protection especially the social insurance is immaturely and wrongly founded. This view is commonly shared[1].

1.7 The Development of Greek Social Protection System During the Last Three Decades

Because of the political and social priorities of the Greek Governments and because of the economic reality, social expenditure was limited during the decades of 1960 and 1970

(social expenditure was 11-13% and 13-15% of GDP respectively).

At the same time, necessities were not dealt with according to their relative importance and no hierarchy of objectives was developed.

As a result, there was a limited improvement, in a discontinuous manner due to pressure by various social groups.

During the decade of 1980, we had a large increase in social expenditure (at the end of the decade, it was more than 25% of GDP) and a qualitative and quantitative extension of social insurance to new social and professional groups throughout the country. At the same time, the necessary resources were not assured by the state.

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[1] PROGRAMME 1983-87, Report E10 "Social Insurance", Centre of Planning and Economic Research (KEPE), Athens, 1988.

As a result, revenue has fallen short of expenditure and deficits of major organizations developed. The deficits first appeared in the late 70s, at the time when the major insurance bodies supplied very low benefits.

1.8 The Reasons of the Crisis in Social Insurance

The crisis, in the face of deficits at the social insurance funds, has brought the insurance system to an economic deadlock. The loans of IKA and NAT are about 8% of GDP.

The reasons for the crisis are several and vary in nature:
first, they are due to external factors - which are common in European countries and
second, they are peculiar to the Greek social insurance system.

The details of the above two factors are as follows:

The reasons due to external factors are:

(i) the unfavourable evolution of demographic indices (6.8% of the Greek population was 65 years old or over in 1950 and it will be about 15% in the year 2000 - Source: National Statistical Service of Greece) and the fact that the insurance systems came to their maturity (the ratio of pensioners to insured persons was 1:3.16 in 1980, but it was 1:2.50 in 1990 - Source: Social Budgets 1980 and 1990).

(ii) the economic crisis and recession were caused by the decrease in the rate of growth of GDP. Consequently there was a decrease in the total value of salaries and the rise in unemployment.

(iii) the qualitative and quantitative extension of social insurance protection in the last years was dictated by contemporary social necessities.

Reasons of peculiarity of the Greek insurance systems are as follows:

- the faulty political choices concerning social insurance and economic development. Social insurance contributions were used for financing industry and economic development but did not produce the expected results or repayment.

  It was compulsory for social insurance money to be deposited with the Bank of Greece. The rate of interest was very low until 1984.

- the exemption from contributions of some specific categories of enterprises was very significant. The number of cases of exemptions has been reduced in the decade 1980-90.

- the expansion of social policy, ought to have been financed by the state but it was not.

- the creation of "privilege status" multiple insurance and the expansion of "privileges" in social insurance for some categories of people.

- the inequality in social resources (third party taxes) among the different social insurance funds.

- the non realization of the tripartite financing (state, employers and employees) because the state's failure to upgrade the role and the objective of social insurance.

- the considerable increase of disabled pensioners and pensioners who were engaged in heavy manual or hazardous occupations. Many jobs classified as heavy manual or hazardous are not genuine. They are classified as such, so that the workers in these jobs retire five years earlier than other workers.

- the very large evasion of contributions. It is one of the most serious economic problems of social insurance.

- the fragmentation (238 funds) of social insurance, the big organizational, management and administrative problems.

- the measures of the last decade, the emphasis which was given:

  a) covering all gaps that were in social insurance (the main social insurance of the biggest fund IKA was extended to cover all parts (regions) of Greece and the complementary social insurance covered all employees who have a dependent job in private sector);

  b) increasing all pensions, especially low pensions.

Note that the economic problems arising within each major organization are caused by different factors.

In the fund of waged and salaried earners in the private sector (IKA), the problem is due to the fact that pensions are not proportional to contributions.

In the Seamen's Retirement Fund (NAT), the problem was created by the disproportionate and adverse relation between pensioners and insured persons, it was 1:0.8 in 1990 (Source: Social Budget 1990).

In the main social insurance of all civil servants, the problem is that the civil servants do not pay contributions and also there retiring age is earlier than other employees.

OGA does not receive any contributions from those insured in the main insurance stream.

Finally, the existence of deficits is not to be ignored. The problem is how it is to be met from the contributions of those that will have an influence in the consumption or from the Central Government Budget that draws out about 30% from direct taxes (58% of it coming from salaries and wages) and 70% from indirect taxes?

CHAPTER 2

PRESENT SITUATION AND PROBLEMS OF THE MAIN AND COMPLEMENTARY SOCIAL INSURANCE.

PRESENT SITUATION, PROBLEMS AND PROPOSAL OF THE MAIN AND COMPLEMENTARY SOCIAL INSURANCE

2.1 Expenditure

According to the Social Budget 1991, social protection (social insurance, health and welfare) is provided by 325 social funds and by the state. The expenditure of social insurance protection is estimated at 3,073 billion drachmas, which is about 24% of GDP. This expenditure was also 24% of GDP in 1996 (see Table 1).

Table 1

Gross domestic product, expenditure of social protection and insurance and pensions:

Billion Drachmas

1991				
		%	%	%
Gross domestic product	12,838	100		
Total expenditure on Social Protection	3,073	24	100	
Total expenditure on Social Insurance	2,579	20	84	100
Pensions	1,883	15	61	73
1996				
Gross domestic product	23,634*	100		
Total expenditure on Social Protection	5,763	24	100	
Total expenditure on Social Insurance	4,940	21	86	100
Pensions	3,409	14	59	69

* Estimates

Source: Social Budget 1991 and National Accounts, NSSG.

The expenditure of social insurance, which is provided by all social insurance funds and the state, is estimated at about 84% of total expenditure of social protection in 1991 and 86% in 1996 or about 20% of GDP in 1991 and 21% in 1996. The expenditure of social insurance is distributed as follows: 73% pensions, 9% lump-sum payments, 11% sickness relief and 7% all other expenditures in 1991 (Table 2).

Table 2

Expenditure of social insurance by special categories

In billion drachmas

Special categories of social expenditure	1991	%
Pensions	1883	73
Lump sum payments	239	9
Sickness reliefs	285	11
Other reliefs	76	3
All other expenditure	96	4
Total	2579	100

Source: Social Budget 1991

The expenditure of the main and complementary pensions, which is provided by all main insurance funds (32 Funds), by 60 complementary insurance funds and by the state, is estimated at about 73% of the total expenditure of the social insurance or at 17% of GDP.

2.2 Revenue

The total revenue of social insurance is less than the total expenditure. However all complementary insurance funds and the majority of the main insurance funds have revenue bigger than their expenditure, but the expenditure of the biggest fund (IKA) and of the (NAT) is bigger than their revenue. In 1991 the proportion of employees and employers contributions to expenditure was estimated at 0.54 for IKA and only 0.13 for NAT (Source: Social Budget 1991).

The state gives subsidies to the above funds but they are not enough to cover all expenditure, so the funds have to borrow from the banks at a high interest rate. The subsidies for IKA started at 1987 and for NAT at 1989. In previous years, the above institutions were borrowing money so their loans are still very considerable. The participation of employees, employers and the state in the revenue of social insurance has improved within the years 1986-91 (Table 3).

The contributions by the state amount to 27% of the total revenue in 1991, they were only 21% in 1986.

Also the contributions of the insured persons are equivalent to 31% of the total revenue, in 1986 they were 37%, which was a rather high percentage.

Table 3

The proportional distribution of the revenue of the social insurance funds*

by source of origin

	1986	1991
Revenue	100.0%	100.0%
Contributions of insured persons	37.3%	31.4%
Employers contributions	35.1%	33.7%
Social contributions	20.6%	27.3%
Property income	7.0%	7.5%

* Including only those which are under the auspices of the Ministry of Health Welfare and Social Insurance.

Source: Social Budgets 1986 and 1991.

2.3 Insured Persons and Pensioners

The insured persons and the pensioners of the funds under the auspices of the Ministry of Health, Welfare and Social Insurance are as follows in 1991.

	insured persons	Pensioners	
main pensions	4,039	1,707	(in thousand)
complementary pensions	3,377	1,254	(" ")
Welfare benefits	720	–	(" ")

Of the insured persons for main pensions: 44% are insured by the biggest funds (IKA) and 29% by the (OGA).

Of the pensioners: 44.5% were formerly insured by IKA and 39% by OGA.

Of the insured persons for complementary pensions: 27% are insured by the biggest fund (IKA-TEAM) and 34% by the complementary social insurance branch of OGA.

Of the complementary social insurance pensioners: 10% were formerly insured by IKA-TEAM and 60% by OGA.

The proportion of pensioners to insured persons is not good and unfortunately it is expected to deteriorate. Five years ago it was better, especially in the complementary social insurance sector it was quite sufficient.

Pensioners / insured persons of the social insurance sector

	main	**complementary**
1985	1:2.89	1:6.98
1990	1:2.50	1:2.88

In five years (1985-90), in the complementary social insurance sector the number of pensioners increased by about 418%, (in 1986 : 300,000 Pensioners, in 1991 : 1,254,000 Pensioners).

This was because the complementary social insurance system of the private sector had begun to mature. The pensioners of the IKA-TEAM increased from 20,000 to 128,000 (an increase of about 640%) and on the top of that they had the first lot of pensioners from OGA. The number of these pensioners was extremely high, 760,000 or 61% of the total complementary social insurance pensioners.

The total sum of the directly and indirectly insured persons in the health insurance branch of all insurance funds is bigger than that of the total population of Greece. The same phenomenon is observed with the insured persons directly insured for main pensions. These insured persons outnumber the labour force.

According to the published data (1991) of the National Statistical Service of Greece, they were 10% more than the labour force (labour force is 3.8 millions, insured persons for main pensions are 4.3 millions in 1991). This occurs because some Greeks are insured in more than one main insurance fund or they are insured twice (directly and indirectly) in the health insurance branches.

2.4 Present Situation of the Main Insurance

In spite of the fragmentation of the social insurance system the majority of the Greek population is covered (for main social insurance) by a very small number of social insurance organizations which insure large professional or social groups. IKA insures, directly and indirectly, about 45% of the population, OGA about 32% and

TEBE about 9%. If we take all these into account plus the civil servants we will have a total of about 90% of the population. Therefore the crucial problems of the social insurance system focus on the operation of the above main social insurance bodies.

The Greek social insurance system relies upon the traditional principles of social insurance. The social protection is dependent upon the participation in the production process. Employees are covered directly and their families are covered indirectly by social insurance organizations. Almost the entire Greek population is covered directly or indirectly by the main social insurance. Almost the entire labour force is protected from the risk of old age, disability and death under some retirement requirements : retirement age and insured years.

2.4.1 Retirement Requirements

Old-age pensions

			Retirement age	Insured years
IKA:	a)	Men	65 years old	4,050 days
		Women	60 "	4,050 "
	b)	Men and Women	58 "	35 years
	c)	Heavy manual or hazardous jobs:		
		Men	60 "	4,050 days
		Women	55 "	4,050 "
OGA :		Men and Women	65 "	25 years
TEBE:	a)	Men and Women	65 "	20 "
	b)	Men and Women	60 "	35 "
Civil servants :				
		Married women	At any age	15 "
		Unmarried women	"	25 "
		Men	"	25 "

In most of the social insurance funds which cover the salaried earners (who are not insured by IKA), the retirement age is 50-55 years old and the insured years are 15 years for married women and 25 years for unmarried women and men. Also there are a few social insurance funds that have more favourable retirement requirements.

The Law 1902 / 1990 stipulates that there will be a gradual increase in the number of insured years at IKA. This number will be 15 insured years (or 4,500 insured days) in 1993.

It also introduced a retirement age for all employees in the public sector. Retirement age for pensioners will be as follows.

	until 1997	**after 1997**
Women with children under 18 years old	42 years old	50 years old
Other Women	53 "	58 "
Men	55 "	60 "

Disabled and survivors' pensions

There is no uniformity in the retirement requirements of the disability pensions. Some social insurance bodies provide disability pensions after 5 insured years and other social insurance bodies after 10 insured years. The situation is more favourable for younger persons, e.g. only 300 working days are required for a 21 year old to be insured against disability.

The retirement requirements: "insured years" for widow's pensions are about the same as the retirement requirements for disability pensions for most of the social insurance funds, whereas "length of marriage" is six months, one year, or two years. The main qualifying condition is 1,500 contribution days and six months' marriage. Widow's pension is payable irrespective of the age of the widow.

Survivors' pension is payable to needy dependent widowers, as well as, in some cases, to dependent parents.

Orphans' benefits are payable to children up to age 18, or 25 in full time education, or at any age for an unmarried or divorced daughter, if her father was an employee in public sector.

2.4.2 The way to estimate the amount of the main pensions

The payments which are taken into account in estimating the pensions differ among the main insurance funds.

The salary consists of the basic salary, long term allowances and more extra allowances and benefits, therefore in some cases basic salary and long service allowance are considered as retirement payments; in other cases, it is the basic salary, the long service allowances and some or all extra allowances and benefits are required for retirement payments. Also as a basis of estimating the retirement payments the following is taken into consideration: the last monthly salary before someone's retirement, or the average of last year's salaries, or the last two years, or the last three years, or the last five years. This retirement payment varies considerably among the social insurance funds.

The pension is a percentage of retirement payments. This is 80% of the retirement payments in most insurance funds and it is given after 35 years of insurance contributions have been fully paid. But in some cases, it is more than 80% of the retirement payments or/and is given after 32 or 30 insured years.

If somebody retires after 15 or 25 insured years, he/she will receive 15/35 or 25/35 of the total pension in most of the cases. In some cases he/she will receive 50% of the total pension after 15 insured years. The widow's pension is 50% of the old age pension.

The amount of disability pensions is determined by the extent of disability.

All social insurance funds have stipulated a minimum level of pension and many of them have stipulated a maximum level of pension and give proportional pensions. The distribution of pensions does not correspond to the distribution of the salaries because the minimum pensions are very high and a great number of pensioners receive them.

2.4.3 The way to estimate the amount of the pensions in the IKA

Old-age pension is a percentage of the final five years (or the last 1,000 days, if an insured person has not worked for at least 1,000 days during the last 5 years) average computable daily pay, of which the monthly equivalent is 25 days pay and the annual equivalent is 14 months pay.

The pension consists of basic and supplementary amount:

- The basic amount of pension range from 30 per cent to 70 per cent of the average earnings and depends upon the employee's insurance class (the percentage is higher in lower classes, whereas it is lower in higher classes). There are 28 insurance classes and more than in 1990. Each year's earnings are increased to the date of retirement by the corresponding increase in the retail prices index, and each employee's insurance class is determined by his/her income.

- The supplementary amount of pension is a percentage addition to the basic pension i.e 1% of earnings for each 300 contribution days between 3000 and 7800; this percentage varies between 1.5% (for the lower classes) and 2.5% (for the mid to higher classes) for each 300 contribution days beyond 7800.

Supplements are payable to the wife: 1 1/2 of the minimum earnings, and to the children: 20% of pension for the 1st child, 18% for the 2nd child and 10% for the 3rd child, up to a monthly maximum for each of them. The maximum total pension cannot exceed 100% of presumed earnings.

Disability pension: An employee would be considered heavily disabled, disabled or lightly disabled if the disability (mental or physical) prevents him/her from earnings more than 20%, 33.3%, or 50% respectively (33.3%, 50%, or 66.6%

respectively, until 1990) of what a healthy person of equivalent education can earn.

Heavily disabled individuals would receive a benefit equal to an old-age pension, disabled would receive 75% of this, and lightly disabled would receive 50% of the pension. A disabled insured person with at least 6.000 days service, qualifies for 100% of a retirement pension.

Survivors' benefits: The spouse's pension is 70 per cent of the accrued retirement pension. The amount of the majority of such pensions is equivalent to the minimum widow's pension.

Each dependent child is entitled to 20 per cent of the accrued pension and this is increased to 60% if both parents are dead. The total pension cannot exceed 100% of an employee's pension or disability pension entitlement.

2.4.4 Minimum main pension per month

IKA has a minimum main pension (old age or disability pension) per month, which is 20 days' money earned by an unskilled worker. The minimum widow's pension is 18 days' money earned by an unskilled worker. The majority of the pensioners of IKA (about 70%) receive the minimum pension. Almost all of them receive the minimum complementary pension, which is 5 days' money earned by an unskilled worker. So the total (main and complementary) minimum old age or disability pension is 25 days' money earned by an unskilled worker.

Many social insurance funds have the same minimum main pension as the IKA. OGA have a flat main pension for all pensioners, that is 12,000 drachmas per month, about 1/6 of the total (main and complementary) minimum pension of IKA. The funds of the self employed have a minimum pension which is less than the minimum main pension of IKA (it is about 2/3 of it).

2.4.5 The contributions by employees and employers

Not all employees are contribute equally to their main social insurance. The proportion of employees' to employers' contributions must be 1:2, but in most of the main insurance funds there are large variation.

In IKA, the contribution of employees for the main pension is 5.75% of their salary and the contribution of employers is 11.5%.

In public sector funds, the employers cover the funds' deficits or they pay high contributions. For example, in the fund of employees of the Ionian and Popular Bank, the employees' contribution is 5.75% of the salary and the contribution of the bank is 27% of the salary. The civil servants do not pay contributions for main pension and in OGA there are no contributions in the main social insurance branch.

2.4.6 The social resources and the subsidies

The social resources (third party taxes) and the subsidies are not uniform. There are large disparities in the financing of the social insurance funds. Some examples:

Annual social resources and subsidies per insured person, in 1991

1.	TEBE	66 thousand drachmas
2.	IKA	104 " "
3.	OGA	154 " "
4.	Funds of employed in the Banks:	
	- National Bank	585 " "
	- Agricultural Bank	485 " "
5.	Funds of employed in Press:	
	- owners and editors	367 " "
	- technician	822 " "
6.	Fund of Lawyers	414 " "

Source : Ministry of Health, Welfare and Social Insurance

Note that a few years ago the differences were bigger. In IKA, in 1986, the annual social resources and subsidies per insured person were only a few drachmas (less than one hundred drachmas).

2.5 Present Situation of the Complementary Insurance

The complementary social insurance was set up at a time when the main social insurance system was incomplete and offered only limited protection to the insured people.

The complementary social insurance benefits:

a) complementary pensions to salaried persons, to waged persons in the private sector and to certain categories of self-employed; b) lump-sum payment to salaried persons upon retirement.

The salaried of the public sector are covered by complementary social pension and lump-sum payment, whereas the private sector salaried are covered by complementary social pension but only few are granted lump-sum payment.

The complementary funds were set up according to the rising needs of the various sectors. Of 162 social complementary funds, 30% provide pensions, 40% grant lump-sum payments and the remainder grant both.

2.5.1 Complementary pensions

The complementary protection in Greece follow the pattern of the main social insurance which is financed by the employee, the employer and the state. There are three categories of funds:

a) Funds financed by the insured persons' contributions only - most of which represent the public sector.

b) Funds financed by insured persons' and employers' contributions - most of which represent the private sector.

c) Funds financed by insured persons' and employers' contributions and by social resources (third party taxes). This number of funds is quite limited.

The complementary social insurance in Greece is different from the "commonly accepted" role of this insurance - which is to supplement the main pension of the insured person and to secure his/her former income from his/her work- as the complementary pension approaches or exceeds the main pension in a number of cases.

In the private sector, in which the complementary fund (IKA-TEAM) insures the majority of workers, the lowest complementary pension is equal to five days' wages of an unskilled worker.
The public servants' funds offer a complementary pension ranging from 11% - 25% of the main pension.

Retirement requirements differ among the various complementary protection funds. Retirement age ranges from 45-65 years for men and 35-60 years for women. Insured years required for retirement range from 5-35 years. It should be noted that a Law has been passed to raise the retirement age and the insured time required for a person to be eligible for a pension.

2.5.2 Lump-sum payments

Lump-sum payments are based on the salary or on some specific amount as well as on the insured years. The lump-sum payments range from 10 -20 monthly salaries. However, there are still differences in certain funds. The lump-sum payments funds are financed mainly by the insured persons and contributions to these funds coming from social resources are very limited.

2.5.3 Private insurance

Trends towards private insurance were observed in the end of decade 1980-90, despite the widely spread complementary social protection. However, we have no accurate information about the extent of the private insurance activities.

2.6 Problems of the Main and Complementary Social Insurance

Social insurance in Greece has not yet found its road. Its benefits (pensions etc.) were treated incoherently.

The impact of demographic change, the economic and social evolution in Greece has exerted great pressure on the cost of compulsory social insurance which is considerable and continues to rise.

The deteriorating ratio of the number of insured persons to pensioners will cause serious financial problems to the social insurance funds since social insurance is based on the principle of "pay as you go".

The segmentation of the social insurance funds and the way they are financed results in a considerable variation in the protection provided.

The disparity in main and complementary pensions and in lump-sum payments made to the beneficiaries is significant. There is also disparity in the conditions of retirement in the different social insurance funds.

The insured persons' contributions towards pensions are not uniform.

The social insurance operates under differing legislation.

The lack of consistency in financing the pensions and financing the complementary insurance with social resources.

The lack of coordination in the provision of retirement benefits by the main and complementary social funds leads to over insurance and multiple pensions for the insured person in some cases.

The increasing administration cost and labour cost as well as incomplete organization are some of the serious problems of the social insurance.

2.7 Targets

If we take for granted that :

- Greek Society is quite sensitive to social insurance,
- the consent of all social parties (concerned: employees, employers and state) is essential before any decision on institutional changes is taken,
- all social parties must be convinced about the significance of co-ordinating of both social and economic policies,
- social insurance is not to be abandoned to the laws of the market and is not to yield to other priorities and
- remedying the social insurance ill demands a continuous and long-term endeavour.

We may come to the conclusion that proposals must conform to the following long-term and mid-term targets.

2.7.1 Long-term target : new insurance system

For Greek social insurance to evolve into a viable and socially acceptable system, the long term target can not be other than the creation of a New Social Insurance System. This system must be based on the social insurance principles and on the economic thought. At the same time an effort should be made to remedy the existing insurance system.

The new social insurance system proposed should provide two kind of pensions:

- National Pension which will be financed by social contributions and subsidies and
- Occupational Pension which will be financed by employees' and employers' contributions.

To obtain the targets of the new social insurance system, a necessary condition should be the support of all political parties, while simultaneously the people are informed so that the new system is received by social approval.

2.7.2 Mid-term targets : repairing the existing social insurance system

As an increase of contributions or taxes is not desirable and as social expenditures amount to a significant percentage of National Gross Income, there is need for reconsideration of the social insurance system and the state should consider specific measures.

Finally, the solution to any problems arising from social insurance ought to be and can be sought within the framework of the social protection system and not be left in the hands of individuals.

PART TWO

A COMPARISON OF THE GREEK SOCIAL INSURANCE SYSTEM WITH THE BRITISH, AMERICAN AND SPANISH SYSTEMS

Chapter 3

The Social Security System in the United Kingdom

Chapter 4

The Social Security System in the United States

Chapter 5

The Social Security System of Spain

Chapter 6

Review of Economic Indicators of Social Security provisions

A COMPARISON OF THE GREEK SOCIAL INSURANCE SYSTEM WITH THE CORRESPONDING BRITISH, AMERICAN AND SPANISH SYSTEMS

The purpose of this part is to consider social security provisions in America, Britain, and Spain. The similarities and the differences between the Greek system and each one of them will familiarize us with the most important facets of the Greek social insurance system.

Social security pensions have, on average, the highest share of expenditure as a percentage of GDP among the other social programmes, in Greece. For this reason and in order to keep this study at a reasonable length, the comparison of the Greek social insurance system with the British, American and Spanish will be concentrate largely on pension schemes.

According to I.L.O publications, pensions expenditure in Greece, as a percentage of total social security benefits expenditure was 69.4% in 1975, higher than that (43.1%) in Spain and that (65.9%) in the United States. This percentage has continued to increase from 69.4% in 1975 to 79.0% in 1985, and it is still continuing to rise. In the same time, the percentage has increased from 43.1% to 50.3% in Spain; whereas, it has decreased from 75.8% to 45.5% in the United Kingdom and from 65.8% to 57.3% in the United States.

The most important findings, from an economic point of view, of the following three chapters are incorporated into the review. This treatment aims at dealing with the economics of the Greek social insurance system.

CHAPTER 3

THE SOCIAL SECURITY SYSTEM IN THE UNITED KINGDOM

SOCIAL SECURITY SYSTEM IN THE UNITED KINGDOM

3.1 Introduction

The Social Security System of the United Kingdom operates under the Beveridge principles. It is characterized by:

- insurance provision against the contingencies of life such as sickness, unemployment, old age and low income;
- universal protection of all British people, without working conditions for some benefits;
- unified management.

The British system is vast and complex. Funding of the system is a large item of government expenditure. The cost of social security in 1988-9 was around one-third of total public expenditure and over 20 million of the 56 million individuals in the United Kingdom received some form of social security benefit. The problem of enormous and escalating costs of funding the system is not unique to Great Britain but it is also common amongst other members of the EU.

The present Social Security Pension System has a Basic Flat rate pension together with an earnings-related scheme, which was introduced under the Social Security Pension Act 1975. It is a "pay as you go" insurance scheme so today's contributors do not receive any guarantee as to the level of benefits in the future.

Government has felt the earnings related part may become too expensive and has been modified it by legislation.

The Social Security Act 1986 introduced major changes to the system of income-related benefits as well as changes to the structure and level of both state and private pension provision.

3.2 The Growth of the Social Security System

The social security system is essentially a creation of the twentieth century. The first half of the nineteenth century was dominated by the "Puritan Ethic" -a belief that poverty was the result of idleness and moral inadequacies, whereas the principle of public responsibility for the relief of poverty had been accepted by the Poor Law Act of 1601.

The main medium of saving for contingencies of life (sickness, unemployment and old age) was through friendly societies. These were a typical manifestation of the Victorian ethic of providence and self-help. Through the holding of regular meeting they also provided social companionship for their members[6].

In 1906 the general election saw a large increase in the number of working class men in Parliament. This forced the Government to concentrate its attention on pensions, so under the 1908 Old Age Pensions Act central Government accepted responsibility for helping the aged poor over age 70 by providing small cash

payments subject to a means test. Three years later the National Insurance Act of 1911 introduced insurance against unemployment and sickness, on the principle of benefit payment in return for contributions. Employers and the State both made contributions to the National Insurance Fund, from which benefits were paid.

In 1925 a contributory old age pension scheme for all employees was introduced, and entitlement to a pension was determined by the contribution record rather than by a means test.

In the inter-war period the system continued to develop and provided various benefits, but the pre-1939 system suffered a number of weaknesses and every benefit scheme was administered by a different authority. The setting up of the Beveridge committee in 1941 by the wartime coalition Government was an important step towards the co-ordination of social security provision.

In 1942 the Beveridge Report was published, which laid much of the foundations of the post-war welfare state. The report was not only concerned with old age pensions but dealt with all aspects of social security and put forward plans for a unified national system of social insurance and social assistance.

Many of the report's recommendations were implemented in the immediate post-war years. Family allowances were introduced in 1946 and a National Health Service in 1948. Moreover, in 1944 the Government accepted responsibility for maintaining full employment. The main provisions of the Beveridge Report were incorporated in the National Insurance Act 1946. This provided a flat-rate pension

for all employees and for the self-employed, subject to sufficient contributions having been paid by men up to age 65 and women up to age 60. State pension was paid from age 65 for men and age 60 for women, the State pension age.

Until the 1959 National Insurance Act both contributions to and pensions from the State were flat amounts independent of income. The 1959 Act introduced the graduate scheme. This Act also introduced the concept of "contracting out" which remains almost unique in the world (McKelvey, Round and Fairclough, 1985)

Until 1975 the state pension plans changed every time a new government was elected, so it was desirable for there to be a degree of consensus amongst the political parties. The Social Security Pensions Act 1975 found support within both major political parties. This Act brought into operation, on 6 April 1978, the State Earnings-Related Pension Scheme (SERPS).

In June 1985, the Government published a Green Paper entitled "Reform of Social Security - Programme for Change (DHSS, 1985 a)" which suggested the abolition of SERPS and the introduction of a system of compulsory "contracting out", either through occupational schemes or through personal pension schemes. Following almost universal condemnation of the proposals, the subsequent White Paper, entitled "Reform of Social Security - Programme for Action (DHSS, 1985 b)", sought only to modify the existing scheme, whilst giving encouragement to personal and occupational schemes to contract out.

As the Government's Green Paper suggested, very few people in Britain were happy with the system as it was. According to the Government's White Paper the fundamental defects were as follows: The social security was too complex and was failing to give effective support to families with children whose parents were either on low incomes or were unemployed. Many people could find themselves worse off in work than if they were unemployed and others could find that a pay rise in work had at best a marginal effect, so many people were trapped in poverty or unemployment. The existing structure of social security pension system failed to take account of the very substantial financial debt too.

Faced with this position, the Government decided to reform the social security system and as the Secretary of State for Social Services said, it's aims were : a simpler system of social security, which is financially secure; also, more effective help going to those who most need it and more people looking forward to greater independence in retirement[33]. In the section 3.3.4, the major modifications of the 1986 Act to the pension scheme are summarized.

3.3 The Structure of the British Security System

At the turn of the century in the United Kingdom there was no state pension scheme and private employers offering formal pension arrangements were a rarity. This century, the social progress of British society has been such that most individuals expect to receive a pension in their old age from the State.

The British social security system broadly comprises two parts: the contributory scheme and the non-contributory scheme.

The coverage of the non-contributory scheme is extensive, its perimeters are not clearly defined and entitlement to benefits depends on conditions other than the payment of national insurance contributions. The scope of the contributory scheme is relatively smaller and better defined.

The national insurance scheme provides cash benefits for periods of interruption of employment through sickness or unemployment or when earnings cease on the retirement or death of a wage-earner. These benefits are provided in return for contributions paid by insured persons and their employers.

The non-contributory scheme includes: a) benefits for certain groups of people and b) supplementary benefits for those with incomes below a specified level.

There are some other benefits which, strictly speaking, are outside the social security system; they are designed to help people on low incomes and include rent and rate rebates, exemption from health service charges, free meals for school-children and legal aid, advice and assistance.

Moreover, alongside the social security system, there is a high level of private provision through various forms of insurance including occupational pension schemes covering about half of the working population.

3.3.1 Contributory Scheme - Contributory Benefits

The main form of State provision for those whose earnings are interrupted or terminated, and for their families, is the National Insurance Scheme.

Benefits payable to employees are: sickness and invalidity benefits, unemployment benefit, maternity benefits, death grant, widow's benefit, child's special allowance and industrial injury and disablement benefits.

These benefits are also payable to self-employed with the exception of unemployment and industrial injuries benefits.
Benefits payable to non-employed (voluntary contributors) are:
retirement pension, widow's benefits and child's special allowance.
Additional payments are made for dependent children.

As the State pensions are described in the section 3.3.1, it may be useful to give a brief summary of the remaining contributory benefits.

Unemployment Benefit is payable for up to a year; this is a flat rate benefit and is not paid for the first three days or for single isolated days of unemployment. People who have been unemployed for over a year or have not worked long enough to build up a sufficient contribution record may be entitled to supplementary benefit. Also, unemployed people may be entitled to supplementary benefit to top up their income from unemployment benefit.

Sickness Benefit is flat rate and is paid after three days for as long as incapacity for work continues or until replaced by invalidity pension; this is not paid for any period covered by statutory sick pay.

Invalidity Benefits include, apart from invalidity pension and additional earning-related pension, invalidity allowance depending upon the age at which incapacity begins and is paid in addition to the pension to people who become chronically sick.

Maternity Allowance: The responsibility for paying maternity allowance to women who are in the work force, when they qualify, is taken over by employers. This is an extension of the statutory sick pay (28 weeks) arrangements and this change operates from April 1987. The State maternity allowance is payable only to employed and self-employed women not covered by these arrangements. The level of the allowance paid by the State is in line with the rate for sickness benefit.
The State maternity allowance goes only to women who can demonstrate a recent attachment to the labour market. Women who do not qualify for maternity allowance are able to claim sickness benefit and many of them satisfy the contribution conditions for this benefit. In these circumstances sickness benefit can be paid from 6 weeks before the expected week of confinement until 2 weeks after the date of birth.

Widow's Benefits take account of age and family responsibilities and do not make widowhood the sole criterion. Apart from widow's pension and earnings-related

addition to the widowed mother's allowance or widow's pension based on husband's earnings, widow's benefits include flat rate **Widow's Allowance** payable for first twenty six weeks of widowhood and **Widowed Mothers Allowance** payable when widow's allowance ceases for as long as the widow has a child under 19 living with her.

Child's Special Allowance is paid to a divorced woman, on her former husband's death, for a child towards whose maintenance he was liable to contribute.

Industrial Injuries Benefit

The Industrial Injuries Scheme provides benefits to employed earners who are incapacitated for work or disabled as the result of an accident at work or a prescribed industrial disease contracted there. Payments are made from the National Insurance Fund. Benefits include **Injury Benefit** for a maximum period of 26 weeks and **Disablement Benefit** based on the degree of disablement.
Additions to disablement benefit are payable, in certain circumstances, to those with severe disablement or particular difficulties. In cases of relatively slight disability, disablement benefit may be paid in a lump sum rather than as a weekly pension. There are also **Death benefits for Widows and other Dependants.**

3.3.2 Non-Contributory Scheme - Non-Contributory Benefits

A number of benefits do not depend on contribution. These non-contributory benefits, apart from retirement pension for those over 80, are:

- **Child benefit** for each child under 16 or under 19 in full-time education, whether the parents are in work or not, and an extra **One Parent benefit** for the first child of one-parent families,
- flat rate **Severe Disablement Allowance** for the severely disabled of working age, who have been incapable of work for at least 28 weeks,
- flat rate **Attendance Allowance** for severely disabled (physical or mental) people needing attention or supervision,
- **Guardian's Allowance** to a person providing a home for a child whose parents are both dead or, in exceptional circumstances, when one parent is dead, and
- **Mobility Allowance** for physically disabled persons unable to walk.

3.3.3 Supplementary Scheme - Supplementary benefit

Supplementary benefit, formerly called National Assistance, has frequently been termed a "safety net" benefit, because it provides a minimum standard of living to those who have either no, or very low, incomes from other sources.
Supplementary benefit was a major benefit in the United Kingdom (representing an expenditure in 1987-8 around £ 8.5 billions) and approximately, one in every five families depends at least in part on supplementary benefit.

The main functions of supplementary benefit were to top up the benefits payable under the national insurance scheme and to provide an income for the very large number of people who are not entitled to national insurance benefits.

Supplementary benefit is intended to provide an income that people can live on - not just enough to keep them alive but an income related to the normal standards of the community as a whole[1].

In the normal case, the benefit payable is the amount by which the claimant's resources fall short of his/her requirements.

According to the supplementary Benefits Act 1976, "every person in Great Britain of or over the age of 16 whose resources are insufficient to meet his requirements shall be entitled to benefit" in the form of a supplementary pension or a supplementary allowance.

Benefit is not normally awarded to full-time workers, to strikers and to people laid off because of a strike or lock-out, and to people undergoing full-time education below University level.
People receiving supplementary benefit have automatic entitlement to certain other benefits and exemptions.

Income Support

Supplementary benefit was replaced in 1988 by income support as part of the "Fowler reforms" of the benefit system.

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1 Lynes, Tony "The penguin guide to Supplementary Benefits" 5th ed. Harmondsworth: Penguin, England, 1985.

Broadly the same people are eligible for income support as were eligible for supplementary benefit. The main groups likely to be entitled to income support are pensioners, the unemployed, single parents and sick people and those caring for them.

The basic benefit is comprised of a personal allowance with increases for dependants and this may be supplemented by one or more "premiums" available for particular groups of claimants (families with children, single parents, the elderly, and the sick and disabled). Income support has many fewer special additions than supplementary benefit. Those with savings in excess of a given ceiling are not eligible for the benefit.

The system of **single payments** for one-off needs which was operated under the old supplementary benefit was abolished and replaced by a scheme of grants and loans from a **Social Fund.** Many of those who qualify or just fail to qualify for supplementary benefit (now income support) could qualify for standard housing benefit -formerly rent and rate rebates and allowances- but they would be unambiguously better off on supplementary benefit because under supplementary benefit they would get all their housing costs paid under certificated housing benefit plus some actual supplementary benefit.

Family Credit: People in full time paid work can not receive supplementary benefits, so Family Credit is designed to help families with small incomes where the head of the family is in full-time work and there are dependent children.

Family credit is a more extensive benefit than the family income supplement which it replaced. Claimants with capital in excess of a given limit are not entitled to family credit.

3.4 Pension Schemes

a) State Pension Scheme and b) Occupational Pension Schemes.

3.4.1 State Pension Scheme

Employees, employers and the self-employed make compulsory contributions to the State scheme.

Under the Social Security Pensions Act 1975, a new State scheme of earnings-related pensions (designed to replace the past flat-rate pensions for retirement, widowhood and invalidity) started in 1978. Ten years later, the changes to SERPS came into effect in April 1988, and they apply to employment after this date for those retiring in the next century.

The important feature of SERPS is that, actual earnings are revalued in terms of the earnings levels current in the last complete tax year before pensionable age (or death or incapacity in the case of widow's pension and invalidity pension).

3.4.1.1 State Pension

Pension is payable to people who retire from work at the age of 65 for a man and 60 for a woman; no retirement is necessary until age 70 (men) or 65 (women). A non-contributory pension is paid to people aged 80 and over who have not qualified for a contributory pension.

a) The Basic State Pension

To qualify for the basic pension a person must have : reached state pensionable age, retired from regular employment and have a satisfactory contribution record.

The basic state pension depends on contributions history and is a flat amount approximately equal to what is known as the lower earnings limit (LEL = £ 72 per week at 6.4.95). Basic pension is increased annually in line with the movements of earnings or prices. Since 1979 the Government of the day has set the annual rate of increase in line with prices.

If a person wishes to continue to work after reaching state retirement age and his/her earnings exceed the "earning rule" limit, the basic state pension is reduced. The earnings rule applies only to the first five years after state retirement age.

b) The State Earning-Related Pension (SERPS)

A person can qualify for SERPS without having met the qualifying conditions for the basic pension. This is because entitlement to SERPS is determined on a year

by year basis - if contributions have been paid on earnings in excess the annual LEL, the excess gives rise to entitlement to SERPS whereas the basic pension requires the requisite minimum number of relevant years in which contribution have been paid or credited.

The self-employed cannot qualify for SERPS.

The full SERPS entitlement amounts to 25 per cent (to be reduced to 20 per cent between 2000 and 2010) of earnings between the lower earnings limit and an upper earnings limit of approximately seven times the lower limit. As maximum entitlement is achieved after 20 years full pension entitlement to SERPS cannot be reached until April 1998, so that people retiring before the full 20 years receives a proportionately reduced percentage of earnings. The pension is increased in line with any increase in the Retail Price Index.

Note that :

- In addition to the flat-rate pension there is a graduated pension based on earnings-related contributions paid between April 1961 and April 1975, when the scheme was superseded and the graduated contribution ceased.
- All pensioners aged 80 and over are entitled to an age addition to their weekly pension.

3.4.1.2 Widow's and Widower's Pension

Widows over the age of 50 inherit 100 per cent (now only 50%) of their husband's total pension entitlement (to be reduced to 50 per cent from 2000 onward). A

widow who is between 40 and 50 years of age (when she is widowed or when her children grow up and either when widow's allowance or when widowed mother's allowance ceases) gets a proportion of the pension. On retirement a widow is able to add to her widow's benefit any additional pension she has earned though her own contributions up to the maximum payable on one record of contributions. When one of a couple over pensionable age dies, the survivor inherits the additional pension of the partner who has died subject to the same maximum.

3.4.1.3 Invalidity pension

The invalidity pension is paid to a person who has received sickness benefit for 28 weeks and is still unable to go to work as a result of the sickness or injury. This is an earnings-related pension based on the contributor's earnings and calculated on the same basis as the retirement pension.

A widow who is incapable of work when her widow's allowance or widowed mother's allowance comes to an end, in certain circumstances, has a right to an invalidity pension based on her husband's earnings record if it is better than her own.

Similarly a widower, who is under retirement age and incapable of work when his wife dies, has a right to an invalidity pension calculated on her earnings record if it is better than his own.

3.4.1.4 Modification to SERPS

According to the Government Actuary's estimate the number of pensioners will grow from 9.3 million in 1985 to 12.3 million in 2025 and 13.2 million in 2035. The same estimate showed that the ratio of contributors to every pensioner is expected to fall from 2.3 in 1985 to 1.8 in 2025 and 1.6 in 2035 [50]. Also, by 2033, the state earnings-related pension scheme is expected to add an eventual £25 billion (at November 1985 prices) to the cost of providing pensions - in 1985, SERPS costed less than £200 million a year (although it should be remembered that the scheme was not mature at that date). For all these reasons, the Government decided to modify SERPS. The 1986 Social Security Act made modifications to the scheme.

The modifications will not affect individuals who reach pensionable age before 6 April 1999. For individuals retiring thereafter, benefits are to be reduced over a ten-year period. Accordingly, the modified scheme will apply to individuals retiring in the year 2010 and thereafter.

The modifications have reduced the benefits of SERPS in the following manner:

- The maximum pension will be 20 per cent rather than 25 per cent of relevant earnings.
- The pension will be based on a person's average revalued earnings throughout his working life rather than on the average of 20 best years, where the working lifetime is the forty-nine years from age 16 to 65. A side effect of this change is that years in which earnings are low or non-existent will be taken into account whereas previously they were ignored.

- The surviving spouse can only inherit 50 per cent of the deceased spouse's pension rather than 100 per cent, for deaths occurring after April 2000, no matter if this benefit accrued during the old or the new regime.

3.4.1.5 Contributions

Contributions for the flat-rate pension were originally on a flat-rate basis, with both employer and employee contributing; since 1961 the contributions have been earnings-related. Since the introduction of SERPS in 1978, contributions have been a percentage of earnings below the upper earnings limit. In 1985 a sliding scale basis was introduced and employers since then have paid contributions on the total earnings of the employee.

There are four classes of contributions liability :

- Class 1 contributions are collected from employees (primary) and employers (secondary):

  primary -Earning related (ceiling)- 1989/90 : 5%-9%

  Secondary -Earning related (no ceiling)- 1989/90 : 5%-10.45%

- Class 2 and 4 are collected from the self-employed,

  class 2 - flat rate - weekly £ 4.25, 1989/90

  class 4 - earnings related (ceiling)- 1989/90 : 6.3%

- Class 3 contribution are voluntary and they are paid only if liability does not arise to the other classes,

  flat rate - weekly was £ 4.15 1989/90.

Members of "contracted out" schemes and their employers pay lower contributions in respect of earnings between the lower and the upper earning limits.

Contracted out contributions, 1989/90 were:

Primary (employees) 3%-7%, Secondary (employers) 5%-6.65%

Great Britain has lower levels of contributions compared with most of the EU countries (Table 4).

Table 4

Social security contributions (employee and employer) as a percentage of pay at national average earnings levels of salaried employees (1990)

Country	Employee	Employer	Total
Belgium	12	32	44
Denmark (ATP)*	0.25	0.50	0.75
France (including AGIRC)	20	42	62
Germany	20	18	38
Greece (including TEAM)	13	22	35
Ireland	7.75	12.20	19.95
Italy	8.50	45	53.50
Luxembourg	10.50	15	25.50
Netherlands	27.10	20.60	48.70
Portugal	11	24.50	35.50
Spain	6.30	31.70	38
United kingdom (incl.SERPS)	9	10.45	19.45

* Danish social security is financed through general taxation - VAT related or payroll related : 2.5 %

Source: Pensions World, January 1991

The contributions are paid into the National Insurance Fund out of which benefits are paid. Throughout most of its existence the fund has been inadequate and unable to meet the payment of contributory benefits. The fund has been

supplemented out of general taxation by means of the Treasury supplement. The supplement was reduced over the years and eventually abolished in April 1989.

3.4.2 Occupational Pension Schemes

In addition to the state (basic and contributory) pension scheme, there are also occupational pension schemes. These schemes were set up by employers and are an integral part of the pensions framework in the United Kingdom.

The growth of occupational pension schemes during the twentieth century has occurred in an environment affected substantially by legislation. The growth in the number of employees, too, covered by occupational pension schemes has been influenced by the government's policy on pension, including tax reliefs and the ability to "contract out" of any state pensions arrangements.

In 1987, the survey of occupational pension schemes for employees in the public and private sectors, by the Government Actuary, showed that the number of employees in occupational pension schemes was 10.6 million or 49 per cent of all employees (just under 40 per cent of employees employed in the private sector and about 75 per cent in the public sector) in employment, including those only working part time, and the Armed Forces. This proportion has remained close to 50 per cent since about 1965. The survey showed as well that two-thirds of the members in the private sector were in some 800 large schemes with over a

thousand members, but about one million employees were in small schemes with fewer than a hundred members.

The total number of schemes in existence is difficult to be determined with any precision. In 1987, the Government Actuary's survey showed that : a) the number of schemes was more than, and possibly considerably more than, 80,000 and b) nearly 90 per cent of the scheme members (80 per cent for the private sector and 100 per cent for the public sector) were in schemes which contracted out of the earnings-related part of the state scheme.

Those schemes which are contracted out take over responsibility for additional retirement pension and half of the additional pension payable to a widow. Employees and employers in contracted out schemes pay lower class 1 national insurance contribution. Their lower national insurance contribution covers them for basic pension and half the additional widow's pension plus the rest of the national insurance benefits available for class 1 contributors.

An employer with a suitable pension scheme can, with the approval of the Inland Revenue, "contract out" of SERPS but not out of the basic pension scheme. "Contracted out" schemes have to satisfy certain minimum requirements. These include the provision of a pension at least as good as that given up, the so-called "guaranteed minimum pension (GMP)" and the payments of a pension based on at least 1/80 of final salary for each year of "contracted out" service. The SERPS is not payable in any year in which a person was in a contracted-out employment.

The changes to non-state pensions

In 1985, the evidence was that about two thirds of the people without an occupational pension would like a pension of their own (including the opportunity of a personal pension). An expansion of pension coverage among the self-employed was desired too. As a result, the Social Security Act 1985 introduced a significant number of new controls on pension schemes.

The Social Security Act 1986 also changed the way in which contracting out can be done.

From 1988, individuals who purchased an "appropriate personal pension plan" could contract out of SERPS and have their rebate paid, via the DHSS, into the personal pension plan. From 1987, individuals who choose to join an occupational scheme can supplement these contributions with a free-standing additional voluntary contribution (AVC). Occupational pension scheme must also provide facilities for AVC.

The Government's intention was to encourage those who participated in SERPS to establish a new personal pension scheme and use it to contract out of SERPS.

3.5 A comparison of the Greek and the British Social Insurance Systems

The levels of the social security protection of Greece and that of the United Kingdom are not compatible as there are several differences between them. These differences concern the structure of the systems, the kind of benefits and their requirements.

Both systems are "pay as you go" social insurance systems, so the common and very important problem is the funding, namely the enormous and escalating costs of funding the systems. This is due to external factors, i.e the economic crisis, recession and demographic factors, and the qualitative and quantitative extension of social insurance protection.

Apart from these factors, there are also reasons peculiar to the Greek insurance system which have brought the system to an economic crisis.

The growth of the British social security system has been carried out in a systematic form. Even the piecemeal changes made to the system have been intended to apply to the majority, rather than to a very small group of individuals according to their power, as it happened with the Greek social insurance system. The Greek social insurance system was developed in a discontinuous manner under the pressure of various social groups.

The landmarks of the British social security system were the Beveridge committee (which produced the Beveridge Report) by the wartime coalition Government, and

the 1975 Social Security Pensions Act which found support within both major political parties. These very important pieces of legislation were not decided by only one political party. However, all the important changes in the Greek social insurance system were decided only by whichever political party happened to be in the government at the time of legislation.

The Greek social insurance system is a contributory one. There are contributions not only for main and complementary insurance but also for health insurance and unemployment benefits. Only, some family benefits are not dependent upon contributions and farmers and public servants do not pay contributions for main insurance. The British social security system includes social insurance and social assistance and provides contributory and non-contributory benefits. In general, contributions are not specifically allocated for health insurance or for unemployment benefits.

The Greek supplementary or complementary insurance covers employed workers and certain categories of the self-employed and provides a complementary pension. Whereas British supplementary benefits are given to every person (not only to full-time workers) of or over the age of 21 whose resources are insufficient to meet his/her requirements. As the social protection in Greece includes social insurance, Health and Welfare, such supplementary benefits do not belong to social insurance system but belong and are provided by the welfare system; this does not mean that the Greek welfare system provides an income related to the normal standards of the community as a whole.

In the British social security system the responsibility for making decisions on individual claims lies with "adjudication officers" whose Chief Adjudication officer is appointed by the Secretary of State for Social Services. However, more responsibilities than those above (for main and complementary pension, and lump sum payments) lay with the 238 Greek social insurance funds, whose Board of Directors is appointed by the Minister of each one of the Ministries within which lies the jurisdiction of the fund; this is the result of the fragmentation of the Greek social insurance system.

Both systems cover the risk of old age, death, disability, illness and unemployment and provide the basic benefits; however some benefits are different in each system -for example there is not "Guardian's Allowance" in the Greek system but a child, whose parents are dead, inherits his parents pension; also a few benefits that exist in Britain do not exist in Greece -for example the "one parent allowance", as there are few "single parents" in Greece.

One of the most important differences between the two systems is the eligibility for benefits; of course there should be differences, as the requirements are different for the same benefits among the Greek Funds. In general the Greek system, from this point of view, cannot be compared with the British system, which has unique requirements for each benefit. For example the state retirement age (60 for women and 65 for men) is the same for all members of the British scheme. Greek civil servants, however have no retirement age as such: employees

can retire at any time provided that they have satisfied certain requirements (insured years).

The British pension system includes the state pension scheme, which provides basic pension and SERPS, and the occupational pension scheme, which provides additional pension.

The occupational pension scheme is unknown to Greek workers. In the Greek system there is no basic pension but there is a minimum pension (25 day's money earned by an unskilled worker); the minimum pension is not the same for all funds.

In general, retirement requirements in the Greek pension scheme are more favourable than those of the British state pension scheme. For example:

- In the Greek pension scheme, the last monthly salary before someone's retirement (in many cases) is taken as a basis for calculating the retirement payments; in order to calculate the SERPS the earnings of the best 20 years is taken into account, however in the future the SERPS will be based on the average earnings of a person's working life.
- A British widow over the age of 50 or (in some cases) when she is between 40 and 50 years of age inherits her husband's pension, but a Greek widow gets her pension at any age.

We may conclude that the Greek social protection system is more favourable to the pensioners who were formerly insured, and the British social security system, with the "safety net" of supplementary benefit, provides an income (related to the

normal standards of the community as a whole) to those whose income is below a specified level. Probably the fragmentation of the Greek social insurance system and the ability to "contract out" of the British social security system are not to be found in any other social insurance system.

CHAPTER 4

THE SOCIAL SECURITY SYSTEM IN THE UNITED STATES

THE SOCIAL SECURITY SYSTEM IN THE UNITED STATES

4.1 Introduction

The United States established its social security program in 1935, although the modern type of social insurance system began some 45 years before. This program was established during the Great Depression as a mandatory retirement program for the elderly, supplementing private insurance and savings. The program emphasized reward for work, earnings and productivity and provided earnings related benefits. It expresses a program, an aspiration and an evolving complex of social institutions and attitudes[5].

Social security provision - social insurance and social assistance schemes - in the United States provides a floor of protection rather than a minimum subsistence level.

The social insurance pension system (Old-Age, Survivors' and Disability Insurance - OASDI) touches the life of every US citizen. Approximately 95 per cent of the total US work force are paying a significant portion of their earnings into the social insurance program. It is the largest and most successful social economic institution created in the United States, but the social insurance benefits are not themselves enough to ensure a reasonable standard of living during retirement.

According to OECD publications, the expenditure on social security (excluding expenditures on health care) as a percentage of gross domestic product was 10.1 in 1985; the percentage had been the same five years before. When the system

began, few Americans were entitled to benefits; four decades later, nearly every senior citizen received some support. Over that time, the ratio of beneficiaries to workers has fallen from 1:40 in 1940 to 1:16.5 in 1950 and to 1:3.3 in 1980; forty years from 1980, it may be only 2.0 workers for each beneficiary.

Between 1950 and 1980 the proportion of elderly households receiving social security benefits rose from 20% to 90% and the average level of real benefits tripled - those benefits represented the major source of income (about 55%) of the aged (National Bureau of Economic Research).

4.2 The Development of Social Security Provision

Social security provision came later to the United States than to almost all other industrial nations. Why did this happen is not easy to explain. However, the reason for the absence of social security provision may be sought in people's attitudes and beliefs, the power of economic interests and the economic conditions prevailing in the first decades of this century.

One of these attitudes was unbounded confidence in the efficacy of individual effort in all spheres of activity, and another deep rooted attitude was the fear among the well-off sections of society that "welfare ethics" would ruin the sturdy independence of the American character, to which the nation owed its greatness. Also, the organised labour movement was, for a variety of reasons, even less in favour of social insurance in the United States[5].

The relief of unemployment as well as the relief of other poverty, was believed to be the responsibility of states and localities and of private charity. During the 1920s attempts to arouse political support for unemployment and old age insurance were unsuccessful: although the population of elderly was growing, it was not yet a political force . The political atmosphere changed with the onset of the Great Depression.

The very economic forces that generated the need for relief reduced the ability of the states and localities to finance such reliefs. However, the federal Government soon found itself under political pressure to enact social insurance measures especially old age pensions and to make some provision for the reliefs of other poverty. Also, Franklin D. Roosevelt brought his state's experience to Washington, when he became President, and contributed to the creation of the Social Security.

The earliest social insurance provisions were Workmen's Compensation programs for industrial injuries in the first decade of the twentieth century and in 1932, Wisconsin was the first state to pass an unemployment insurance law. All other forms of social insurance, with the minor exception of state experimentation, awaited the passage of the Social Security Act of 1935.

The economic catastrophe of the 1930s resulted in a basic shift in preference from individual savings to organized saving for retirement. Also, the great depression, with 13 million people unemployed, created a sympathetic environment for the

passage of the Social Security Act, that was signed by President Roosevelt on August 14, 1935.

The Social Security Act 1935 created a social insurance system and kept it separate from previous notions of public assistance. Also, the Act created federally subsidized public assistance programs and required each state to establish a standard of need, although it did, not require any state to pay 100 per cent of this standards. Public assistance was aimed at people who were not able to participate in the labour market, either temporarily or permanently.

The federally administered scheme of old-age pensions for employees in industry and commerce, formally known as Old Age Insurance and popularly called Social Security, had several features characteristic of private insurance plans. It was amended in 1939 and became less like a private pension scheme. The 1939 social security amendments represented a major turning point in the evolution of social security. They weakened the link between tax payments and future benefits, abandoned the principle of full reserve funding and moved the program toward a pay-as-you-go system. The policy change in financing occurred because of great opposition to the concept of a large reserve, an opposition that came from a wide spectrum of political opinion.

After the major amendments of 1939, the scope of the Social Security Act broadened and virtually all employees and all self-employed persons were covered. Congress has amended the Act more than a dozen times since 1937.

In 1940, Survivors' benefits were added for dependent children and wives of deceased workers along with benefits for dependent spouses of retired workers. In 1956, the social security system was further extended by the addition of Disability Insurance for permanently disabled workers and their dependants. In 1965, a program of hospital insurance and supplementary medical insurance was added and payments to eligible persons aged 65 and over began in July 1966. In the 1970s, social security benefits grew rapidly as a result of ad hoc increases and automatic cost of living adjustments - for the average worker, the percentage of pre-retirement earnings replaced by social security benefits has increased from 31 percent in 1970 to 45 percent in 1978 [101].
In October 1972, Congress passed the social security amendments of 1972.

In 1974, two public assistance programs were added: a) the adult categories were federalized into one means tested pension system entitled supplemental security income - SSI levels were set well below official poverty criteria - and b) the food stamp program was developed into a minimum income guarantee.

At the end of 1977, Congress amended the Social Security Law to correct a technical error in the social security benefit formula legislated in 1972. In that earlier legislation, the Congress had inadvertently double indexed the benefits[1].

[1] William C. Hsiao, "An optimal indexing method for social security"in Financing social security", American Enterprise Institute for Public Social Security, Washington 1977.

The new 1977 benefit formula has two forms of indexing. One form, called wage-indexing, is used to calculate the initial monthly benefit awarded to a worker at retirement. The other form, called price indexing, is used to make annual cost-of-living adjustments for persons already receiving benefits. As a result of the 1977 amendments to the Social Security Act the benefit base doubled again in a few years, so that the 1977 amendments were inadequate to solve the future financing problems of the system.

In 1981, additional amendments to the Social Security Act were approved. These changes secured the economic equilibrium of the system until after the 1982 election. By early 1983, the OASDI- trust funds had only eight weeks' worth of reserves. Over the next seventy-five years, according to the projections, the system annually would need about $25 billion (in 1983 dollars) over and above anticipated revenues; this meant that the discounted present value of the deficit would be at least $1.6 trillion by 2058[1]. Such figures frightened thoughtful citizens because they seemed to provide "hard evidence" that something needed to be done.

On April 20, 1983 President Reagan signed the social security amendments of 1983. Their major features may be summarized briefly: taxes would have to be raised and future benefits would have to be cut in order to restore the financial soundness of the system. Also, a major feature designed to deal with the projected long-term trust fund deficit is the provision delaying the normal retirement age. In

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[1] W ANDREW ACHENBAUM, "Social Security : Visions and Revisions" Cambridge University Press, 1986.

addition, the 1983 Act has an automatic mechanism for reducing the cost of living adjustments whenever the Trust Funds fall to dangerously low levels.

Apart from the fundamental principles: individual equity balanced with social adequacy and a floor of protection, Congress has adhered to two important principles: controllability and long run stability and economic efficiency, to guide its decisions about social security for American workers and their families in the event of lost income because of retirement, disability or death.

In recent years, in the United States the increased cost of social services has led to the growth of political forces pressing for limitations rather than expansions and the provision of services to be made by the private sector rather than by the State[65].

4.3 The Structure of the American Social Security System

The Social Security System includes social insurance and public assistance schemes. The government expenditures for social security consist of 1/4 public assistance and 3/4 social insurance expenditures. Social security spending (social insurance, public aid, health and medical care, veterans' programs and other social welfare programs) accounted for 13.6 per cent of the gross national product (GNP) in 1989, (source: U.S, Social Security bulletin, November 1991). This percentage (13-14 per cent) has been typical of the 1980's with the exception of 1983, when the larger percentage of social security outlays represented a reaction to the

recession of 1981-82. The percent of all government spending devoted to social security is about 39%.

Also, in the United States reliance is placed on private income maintenance schemes such as collectively bargained pension and health plans. In 1984, the expenditure on public and private insurance was 23.3%, private 10.3% and public expenditure 13% (source: Social Security Bulletin, May 1987).

The Social Insurance Scheme consists of two parts:

- first, Social Security Administration Programs, i.e. old age, survivors and disability insurance, and medicare;
- second, States Programs, i.e. unemployment insurance and workmen's compensation.

The Public Assistance Schemes, which are characterized by a means test and with benefit levels determined by family size and composition, constitutes:

the **Federal Programs**, with uniform minimum benefits and eligibility requirements, such as

- **supplemental security income** (SSI) for the indigent aged and disabled. The minimum benefit level, by family size, is established by federal legislation and is federally financed. States may administer the program or contract out administration to the Social Security Administration. In July 1991, the number of persons receiving federally administered payments was 4.97

million and the amount of payments $1.52 billion (federal SSI payments : 82% and state supplementation payments : 18%); the average federally administered payment was $306 in July 1991 [116].

- **food stamps**. Persons with low assets and with incomes below the prescribed maximum net incomes may purchase food stamps below their face value.

- **school lunches** (free or reduced price) for needy children.

the **Federal - State Programs**, such as

- **aid to families with dependent children (AFDC)**, where the father is absent, incapacitated or unemployed. Benefits are based on the standard of need by family size estimated by each state.

- **medical assistance (Medicaid)** - as long term care in nursing homes, etc. - for indigent, aged and disabled.

Also, Public Housing Units are available to certain needy families and individuals, and Legal Services in civil cases for indigent clients. Virtually all states and localities have provisions for temporary or emergency aid, called General Assistance.

Social Insurance Schemes

Below are summarized the major American social insurance programs: Health Insurance - Hospital and supplementary medical -and Unemployment Insurance. The Social Insurance Pension Programs are described in the section 4.3.1.

4.3.1 Health Insurance Programs

In the United States, there is no national health service and for persons under 65 there is no national health insurance system. There is only a health insurance scheme for elderly and totally disabled persons (Medicare) and a parallel provision for the poor (old and young) in the public assistance system (Medicaid). Medicare consists of two programs: Hospital Insurance and Supplementary Medical Insurance.

Total health care spending (combines health and medical programs with medical services provided in connection with social insurance, public aid, veterans' programs, and other social welfare programs) as a per cent of the gross national product was about 4.7, in 1989 [116].

4.3.1.1 Hospital Insurance - "Medicare"

The Hospital Insurance (HI) applies only to persons aged 65 or over and to disabled persons who have been entitled to disability insurance for 2 years or more.

Virtually all aged are covered. The program provides for up to 90 days of in-patient hospital treatment for any spell of sickness. A further 60 days of hospitalisation, to be used at any time during the life of the beneficiary, is available. HI pays a portion of the cost of inpatient hospital care. Also it provides additional related benefits as post-hospital "extended care facility" and "home health services" benefits.

The Hospital Insurance is a contributory social insurance system covering the same workers as the OASDI system and it is financed by a pay roll tax on the earnings of employees - shared equally between employers and employees - and a similar tax on the self-employed, except that the benefits provided for the transitional non-insured group are financed from general revenues of the Government. HI accounts for about 11 per cent of Old-Age, Survivors, Disability and Hospital Insurance - OASDHI- outlays.

4.3.1.2 Supplementary Medical Insurance - "Medicare"

The Supplementary Medical Insurance (SMI) is not a compulsory social insurance as is Hospital Insurance, but rather an individual voluntary insurance with government subsidy.

The Supplementary Medical Insurance is available to retired and disabled persons covered by Social Security . Virtually all persons aged 65 or over may participate in it - about 95 per cent of people aged 65 and over have enroled.

This program covers other medical expenses which relate primarily to physician services (in home, surgery, or hospital). The benefits are financed by premiums paid by insured persons, plus a contribution from the general revenues of the federal government. Premiums to SMI cover less than 25 per cent of costs. The share financed by premiums has declined continuously since payments began, so it is not surprising that nearly all eligible persons participate in SMI.

Among major items not covered by Medicare are dental expenses, drugs and medicines not administered in hospitals.
The population under 65 (about 85%) have private insurance for hospital care or other care. Most private insurances cover only a proportion of the expenditure incurred.

In general, the expenditure on individual health care is financed by direct payments from consumers, by social and private insurance benefits, by federal government and by the state and local authorities subsidies.

4.3.1.3 Medicaid

Medicaid is available either to persons who receive public assistance cash benefits or those who are medically indigent. This programme covers all medical and hospital fees, including pharmaceutical. Regarding the aged and disabled, medicaid can be used to supplement medicare in payment of insurance premiums and also in providing services not covered by medicare.

4.3.2 Unemployment insurance

The Social Security Act of 1935 created a system of Unemployment Insurance, and provided an inducement, in the form of a tax-offset, for states to introduce unemployment insurance schemes. As a result of this provision all states had enacted unemployment insurance by 1937 and benefits are payable to persons who have lost jobs, generally only for economic reasons.

This system is not uniform across the United States. The conditions for eligibility and benefit levels vary considerable from state to state. There are only some minimum standards for the system in all the states. Benefits are earnings related subject to a maximum. As a general principle benefits are supposed to be about 50 per cent of wages. The usual maximum duration of unemployment benefits is twenty-six weeks, with a thirteen week extension in states with high rates of unemployment. A number of states provide additional allowances for dependants and have entered into a federal program for extended benefits. Also, a number of states afford aid to families with an unemployed male head of household who is not eligible for unemployment insurance; this program is offered under very restricted circumstances.

In the United States, financing and administration of the unemployment insurance system is not a central government responsibility. The states administer and finance it. Benefits are financed by payroll taxes levied on employers. State payroll taxes levied to support the unemployment insurance system are deposited in a

federally administered trust fund in which each state has an account. The temporary extension is financed out of general federal revenues, so the federal government agreed to take on all costs of the Emergency Unemployment Compensation Act of 1971. Central government, through fiscal and monetary policy, can influence the level of economic activity and thereby the level of employment but it is not within the power of the states to do this.

4.4 Pension Systems : Public and Private Pension Systems

The development of the social security program and private pension systems reflect the nation's preference toward organized retirement saving.

4.4.1 Public pension system

The national pension system of the United States is of extremely broad application and, in practice, might be said to have almost universal coverage of all employees (including the self-employed) - about 90 per cent of the gainfully employed are covered by this system, another 5 per cent by other government retirement programs; the remaining 5 per cent consists primarily of persons with a minimal or temporary attachment to the labour force[70].

This federal government social insurance system includes : Old-Age, Survivors' and Disability Insurance (OASDI). The Old-Age and Survivors' Insurance (OASI) program is by far the largest component of the social security system, accounting

for 80 per cent of Old-Age, Survivors, Disability and Hospital Insurance (OASDHI) disbursements[70].

The Social Security Trust Fund, which deals with Old-Age and Survivors Insurance, is credited with the payroll taxes collected from workers and employers.

In the case of Old-Age Insurance the transfer of income is inter-generational. Taxes are paid by currently employed workers and the benefit from these taxes accrue to the older generation of pensioners.

The social pension system provides monthly benefits to insured persons and their eligible dependants in the event of retirement or invalidity and to certain surviving dependants of deceased insured persons and pensioners. To be eligible, the workers must be insured for a required number of years, i.e they must have been employed in jobs covered by the system.

At the end of July 1991, 40.205 million beneficiaries (62% retired workers, 8% disabled workers and 30% survivors and dependents) under the OASDI program were receiving $22.0 billion in monthly cash benefits[116].

Old- Age Pensions

Full retirement pension is payable at age 65. Since 1956 women have had the option of retiring on a reduced pension at any age above 62 and this option was extended to men in 1961. The age at which full retirement benefits are available will be advanced from the current 65 by two months a year to age 66 during the year 2000-2005. The normal retirement age remains at 66 until 2017, when it is

again increased by 2 months per year until 2022, at which point it will be fixed at age 67. The pensions of contributors who retired before 65 are actuarial reduced. The reduction for retirement at age 62, now 20 per cent, will be increased and will reach 30 per cent when the retirement age is set at age 67. The number of contributors retiring on a reduced pension are remarkably high[70].
To qualify for benefits a worker must have worked a minimum number of quarters (40 quarters or 10 years) in covered occupations.

Supplementary pensions for dependants of retirement pensioners are payable to a wife, who either cares for a dependant or disabled child or is above the age of 65 (this pension could be awarded at an actuarial reduced rate for a wife aged 62) and to children under age 18, or at ages 18-21 if in school or if they are in a severely disabled state that began before age 22. Divorced spouses are generally eligible for dependant's benefits if they were married to an eligible worker for 10 years or more.

Old age pensions are earnings-related subject to a minimum and a maximum so that low earners receive proportionately higher benefit. Pensions are calculated on the worker's average indexed monthly earnings. These earnings are based on a worker's covered earnings for all years of employment from 1951 or the year the worker reaches age 21, whichever is later, through to the year in which he or she attains age sixty-two. Earnings for each year prior to the two years before retirement are adjusted upward by a wage index. This procedure converts past earnings to close to their real value at time of retirement. The five years in which

earnings were lowest are excluded from the computation. If the worker continues to work past age sixty-two up to age sixty-five, he or she may substitute those three years of earnings for three earlier years of lower earnings. Earnings for the remaining years are summed and divided by the number of months in the benefit calculation years, yielding average indexed monthly earnings (AIME). This computation started in 1978 and for those who attained age sixty five in 1978 the averaging period is nineteen years. Thereafter the averaging period increases by one each year for all workers until it reaches a maximum value of thirty-five years in 1994.

The primary insurance amount (PIA), that is paid to a worker without dependants who retires on reaching age 65, is obtained by applying the benefit calculation formula to average indexed monthly earnings (AIME). The formula is progressive and has three AIME brackets. The PIA serves as the basis for all benefit calculation. Workers opting for retirement at the minimum retirement age of 62 receive a benefit equal to 80 per cent of PIA. This 20 per cent reduction is an actuarial adjustment. The benefit reduction is prorated for workers who retire between ages 62 and 65. Workers who postpone retirement beyond age 65 receive a benefit increment per year. The benefit increment was 3 per cent in 1990; it will be raised gradually to 8 per cent per year. Pensions are adjusted twice yearly for changes in the Consumer Price Index. Average monthly benefit amount payable to retired workers was $605 in July 1991.

The pensions for eligible dependants are 50 per cent each for wives and children of pensioners. Total benefits to a family cannot exceed a prescribed maximum amount. The maximum ranges from 150 per cent to 187 per cent of PIA. An individual eligible for more than one type of pension, such as a married woman who has worked, receives only the largest pension.

Survivor pension

Full survivor pensions are payable to widows at age 62, with actuarial-reduced pensions at age 60. 75 per cent of full survivor pensions are payable to widows or widowers at any age provided they are caring for entitled children. Survivor pensions are also payable to eligible children of deceased workers and to the children's mothers in the same manner as for dependants of retirement and disability beneficiaries. Survivor pensions are also available to the relatively minor category of aged dependent widowers and parents, as well as to divorced spouses if they were married to an eligible worker for 10 years or more.

The spouse's pension, subject to the fully insured requirement, is 100% of the deceased's primary pension. The pensions for other survivors are percentages of the basic pension, i.e 75 per cent each for survivor children and their mothers.

Disability Pensions

There are three types of disability benefit: first, for severely disabled workers under age 65 whose disability is expected to last for one year or more, second, for the

adult disabled children of deceased and retired workers if they became disabled before 22 -their benefits are payable after age 18- and third, for disabled widows or widowers aged 50 to 59.

Benefits are calculated in essentially the same way as OASI benefits, based on adjusted career average earnings up to the time of disablement. The only difference is in the procedure for determining the number of benefit calculation years. The DI program pays benefits to 2.7 million disabled workers and 1.3 million dependents. It accounts for about 9 per cent of OASDHI expenditures.

The average monthly benefit amount paid to disabled workers was $587 in July 1991 [116].

Contributions

The OASDHI system is financed by a pay roll tax divided equally between employee and employer and by a tax on the earnings of the self-employed. The tax on earnings is applied at a flat rate to the earnings of all workers in covered occupations. Also the rates apply to earnings up to the annual taxable ceiling. This ceiling is $53,400 per annum adjusted according to a wage index.

The tax receipts are allocated among three separate trust funds: old-age and survivors insurance (OASI), disability insurance (DI) and hospital insurance (HI). The OASDHI tax rate since 1991 is 15,3 per cent, OASI : 11.2, DI : 1.2 and HI: 2.9[116].

The combined contribution rate that employers and employees have to pay for entitlement to cash benefits (OASDI) was gradually increased from 3 per cent in

1950 to 8.4 per cent in 1970 and it is 12.4 per cent in 1992. These increases were made because the scope of the program was broadened and because the ratio of over 65s to the working population was rising. There is no general contribution from the Government[116].

4.4.2 Private Pension Systems

The majority of employees participate in employer sponsored retirement plans as well as being covered by separate group life and disability insurance; while the most prevalent benefit is health insurance.

Private pensions date officially from the establishing of the American Express Plan in 1875, but both public and private pension systems are rooted in the desperate desire for security that became part of the national psychology following the Great Depression[66].

The social security and private pension systems developed simultaneously since neither program alone provided adequate retirement income. The inadequacy of social security benefits during the 1940s was an important factor in the drive of labour unions for private pensions. The Revenue Act of 1942 clarified the favourable tax provisions for pensions and instituted a procedure whereby companies could receive advance assurance from the Internal Revenue Service[65]. The cost to the firms of establishing pension plans was minimal. The deductibility of the contributions combined with the high corporate tax rates meant that the

major share of pensions was financed by funds that otherwise would have been paid to the Government in taxes. Also the Korean War provided another major stimulus to the growth of private pensions, because emergency wartime measures stimulated the interest of employers in pensions[65].

In the 1970s the climate for private pensions changed dramatically. The costs of maintaining private pension systems increased because of regulations imposed by the Employee Retirement Income Security Act of 1974 (ERISA), which established vesting and funding standards for pension plans managed by private firms. The supplemental programs such as Medicare reduced the need for private pension benefits.

Between 1950 and 1980 the proportion of elderly households receiving benefits from employer sponsored pension plans tripled. Also, in 1980, there were an estimated about 617,000 private pensions plans, an enormous growth from the 14,000 (about) plans in existence in 1950[65].

The private plans

There are **single-employer plans** in industries which are characterized by a few relatively large employers (steel and automobile industries) and **multi-employer plans** in industries containing many small companies and involving frequent job changes of employees. Coverage under multi-employer plans grew more quickly

than single-employer plans, since workers rarely remained with a single employer long enough to qualify for pensions[66].

Many plans are **defined benefit plans**; that is, pension payments represent a fraction of the retired employee's average salary multiplied by the number of years worked. An employee's salary may be averaged over his/her entire career or computed over a shorter period before retirement. Employees, generally, forfeit any claim to benefits when they leave the company after only a few years of employment, but employees who stay with a firm for some minimum number of years become entitled to benefits even if they leave the company before retirement age. Some firms set aside tax-deductible funds to meet these future benefit obligations, but many do not.

Other plans are **defined contribution plans**; that is, a percentage of a worker's salary is set aside annually and retirement benefits depend upon the performance of the pension fund. No explicit retirement annuity is promised during the accumulation period and on reaching retirement age the worker receives the total amount accumulated in the form of a lump- sum distribution or an annuity.

In a defined-contribution plan the sponsor's obligation is completed when it makes contributions to a retirement investment fund held in trust for the employee. In many cases, workers have some choice as to the investment vehicle in which these funds are deposited, but the worker bears the entire risk of the performance

of the investment portfolio. Defined-contribution plans are always fully funded by definition.

In 1980, approximately 65 per cent of plans were defined-contribution. However, defined-benefit were much larger on the average and covered about three-quarters of the plan participants[65].

The benefits from private pension provision and from social security are negatively related. Low-income earners obtain comparatively high replacement ratios from their social security benefits but relatively smaller replacement ratios from their private plans. High-income earners, on the other hand receive relatively low replacement ratios from social security, because of its truncated taxable wage base, and relatively high replacement from private plans.

Many firms integrate private pension plans with social security benefits. The intent of integration of private pension with social security benefits, therefore, is the maintenance of roughly constant replacement ratios across employee income groups. The Internal Revenue Service (IRS) has set limits on the degree of integration.

4.5 A comparison of the Greek and the American Social Insurance Systems

The US social security system - social insurance and public assistance - is complemented by the private insurance system; therefore, there is low protection to persons who are entitled to only one insurance (social insurance) and quite high protection to persons who have two insurances (social and private insurance). The Greek social insurance (main and complementary social insurance) provides quite satisfactory protection to the employees (including self-employed) and to pensioners - formerly insured persons; but the Greek welfare system provides low protection, lower than the US public assistance, to poor people.

In 1985, the expenditure on the US social security (excluding expenditure on health) was 10.1 per cent of gross domestic product, whereas on the Greek social security was 15.5 per cent; also, in 1990, the expenditure on the Greek social protection was more than 25 per cent of GDP[72]. The percentages between these countries are unequal. This did not happen as a result of important differences in the level of the protection but due to the important differences in the structure of the insurance protection, since in the United States there are two (public and private) insurance systems, whereas, in Greece one (social) insurance system.

The expenditure on public and private US insurance was 23,3% of GDP in 1984. In Greece, as the complementary social insurance is widely spread, the private insurance has not been developed.

In the United States, the social security expenditure, as a percentage of GDP, was about the same during the last decade (13.6% in 1980, 13.8% in 1985, 13.6% in 1990). This is because the great development of the social protection had already taken place during the previous years[116].

On the contrary, in Greece the above percentage increased very much during the decade of 1980 - about 50 per cent in only five years (1980: 10,1% -------> 1985: 15,5% [72] This is because any significant development of the Greek social protection system has taken place rather recently - not during the time when there was a substantial economic growth, and this was when the great social security development in industrial countries took place.

The Greek social insurance pension scheme as well as the American cover the labour force - employees and self employed - but not all the population. This is because both countries do not have National pension systems and their systems hinge on the attachment by the individuals, or household head, to the labour market.

Four Social Insurance Trust Funds in the United States and more than two hundred (238) Greek Social Insurance Funds deal with old-age, survivors, disability and

health insurance and are credited with the pay roll taxes or contributions collected from workers and employers. In the two countries, participation in their pension scheme is possible only when contributions are paid into the Funds that finance the benefits. The "pay roll taxes" are divided equally between US employees and employers, whereas the proportion of Greek employees to employers contributions is 1:2, in general.

Both the US old-age insurance system and the Greek are inter-generational. Benefits in both pension systems are not subject to a means test and are earnings-related and they vary between a minimum and a maximum. In the US they are set too low to enable claimant to enjoy a living standard anywhere near his or her previous earnings except in a small number of cases. However in the Greek system, they are often set too high. The maximum is higher than the previous earnings and the minimum is 25 days wage earned by an unskilled worker.

These differences exist because the complementary social insurance and the complementary pension - very important to the Greek system - are unknown to the U.S social insurance pension system. The Americans have the private pension as complementary insurance instead.

In the United States, the pensionable age is 65, it is the same for men as it is for women; Men and women too, could also claim an actuarial reduced pension from the age of 62. In Greece, except in the OGA and TEBE, the pensionable age is five years earlier for women than men. In IKA, it is at age 65 for men and age 60 for

women. Men can claim a reduced pension from the age of 60 and women from the age of 55. In other Greek funds, the pensionable age, for both men and women, is lower than that of IKA.

Insurance pensions are related to earnings for all (except five) years of employment, in the United States, and to earnings for only five years or to the last salary in Greece. Married men could receive an increase in their pensions for wives of any age in Greece and for wives aged 62 and over in the US. A widow could receive a widow's pension of any age, in Greece, and from the age of 62 or at any age if she is caring for entitled children, in the US. As we can see, there are many differences between both pension systems, especially between retirement requirements. In the Greek system, in many cases, the requirements are more favourable than those in the US system.

Invalidity pensions in the United States are paid to persons who are incapacitated "to pursue any substantially gainful occupation" for at least 12 months; the rate of the invalidity or disability pension is the same as the old-age pension. In Greece the work-incapacity benefit is paid at three different rates depending on the degree of incapacity. Since 1990, benefit is paid for any incapacity in excess of 50 per cent- as follows:

50%	Incapacity	--->	50% of old-age pension
67.7%	"	--->	75% " "
80%	"	--->	100% " "

(before 1990, the conditions were more favourable).

In both systems, invalidity pensions are paid without any age limit and the disability pension schemes are closely linked with the old-age pension schemes.

In the United States, each of the states has its own worker's compensation program independent of any federal legislative or administrative responsibility. The premium rates paid by employers in the same industry differ according to the level of benefits provided in the state in which the employer operates. Also, in many states, there is no scheme for temporary disability or sickness benefit for an injured worker. In Greece, the main insurance funds cover, subject to not very stringent eligibility requirements, the risk of employment injury. These benefits are employer financed and in the major fund, IKA, there is a scheme for temporary disability or sickness benefit.

Health social insurance virtually covers - directly or indirectly - all the Greek labour force and their families. Nearly, all Greeks have health protection provided by the State, whereas, the American medical insurance "Medicare" is provided only to the persons aged 65 or over. The majority of the Americans under 65 have private health insurance. But both private insurance and medicare have limits beyond which payment ceases. In the American public assistance system, there is also a provision for the poor (old and young) and the disabled

The financing and the administration of unemployment benefit is a central government responsibility in Greece and there is only one fund (OAED). However, in the United States unemployment relief is the responsibility of the individual

state. The Greek unemployment income support system is uniform but the US system is not. Both systems provide contributory benefits.

The federal-state American programs to Aid Families with Dependent Children provide a non-contributory benefit with lower structure than that for the other categories of benefits. The Greek non-contributory Family Benefits, which are provided by the state, are very small; but there are also contributory family benefits, which are provided by the Greek insurance system.

The provision for "adult disabled children" is an innovation in the American social insurance legislation. It gives to these invalids a status somewhat similar to that of a dependent spouse or a widow. In the Greek insurance system we can find this only in the farmers' insurance (OGA), the other Greek "adult disabled children" have only some benefits from Greek welfare system.

Finally, it can be noted that:

a) Some of the American public assistance programs, such as "food stamps" do not exist in the Greek welfare system and

b) an American divorced spouse is generally eligible for survivor's or dependent's benefits but a Greek divorced spouse is not.

In conclusion, we can say that:

- the United States social security pension provision is below the subsistence level and it is meant to provide a floor on which other provisions could be built. The Greek social insurance pension provision is not below the subsistence level, however the dominant part in benefits is the pension itself and it is meant to provide a benefit on which other provisions need not be built;

- the rate of pensions is one important characteristic of an old-age pension scheme, another one is the proportion of old people who are covered by the scheme; during the last decade, both of these changed in the Greek system, but only the second one in the United States system.

Chapter 5

THE SOCIAL SECURITY SYSTEM OF SPAIN

THE SOCIAL SECURITY SYSTEM IN SPAIN

5.1 Introduction

The Spanish evolution from an authoritarian regime to a democratic system could be expected to have an effect on the Spanish social security system. So we can say that the system is in a transitional period.

The social security system consists of a general scheme covering most employees, with a further ten special schemes.
The provisions differ under some of the special schemes. Benefits and contributions are based on covered earnings which vary according to the employment category.

Since the mid-seventies, the social security accounts (excluding unemployment insurance) have exhibited a persistent and growing tendency towards deterioration with the deficit rising from 0.4 per cent of GDP in 1977 to 2.5 per cent in 1984, (source : Ministry of Labour and Social Security).

The roots of this trend lie :

- in the specific social policies pursued, between 1972 and 1979, which broadened coverage and raised the average benefit without a commensurate increase in contributions;

- in the structural deficiencies on the revenue side, by the uneven distribution of rates of contributions and the narrowness of their base (wage ranges and evasion);

- in broader macroeconomic development, slower than expected economic growth and falling employment since the two oil shocks; as well as

- in demographic factors, the ratio of contributors to beneficiaries has fallen from 2.9 in 1976 to 2.0 in 1985; it will be 1.6 in 1993 [87].

Since 1984, a series of measures have been taken to tackle the most obvious faults of the system; as a result, the ratio of pension payments to GDP has stopped rising.

5.2 The Legislation and Structure of the Spanish Security System

The legislation

Since 1938, the Spanish social security system has aspired to make the principle of universality a reality, by extending social security coverage to all citizens. Present social security legislation consists primarily in pre-pre-constitutional provisions promulgated during the former regime. These provisions are basically contained in the General Social Security Act of 30 May 1974, with several substantial post-constitutional modifications.

According to the Article 41 of the 1978 Spanish Constitution: "Public powers shall maintain a public social security system for all citizens, which shall guarantee sufficient aid and social benefits in situations of need, particularly in the case of unemployment. Such aid and complementary services shall be free of charge".

A new Law in 1985 changed the qualifying conditions and the income basis relevant for the calculation of future pension benefits. Also, after the 1985 Law the system has become somewhat more generous.

The structure

The Spanish social security system is composed of two types of coverage, general coverage and special types of coverage.
General coverage : this type covers most service and industrial employees. It is the standard type of coverage, which special types attempt to duplicate.

Special types of coverage : these were created due to "the difficulty in applying the same types of coverage methods and legal provisions to persons whose legal or professional status differs greatly from the general rule, due to the nature of their activities, conditions of time and place, or the kind of manufacturing process involved"[48].

The social security system covers the benefit areas of medical care, sick pay, unemployment benefit, old-age pensions, industrial injury compensation, family benefits, maternity pay, disability benefits, and survivors' benefits.
The general scheme and the special schemes effectively cover most employees and their families.

5.2.1 Health Insurance

Health care: Before 1986, only contributors to the financing of social security were covered. Others could use health facilities of benevolent institutions, and public services only on a case-by-case-basis. The basic institutional framework for public health has been substantially altered by the 1986 Law on health. Taking the special schemes into account, almost 100 per cent of the population is covered for medical care, including the unemployed.

Benefits provided include free medical services and pharmaceutical benefits, hospital visits, hospitalisation, emergency out-patient care, dental care, maternity care, laboratory services, appliances and transportation. Drugs are free of charge when they are distributed as a part of hospitalization, to pensioners, or when they are occupationally-related. In all other cases, social security beneficiaries pay part of the purchase price of the drugs, which may reach as high as 40 per cent.

National health care is provided by the social security health services (INSALUD), institutions of two ministries (Health and Defence), the Autonomous Regions, the local authorities, and special central government organizations.

The financing of public health care provided by INSALUD is based both on social security contributions and state transfers (variable annual subsidy).

Social security contributions

- by insured person: 2.22 per cent of covered earnings according to 12 occupational classes (includes 1.73 per cent for benefits in kind and 0.49 per cent for cash benefits); and
- by employer: 12.6 per cent of covered earnings according to 12 occupational classes (includes 9.82 per cent for benefits in kind and 2.78 per cent for cash benefits)

Sickness benefit, 75 per cent of covered earnings, is paid, after a 3-day waiting period (during which benefit is payable by the employer). Up to 12 months, benefit is paid to insured persons who have 180 days of contribution during the last 5 years. This benefit may be extended to 18 months or 72 months in case of temporary invalidity.

Maternity benefit, 75 per cent of covered earnings, is payable, for 6 weeks before and 8 weeks after confinement, for the insured woman who has an affiliation with

social insurance system of 9 months before childbirth, and 180 days of contribution during the last 5 years.

5.2.2 Unemployment Insurance

Unemployment benefit is 75 per cent of covered earnings, plus family assistance; it is payable, for up to 12 months to unemployed people with 6 months contributions during the 18 months before unemployment. This benefit may be extended up to 18 months, at 60 per cent of covered earnings, in special circumstances.

Unemployment benefits are financed 60 per cent by contributions and 40 per cent by the State, which also covers any potential deficits between budgeted revenues and those actually collected at the end of the fiscal year through the pure levying technique. The contribution is 6.3 per cent, with 5.2 per cent paid by employers and 1.1 per cent by employees.

5.3 Pension schemes

The Spanish social security is divided into two main levels:

a) the basic level, which is overwhelmingly state-regulated, publicly administered and obligatory at an individual level;

b) the complementary level, which is characterized by its progressive deregulation, through collective bargaining and individual agreements; the relative privatization of its administration, by means of mutual association and private insurance; and its acceptance of voluntariness through collective and individual autonomy.

5.3.1 State Pension Scheme

The State pension scheme corresponds to the principles on which the prior regime was based. The general state pension scheme covers employees in industry and commerce, classified according to 12 occupational classes. The special state pension scheme covers agricultural workers and small farmers, domestic servants, railway employees, salesmen, non-agricultural self-employed, seamen, public employees, miners, liberal professions, and members of cooperatives.

The Spanish state pension system is based on the insurance principle, covering only contributors to social security. Old-age retired people, invalids and survivors are the three broad categories of pensioners.

There is an unbalance between social security expenditure and revenue, that is serious in the special regimes - especially, in the agricultural regime. In 1986 the ratio of revenue to expenditure was 37.6 per cent in the special regimes (Agriculture: 20.7 %, Self-employed: 81.3 %, Seamen: 38.6 %, Minery: 34.8 %, Other: 37.1 %). In the general regime, as its deficit was only 0.6 billion Pesetas,

this ratio was about 100 per cent, but it was higher in the previous years - in 1981, it was 116.6 per cent[85]. This imbalance of social security accounts as a proportion of GDP was 3 per cent in 1986 (it was only 0.4 per cent in 1976).

The main factor behind the widening deficits has been the growth in expenditure and within it, that of pensions. Real pension expenditure growth (amounting to 10 per cent per annum during the ten-year period to 1984) can be attributed to two factors, i.e. the rise in the number of beneficiaries and changes in real benefits per beneficiary[85].

Since 1984, a series of Decrees and Laws in public pension scheme introduced some measures (such as: a ceiling to the maximum value of pension, reduced the possibility to cumulating pensions, tightened the checks in invalidity pensions, etc) tended to reduce the deficit.

5.3.1.1 Retirement Pension

In the Spanish social security system, retirement is determined by reaching a specified age and ceasing work activity. There are various age and waiting period requirements. The normal retirement age is age 65. Early retirement may be taken at age 64, provided that an employee is replaced by another employee. Also, there are lower ages for difficult, dangerous, or unhealthy work. Obligatory retirement may be provided for in cases of onerous, toxic, dangerous or unhealthy activities, or to secure and guarantee public services.

Between 1974 and 1985, old-age pensions were received from the age of 65 after a minimum contribution of ten years. Earnings of the two best years (over the last seven working years) served as a basis for the calculation of the pension benefit. After 1985, the minimum contribution period was extended to 15 years. Also the last eight best years are now taken as a reference for calculation of the pension benefit. The first six of these year's earnings are re-valued.

Retirement benefits vary according to contributions paid. For the first ten years of contributions, pensions are calculated as 50 per cent of assessable earnings and for each additional year as 2 per cent of assessable earnings. For pensioners with 35 or more years of contributions the pension could amount to up to 100 per cent of to the income basis. The income basis is significantly lower than the actual wage for most wage-earners. Benefits payable are subject to a minimum level.

Since 1985, benefits have been linked to official inflation targets rather than actual inflation outcomes. In the mid-1980s, old-age pensions accounted for 57 per cent of total pensions[85].

5.3.1.2 Survivors' Pensions

Survivors' pensions are subject to certain minimum contribution requirements. The deceased must have had 500 days of contribution in the 5 years prior to death, or be a pensioner at death.

A widow or a (dependent or disabled) widower will have a right to a pension if it can be proved that they and their deceased spouse normally lived together. If the deceased was married more than once the survivor's pension will be divided in proportion to the time which each spouse lived with the deceased. The widow's or widower's pension is, generally, 45 per cent of average covered earnings in last eight years of the deceased, or 60 per cent of the pension the insured was receiving if he was a pensioner.

Orphans' benefits are extended to all children, provided that they are under 18 years of age or, if over this age, are unable to work or are disabled. The benefit for each orphan is 20 per cent of average covered earnings in last the eight years of the deceased's lifetime. For each orphan, benefit is increased by amount of widow's pension divided by number of orphans.

Survivors' pensions are payable for dependent parents and unmarried daughters or sisters over the age of 45.
The sum of all dependants' benefits cannot, however, exceed the assessable earnings of the deceased.

5.3.1.3 Invalidity Pension

Invalidity pensions are subject to certain contribution and eligibility requirements, i.e. loss of work due to illness or disablement, active work immediately prior to disablement, contributions during at least 50 per cent (under age 26) or 25 per

cent (age 26 and older) of the time till date of claim (in all cases at least five years of contributions). If not working at the time of disablement: 15 years of contributions with at least 20 per cent of them during the last ten years.

Permanent disability is recognised after six years have elapsed since the commencement of short-term disability.

For the partial permanent disability (i.e. loss of at least 1/3 of work capacity),	the benefit is 24 monthly payments of the last monthly salary received subject to contributions.
For total normal permanent disability (i.e. incapacity to work at an own trade or profession),	the pension is 55 per cent of average covered earnings in the last eight years, with alternative lump sum compensation if a beneficiary is aged under 60.
For total qualified disability (i.e. if there is difficulty in finding other work because of age or lack of retraining facilities),	the pension is 75 per cent of average covered earnings in last eight years.
For absolute disability (i.e. unable to follow any occupation),	the pension is 100 per cent of average covered earnings in the last twelve months.
For absolute and severe disability (i.e. requiring constant hospitalisation or attendance),	the pension is 150 per cent of average covered earnings in the last twelve months.
There is a minimum, for all total disability pensions.	

In the mid-1980s, the share of invalidity pensions was at 30 per cent of total pensions expenditure. Also invalidity pensions have substantial increased; the number of invalidity beneficiaries rose about three times as much as the number of old-age pension receivers. There is evidence that criteria and controls on

invalidity pensions were rather lax and there is also collusion between employers and employees to abuse the system[85]. Since 1985, application of the eligibility rules for invalidity benefits have led to a marked showdown in pension growth.

5.3.1.4 Contributions

The social insurance system's main financial resources are employer / employee contributions and state contributions.

Employer / employee contributions are determined as percentages of the contributions base, which is the total remuneration received by employees, subject to maximum and minimum levels and depending on the employment category.

The **main contribution rates** are :

	Old-age, Invalidity, Survivors contribution	**Total contributions**
by employers	12.04 %	24.0 %
by employees	2.14 %	4.8 %

Also, workers contribute 0.42 per cent and employers 2.4 per cent of earnings to special fund for agricultural and maritime workers.

There are 12 employment categories with different levels of covered earnings for social security purposes, ranging from appendices to professionals and management levels.

	Covered earnings (pesetas a year) 1/1/1989	minimum	maximum
1.	Graduate management directors and engineers	975,960	3,309,840
	.....	...	...
12.	Apprentices under age 17	252,360	687,600

The Social Security General Treasury collects the contributions, in a function quite similar to an administrative-tax function.

5.3.2 Private Pension schemes

The high level of social security benefits in Spain has not left a large sphere of activity for private initiative. In recent years, however, due to the excessive financial burden borne by obligatory social security, part of the cover provided by the obligatory social security was being shifted toward complementary coverage[48]. So, company sponsored pension arrangements are common, despite the relatively generous social security provisions[93].

The particular reasons for the existence of these pension arrangements are the practice of collectively bargained conditions of employment, the earnings-ceiling for state pension purposes, the increased period over which salaries are averaged in the calculation of pension, and the maximum pension level, which was frozen for some time and has recently been modesty increased.

Retirement benefits are generally paid in pension form and integrated with social security. Employers usually pay the full cost of such pension arrangements. These are mostly financed on a pay-as-you-go basis. Many large indigenous companies have 100 per cent of final pay pension liabilities, inclusive of social security, resulting from union negotiation. In the past when, for the majority of employees, the state pension was close to final pay, an employer's burden was not too onerous. With the recent reduction in social security expectations, more attention is now being given to the need for actuarial valuation.

Until recently, the main pension financing methods were book reserves or insured deposit administration, but pension fund by legislation was passed in 1987.

The pensions Law 1987 was intended to clarify the taxation position and the regulatory regime for company sponsored pension arrangements and it extends to individual pension schemes and to those established on account of a trade or profession. It was also intended to stimulate a capital market and to encourage employers to remove the pension liabilities from their balance sheet in favour of external funding.

In practice, the pensions Law has been unsuccessful, and the number of new or adapted plans under it has been very limited.

The important reasons for the apparent rejection of the Law by most employers are the following:

- The tax deductibility is limited and insufficient.

- A plan must apply to all employees, when only the minority need additional benefits.

- The plan must be managed by a Control Committee, in which employees have the majority; as a result, employees can control the investment strategy.

Under the new Law, employer contribution is a tax-deductible expense for company tax purposes. Employees can deduct both their own and their employer's contributions up to a maximum of 15 per cent of earnings or Pta 500,000, whichever is lower. The excess over the amount up to a maximum of Pta 750,000 will be eligible for a 15 per cent tax credit against the employee's income tax liability.

Whilst it is too early to judge the future trend in private pensions insurance, it is generally thought that the current legislation will have to be modified in future, and the legislation points towards likely growth of contributory plans and some development of defined contribution plans[92].

5.4 A Comparison of the Greek and the Spanish Social Insurance Systems

The Greek social insurance system is more similar to the Spanish system than the other two systems (the British and the American). The Spanish social security system and the Greek are both divided into two main levels: the basic and the complementary level.

The Spanish social insurance system is complemented by the private insurance system, and the Greek is not. As a result, the complementary level in Spain is characterized by private insurance and in Greece by social insurance. The above is one of the most important differences between the two systems.

In both Countries, the basic social security level is an earnings-related scheme with universal coverage for employees.
The above is also true for about nearly all the self-employed persons in Greece, but in Spain, voluntary coverage is required for the self-employed.

The Spanish social security system consists of a general scheme with 12 occupational classes and ten special schemes. The Greek main social insurance system consists of a general scheme (the biggest social insurance fund - IKA) and of special schemes, which correspond to all other 31 main social insurance funds.

It must be noticed that, apart from four special schemes: for civil servants, small farmers, self-employed, and seamen, there is no correspondence between the Spanish general and special schemes and the Greek ones.

The common element between both systems is that the provision differs under the Spanish as well as under the Greek schemes.

Social security revenues have fallen short of the expenditures and deficits have grown up rapidly; this happened in the Spanish system in the early eighties, and in the Greek system since the mid-eighties[59]. Apart from the special reasons for each system, the common and most important reasons for their deficit were the macroeconomic and demographic factors, as well as the extension of the Spanish system (during the decade starting in 1970) and in the Greek system (during the decade of 1980).

Pension outlays have been increased more rapidly than the total social security expenditures in the Spanish system, as well as in the Greek system. The share of pensions expenditure in total social security benefits expenditure is very high, it is more than 50 per cent in both countries[59]. The high cost of pensions is not only due to the appreciable rise in the number of pensioners but also to increases in the average real value of each pension.

In the Spanish system, the general regime has been in surplus, whereas the special regimes have incurred deficits, the imbalance being particularly large in the agricultural scheme.

In the Greek system, the general regime has incurred deficit, whereas the majority of the special regimes have been in surplus.

In both systems, the rates of contributions are different between their regimes. In the Spanish system, the rate of contributions is much higher in the general than in the special regimes; in the general regime the rate of contributions is 28.4 per cent, of which 4.8 per cent is paid by employees and 24 per cent by employers: the ratio employees / employers contributions is 1/5. In the Greek system, the ratio employees/employers contribution is 1/2 and the rate of contributions is 24 per cent (of which 8 per cent is paid by employees and 16 per cent by employers), lower than that in the Spanish general regime. Now, despite the higher rate of contributions in the Spanish general regime than that in the Greek - it was 33.1 per cent in the Spanish and 21 per cent in the Greek, in 1980 [124], the ratio of revenue to GDP was about the same - 10 per cent - in both systems. This resulted partly from the low contributions in the Spanish special regimes, as well as from the high employers contributions in some Greek special regimes.

Contributions are collected by the Spanish Social Security General Treasury in an administrative function quite similar to the administrative-tax function, and by the Greek Social Insurance Funds in several administrative functions, different to the administrative-tax function. It is noticeable, that the evasion of contributions is a common and very serious problem in both systems[85 and 87].

The retirement age is the same for both men and women, and the average retirement age is about 64 years old in the Spanish system. In the Greek system,

the actual retirement age is different between men and women and the average retirement age is lower than in Spanish system.

In both system there is a lower age for difficult, dangerous, or unhealthy work, and an obligatory retirement age for some categories of employees, such as the public servants.

There are disability pensions for several permanent disability levels in both systems; but there is no correspondence either between the levels of disability or in the disability benefits, in these countries. In the Greek system as well as in the Spanish system, the invalidity pensions have shown substantial increase, because their criteria and controls for disability pensions were not proper enough, as a result there was an abuse of the systems from the insured persons.During recent years, requirements for invalidity pensions were changed twice in the Greek system and became more strict; in the Spanish system, too, there was a stricter application of the eligibility rules for invalidity benefits.

Health insurance is the area providing the widest coverage in Greece and in Spain too; as, almost the whole population is covered for health care, since the early 1980s in Greece, and since 1986 in Spain.

Public health care is provided by the "National Insurance System (ESY)" in Greece, and by the "Social Security Health Services (INSALUD)" in Spain. In both countries the financing of the public health care is based both on social security contributions and state transfers. The Spanish rate of contributions is 14.82 per cent and the

Greek 6.75 per cent; the ratio employees / employers contributions is 1/6 in Spain, and 1/2 in Greece.

Efforts by the social security systems to provide the necessary resources for the rapid expansion of pension benefits, have had a negative effect on state transfers to health care services in Spain. In Greece, these efforts resulted in using some revenues of the health insurance schemes to finance expenditures of the pension schemes.

Finally, an overall vision behind policy must be an ultimate system establishing :

a) "a sharp division between insurance (whereby social security benefits would be financed entirely by social contributions), welfare payments for those falling outside the insurance net (to be wholly at the expense of the State budget) and a strong complementary private insurance scheme"[80], for the future of the Spanish social insurance system;

OECD 1986

b) a sharp division between main social insurance benefits (tripartite financing by employees, employers and state) and welfare payments (to be wholly at the expense of the State budget), and a strong complementary social insurance scheme (to be financed by employees contribution), for the future of the Greek social insurance system.

CHAPTER 6

REVIEW OF ECONOMIC INDICATORS OF THE SOCIAL SECURITY PROVISIONS OF GREECE, SPAIN, U.K AND U.S.A.

REVIEW OF ECONOMIC INDICATORS OF THE SOCIAL SECURITY PROVISIONS OF GREECE, SPAIN, U.K AND U.S.A

According to the previous comparison between the Greek social insurance system and the British, American and Spanish, it seems to me that the followings are the most important factors from economic point of view.

6.1 Average level of social security provision

The Greek average level of social security provision is no lower than the British, American or Spanish, if we take into account -the level of growth of each of the countries. In 1985, the social expenditure as a proportion of GDP was 19.5 per cent in Greece, quite close to the British (20.3 per cent) and Spanish (18.4 per cent); but, it was higher than that (12.6 per cent) of the United States, (Table 5).

Table 5

Receipts (R) and Expenditure (E) of social security schemes as percentages of total gross domestic product in purchaser's values

(per cent)

Country		1970	1975	1980	1985
Greece	(R)	12.0	12.1	14.2	18.9
	(E)	10.8	10.8	12.2	19.5
Spain	(R)	n.a	12.2	15.8	18.6
	(E)	n.a	11.7	16.0	18.4
U. K	(R)	14.2	18.1	19.0	20.8
	(E)	13.7	17.1	18.1	20.3
U. S	(R)	11.0	13.9	13.8	14.9
	(E)	9.3	12.8	12.3	12.6

Source: I.L.O, "The cost of social security "Thirteenth international inquiry, 1984-86, Geneva.

6.2 Growth of social security system

6.2.1 Expenditure: The Greek social security system grew considerably in recent decades, especially during the decade 1980-90. Growth in real prices social expenditure per year was 8.2%, during 1980-85. On the contrary, the American social security system and the British grew very rapidly during the 1950s, 1960s and the early 1970s. The Spanish system grew until the end of the 1970s. As a result, during the period 1980-85, the above percentage was very small: 1.1 in Spain, 1.9 in the United Kingdom and 2.7 in the United States (Table 6).

Table 6

The growth of real social expenditure

(percent per year)

Country	1960-75	1975-80	1980-85
Greece	n.a	7.6	8.2
Spain	n.a	n.a	1.1
United Kingdom	3.9	2.0	1.9
United States	6.5	2.0	2.7

Source: OECD, "The future of social protection", Paris 1988.

[N.B: These statistics are the latest available publications from OECD]

later figures are available from OECD

6.2.2 Receipts: The growth of the American system and British was facilitated by favourable economic performance, so the necessary revenues was available; whereas the extension of the Greek system, as well as the Spanish, were not facilitated by sustained growth in economic performance, and their necessary

revenues were not secured. In 1980, the receipts (15.8 per cent of GDP) were less than expenditure (16.0 per cent) in the Spanish system, but this gap was closed after the reformation of the system. In 1985 the receipts (18.6 per cent) were more than expenditure (18.4 per cent); whereas, in this time, the receipts (18.9 per cent) were less than expenditure (19.5 per cent) in the Greek system (Table 5). The receipts of the Greek system continued to be less than expenditure; as a result, the system went through an economic crisis.

The majority (more than 90 per cent) of social security receipts originate from various sources of financing, i.e. employees and employers contributions, as well as taxes and State or other authorities' subsidies, in these four countries.
Until the mid 1980s the amount of State participation and social taxes was small in the Greek system, whereas the participation of employees contributions was high.

In the Greek system in 1985, the share of state subsidies and social taxes as percentages of total receipts was 21.4 per cent, and about 3/5 of that (55.5 per cent) in the United Kingdom. In Greece the share of employees' contributions (29.4 per cent) was much higher than that of Spain (16.2 per cent), and that of the United Kingdom (18.3 per cent); also in 1985, the share of employers contributions (42.6 per cent) was higher than that of the United Kingdom (23.5 per cent), and that of the United States (34.4 per cent), but smaller than that of Spain (55 per cent) - Table 7.

The participation of the Greek State subsidies in the revenues of social insurance scheme has increased during the period 1985-90, after financing of the IKA and NAT by subsidies. The distribution of social receipts has been more favourable for employees too (Table 7).

Table 7

Distribution of social security receipts according to origin, 1985

(as percentages of total receipts)

Country	Contributions		Public Participation and Taxes	Income of capital and other receipts
	Employees	Employers		
Greece	29.4	42.6	21.4	6.7
Spain	16.2	55.0	25.9	2.9
U. K	18.3	23.5	55.5	2.7
U. S	24.7	34.4	31.0	10.0

Source: I.L.O, "The cost of social security" Thirteenth international inquiry, 1984-86, Geneva.

6.3 Social security schemes

The basic social security scheme in the four systems is the social insurance scheme. However, in 1985 the share of social insurance benefit expenditure as percentages of total benefit expenditure was higher in Greece (77.3 per cent), and in Spain (84.4 per cent) than that in the United Kingdom (58.8 per cent) and the United States (62.6 per cent) - Table 8.

Table 8

Distribution of social security benefit expenditure among the different schemes, 1985

(as percentages of total benefit expenditure)

Country	Social Insurance	Special Scheme for Public Servants	Public Assistance	Other Schemes
Greece	77.3	15.8	5.0	1.8
Spain	84.4	8.7	4.6	2.1
U. K	58.8	8.8	24.5	7.9
U. S	62.6	13.1	19.2	5.1

Source: I.L.O, "The cost of social security" Thirteenth international inquiry, 1984-86, Geneva.

Public assistance is more important and greater in the United States and the United Kingdom, than in Spain or Greece. The share of public assistance benefit expenditure as percentages of total benefit expenditure was four to five times bigger in the American and the British systems than that of the Greek and the Spanish systems, in 1985 (Table 8).

The Greek public assistance scheme was and is still small, because there has not been separation between social insurance policy and assistance policy.

The special scheme for civil servants is big in the Greek system; its share of total expenditure was about the same as that of the American system, but was two times as large as that of the British and the Spanish systems (Table 8).

6.4 Benefits

Favourable economic performance up to the mid seventies led to big increases in real per capita benefits in the United States, as well as in the United Kingdom. The average level of benefit per head of the total population increased by 63 per cent in the United States and by 39 per cent in the United Kingdom, during 1970-75; whereas, it increased by only 20 per cent in Greece. On the contrary, there were high increases in real per capita benefits in Greece, during the past decade; the above average level of benefit increased by 60 per cent during 1980-85; whereas it increased, between 10 per cent and 20 per cent in the United States, the United Kingdom, and Spain (Table 9).

Table 9

Indices of annual average benefit expenditure per head of the total population

(values adjusted according to cost-of-living indices: 1970 = 100, and 1980 = 100)

Years	Greece	Spain	U. K	U. S
1970	100	100	100	100
1975	120	n.a	139	163
1980	100	100	100	100
1983	138	112	116	110
1984	149	112	117	107
1985	160	117	120	109

Source: I.L.O, "The cost of social security" Thirteenth international inquiry, 1984-86, Geneva.

6.4.1 Pensions

In Greece, pensions expenditure grew more rapidly than other social insurance benefits expenditure - due to the increased numbers of old people, the increased coverage of population groups previously excluded from the schemes and increases in the real level of pensions per beneficiary.

In only five years pensions expenditure as a proportion of GDP, almost doubled; it rose from 5.8 per cent of GDP in 1980 to 10.7 per cent in 1985. This meant that a rising share of national resources was transferred to the elderly (Table 10).

In the same period, in the United Kingdom, the share of pensions in GDP rose very little (from 6.3 per cent to 6.7%). In the United States, it rose from 6.9 per cent to 7.2%; In Spain, this share rose from 7.3 per cent in 1980 to 8.6% in 1984, this again was a small increase (Table 10). (~~Idem~~ According to latest Publications by OECD)

Table 10

Public pension expenditure as a proportion of GDP, 1975-1985

(per cent)

Country	1975	1980	1985
Greece	4.8	5.8	10.7
Spain	4.3	7.3	8.6
United Kingdom	6.0	6.3	6.7
United States	6.7	6.9	7.2

Source: OECD, "The future of social protection", Paris 1988.

Pensions are, for the four countries, the main determinant of all social benefits expenditure. In 1985, the share of pensions expenditure as a percentage of total benefit expenditure (79 per cent) was bigger in the Greek system than that of the American system (57.3 per cent) and of the British (45.5 per cent), as well as of the Spanish system (50.3 per cent) - Table 11.

6.4.2 Other benefits

If we compare the three most important social security branches, we can say that, in Greece:

- the branch of pension benefits is very big and public pensions are the main benefits of the Greek system;
- the branch of unemployment benefits and family allowance is very small;
- the branch of sickness, maternity and unemployment injuries benefits is very small, too.

Table 11
Distribution of benefit expenditure by social branch,1985
(as percentages of total benefit expenditure)

Country	Sickness, maternity, employment injuries	Pensions	Unemployment, Family allowances
Greece	14.8	79.0	6.3
Spain	28.7	50.3	21.1
U. K	39.4	45.5	15.1
U. S	37.3	57.3	5.4

Source: I.L.O, "The cost of social security" Thirteenth international inquiry, 1984-86, Geneva.

In the Greek system, the share of unemployment benefits and family allowances as a percentage of total benefits expenditure was two to three times smaller than that in the United Kingdom and Spain, in 1985 (Table 11).

The share of sickness, maternity and employment injuries benefits expenditure as percentages of total benefit expenditure was 14.8 per cent in Greece, i.e it was about 1/2 of that in Spain and about 1/3 of that in the United States and in the United Kingdom (Table 11).

6.5 The influence of demographic changes

The proportion of the population aged 65 or over is quite high in the four countries (13.0% in Greece, 12.8% in Spain, 15.3% in the United Kingdom and 12.1% in the United States in 1986) -Table 12.

According the OECD projections for 2040, this proportion will increase: the Greek proportion (21.2 %) will be quite similar to that of the British (20.6 %) and the American (20.0 %), but lower than that of the Spanish (23.3 %) in 2040, (Table 12).

Table 12

Proportion of population aged 65 or over, 1960-2040

Projections

Country	1960	1986	2000	2020	2040
Greece	8.1	13.0	15.0	17.9	21.2
Spain	n.a	12.8	14.6	17.9	23.3
United Kingdom	11.7	15.3	14.5	16.4	20.6
United States	9.2	12.1	12.2	16.2	20.0

Source: OECD, "The future of social protection", Paris 1988.

However, the influence of the demographic change on the share of pensions expenditure in national income will be much higher in Greece (19.5%) than that in the United Kingdom (11.2%), as well as higher than that in the United States (14.6%), but quite similar to that in Spain (20.4%) - Table 13.

6.6 Retirement Age

The Greek average old-age pension retirement age is not available according to the OECD reports, but we can estimate that it must be lower than the Spanish average age of 63.9 years, the British 65.4 years for men and 60.4 for women, and the American 63.6 years for men and 63.3 for women.

Table 13

Influence of demographic change on the share of pension expenditure in national income 1984- 2040

projections

Country	1984	2000	2020	2040
Greece	10.8	13.0	15.7	19.5
Spain	10.0	11.7	13.6	20.4
United Kingdom	7.7	7.5	8.6	11.2
United States	8.1	8.2	11.3	14.6

Source: OECD, "The future of social protection", Paris 1988.

6.7 Financing of the state pension system

In the United Kingdom, the costs of the contributory benefits are covered by the contributions paid by the insured persons and the employers. There was a yearly supplement into the National Insurance Fund from the Treasury, but it was reduced over the years and eventually abolished in 1989.

In the United States, the OASDI programmes are in principle self financing and rely on contributions, although since 1984 social security system beneficiaries pay income taxes which are transferred to social security.

In the USA and the UK state pension systems, there are no general contributions from the Government.

In Spain, pensions are financed mainly by contributions from the insured persons and the enterprises. These sources of finance are supplemented by state subsidies, which have increased considerably within the last ten years.

In Greece, the main pensions, as well as the complementary pensions, are financed in a different way by contributions from employers and/or employees, by social resources (third party taxes) and by subsidies. The state subsidies have gradually increased in recent years.

In the Greek and the Spanish systems, there is an inequality between the various groups of insured persons with regard to the contribution/benefits relationship. Neither system is not self financing; they are mainly financed from contributions but the Government makes other transfers of varying size.

In the Greek system, solutions to the financing problem, as well as a sufficient degree of equality between insured person with regard to the contribution/benefits relationship, could be found by making modifications to the structure of revenue and benefit outgo.

A prevalent proposal is that a three-tier pension system with uniform retirement requirements may have to be introduced: the first tier of retirement pension would

be a "minimum basic pension" and would be mainly financed by social resources (third party taxes and subsidies, or a partial tax for social insurance), the second tier should be a main pension financed by employees and employers contributions, and the third tier would be a complementary pension financed by employees' contributions.

6.8 Reforms of social security systems

The British, the American, and the Spanish social security systems have been reformed or modified during the years 1980-90 as a result, the changes in the systems have led to a marked slowdown in pension growth, and the ratio of pension payments to GDP has stopped rising. On the contrary, this ratio continues to rise in Greece. The Law 1902/1990 introduced a retirement age for all Greek employees in the public sector, who will retire after 1997; but it is not known if the ratio of pension payments will stop rising or it will start to increase in 1997, as the number of beneficiaries is expected to increase very much in that year.

The high current revenue level, the budget deficit, and the projected future developments on the expenditure side of the pension scheme may lead to the conclusion that the Greek social insurance system needs reform, in particular, a substantial change in the pension structure, in order to reconcile financial necessities with changed preferences.

The problems facing the Greek social security system are evident, but there are social and political objectives, which serve as constraints on possible options for a radical reform.

The experience of the United Kingdom, the United States and Spain are useful when considering the future reform of the Greek social insurance system. The general orientation of policy must be to rationalise its structure and to reduce the gap between benefits and contributions, while at the same time attempting to redirect expenditure towards the worse off.

PART THREE

THE GREEK SOCIAL INSURANCE SYSTEM : AN ECONOMETRIC MODEL

Chapter 7

The Creation of the Model

Chapter 8

Estimation of the Model Simultaneously

Chapter 9

Results of Simulation

THE GREEK SOCIAL INSURANCE SYSTEM : AN ECONOMETRIC MODEL

The comparison of the Greek insurance system with the British, American and Spanish systems, shows that only the Greek social insurance system is not complemented by a private sector insurance system. Because of this fact, the social insurance system of Greece and in particular the pension scheme, plays an increasingly more important role in the Greek aggregate economy than the other three systems and in the corresponding economies.

Policy changes in pension benefits and their financing influence economic decisions and behaviour throughout the entire economy; for this reason, there is an advantage for each country to have some empirical evidence for such macro-economic effects, but according to the previous comparisons, such evidence is particularly necessary for Greece. The Greek insurance system cannot continue to carry on in a disjointed manner under the pressure of various social groups, as it has done in the past, but instead it should adopt at a rather systematic form.

During the 1980s, when pension expenditure increased considerably in Greece, the rate of growth of the Greek economy was relatively low. The social commitments, contrary to the recent Law's stricter retirement requirements, will continue to remain large and pension expenditure high, while the growth of the economy remained low until 1993 and only in the last two years has started to improve. This

is an additional reason why it is important for continuous studies to be made in order to assist the systematic development of the social insurance system. These studies will highlight the direct and indirect effects on the Greek economy, resulting from policy changes of the social insurance system.

In the first part, it was mentioned that the Greek social insurance system has come to an economic and organizational crisis; so in an effort to surpass this crisis, measures have been taken recently and measures will be taken in the future. It is very important however that these steps are carefully examined before being implemented.

The measures must tackle and solve the social insurance problem without creating any serious problem for the other sectors of the economy. Because, if the problem is just shifts from one sector to another, no real benefit will accrue to the economy.

In this third part, an effort will be made to answer these questions, which arise from the above discussion, i.e if a step has been taken by the Greek social insurance sector, what effect will it have on the Greek aggregate economy.

This means that every step will be assessed so as to show the increase or decrease in pension benefits or other social benefits or/and in social insurance revenue. Later on, the indirect and direct effects on the aggregate economy, from such increases or decreases, will be estimated by an econometric model. For this

reason, a simple econometric model of the Greek economy is employed to simulate the effects of the hypothetical policy changes, which may be :

- a ceteris paribus increase in the employer contribution rate
- a ceteris paribus increase (or decrease)in pension benefits and
- an increase in both together.

The experiments contain:

1. Creation of the "Econometric model of the Greek Social Insurance System" (chapter 7),
2. Simultaneous estimation and simulation of the model, (chapter 8) and
3. Discussion of the results of policy simulation, (chapter 9).

Chapter 7

THE CREATION OF THE MODEL

THE CREATION OF THE MODEL

7.1 Introduction

Studies are the only way in which the interaction between social insurance and the organization of society as a whole can be understood. Statistical data and methods of analysis and evaluation are used in order that social changes can be followed more closely.

Recently public authorities have begun to carry out long-term forecasting work in the pensions field. These are designed to measure the major trends in the development of the system and to evaluate the scope for adjustments. Particular attention is given to social security problems and above all to variables that link up social security to the economy in general.

The methods which define quantitatively the effects of any real or potential intervention in the social insurance field are classified as follows:

- Actuarial models, specifically devoted to the study of social insurance.
- Econometric models, a macroeconometric model with some equations intended for social insurance or a sub-model intended for social insurance, linked to a macroeconometric model.

These methods should make it possible to have a better picture of the actual situation so that better decisions can be taken on the social insurance system.

The building and use of macroeconomic models is becoming more and more a practice in Greece as interest by public authorities seems to be emerging. Several models have already been constructed based as much on public as on personal initiative.

Macroeconomic model building has been implemented with appropriate attention to Center of Planning and Economic Research (KEPE). The construction of its models is followed by a systematic periodical forecasting and policy simulation exercises but appropriate attention has not been given to the social sector[64]. This is the main reason for this attempt to construct a new model with a view on the social sector.

The model developed for this thesis, which enables a link between the social insurance and macroeconomic system, allows one to assess the direct effects of the economy on social insurance and conversely the feedback of the impact of social security on the macroeconomic system.

The aim of this chapter is to present and estimate the equations incorporated in the model. We begin by specifying the overall structure of the model, including the appropriate functional forms of each equation.

Behavioral equations were estimated using the ordinary least squares method, apart from those equations which do not contain a lagged dependent variable, but the Durbin-Watson statistic indicated serial correlation of errors, an alternative equation was estimated assuming first-order autocorrelated residuals and the AR(1) version was chosen.

Time Series Processor (TSP) program was used for the estimation of the model. All equations of the model are estimated with annual data covering the period 1962-1990.

Data bank is: National Accounts Service - Ministry of Coordination
National Statistical Service of Greece
Center of Planning and Economic Research.

Definitions of all the variables of the model are listed as follows, (Section 7.2).

7.2 DEFINITIONS

a) Endogenous variables

1.	CPR	Real private consumption expenditures
2.	IPR	Real business investments (total private investments - housing investments)
3.	XTR	Real exports of goods and services
4.	MTR	Real imports of goods and services
5.	Y	Real gross domestic product
6.	YFB	Real-valued factor income
7.	W	Average yearly money wage
8.	WI	Wage income
9	P1	Aggregate domestic price (GDP deflator)
10	PC	Consumer price index
11	PHI	Producer price in industry
12.	LS	Labour supply (LS = LI + Unemployment)
13.	K	Real valued capital stock
14.	PEN	Pension benefit per recipient
15.	PENS	Total pension benefits
16.	OTR	Other public transfers to households
17.	BIH	Business income of households, plus other components of household disposable income
18.	TD	Total direct taxes of households
19.	YDP	Disposable income

b) Exogenous variables

20.	IPHR	Real housing investments
21.	INV	Real inventory investments
22.	CGR	Real government consumption expenditures
23.	IGR	Real government investments
24.	PE	Export price
25.	PM	Import price
26.	Poil	Oil price index
27.	LI	Labour demand in non agricultural sector (Employees)
28.	WFD	Foreign demand
29.	GOS1	Real-valued gross operating surplus
30.	YCPR	Saving: total income of consumers that is not spent
31.	DA	Depreciation of capital stock in private sector
32.	WPOP	Working-age population
33.	TIS	Net of interest taxes and subsidies
34.	A	Employer contributions rate
35.	R	Number of pension benefit recipients
36.	YPP	Net capital income of households
37.	ST	Statistical discrepancies

c) Dummy variables

38.	DD82	1982 = 1 zero remainder of period
39.	DD90	1990 = 1 " "

Note that any variable preceded by the letter L means that it is in the log form

Theoretical and empirical equations for determining the model are as follows.

7.2.1 Real Gross Domestic Product = dependent variable Y at 1980 prices, market values.

GDP and its components, consumption (private consumption CPR and government consumption CGR), investment (private IPR, government IGR, housing IPHR and inventory IVN) and net exports (exports XTR minus imports MTR) are all in real (1980) prices.

The GDP identity is written as:

$Y = CPR + IPR + IPHR + INV + CGR + IGR + (XTR - MTR) + (ST)$

The major components of aggregate demand are treated endogenously and only the public and housing sector exogenously.

7.2.2 Private consumption equation

The consumption behaviour can be expressed by a function which includes as predetermined variable real disposable income (YDR) as well as lags of the dependent variable of real private consumption (CPR_{-1}).

The following simple general form is obtained :

$CPR = f(YDR, CPR_{-1})$

The consumption function, equation, was estimated using the ordinary least squares method (OLS), with annual data covering the period 1962-1990 inclusive.

$CPR = 17136.54 + 0.3452323*YDR + 0.526978*CPR_{-1}$

(8.07) (6.07) (6.86) = t statistic

$R^2 = 0.9986$ $h = 1.80313$ (D-W = 1.2968)

$h = 1.80313 < Z = 1.96$ **There is no autocorrelation**

R^2 is the multiple correlation coefficient. The higher R^2, the better the "goodness of fit" of the regression plane to the sample observations.

D-W is Durbin and Watson statistic, test for serial correlation in least squares regression, h is Durbin's statistic for testing serial correlation in lagged models.

Note that both changes in (YDR) and (CPR_{-1}) have the correct signs and are highly significant. As one would expect consumption can be largely explained by disposable income.

7.2.3 Private investment equation

The desired capital stock (K) is assumed to be determined by the expected output and the expected margin of profit, in line with standard economic theory. The gross investment (investment less depreciation) is determined by desired capital stock and the stock in previous year.

The private investments (including both investments in machinery and buildings but excluding investments in dwellings) are influenced by the real value added, the rate of profits and the real capital stock.

In an attempt to specify an private investment function for Greece the numerous forms of functions and factors as savings, interest rate were taken into account. The factors explaining private investment behaviour in Greece satisfactorily are as follows:

- real valued gross operating surplus (GOS1),
- real valued capital stock (K01 = $K - K_{-1}$),
- savings in previous year ($YCPR1_{-1}$) , as well as
- lag of the dependent variable of private investment, IPR_{-1}

Private investment (IPR) is modelled as follows:

$$IPR = f(GOS_{-1}, K01, YCPR1_{-1}, IPR_{-1})$$

The estimation of this function using the OLS method for the period 1962- 1990 is obtained as follows:

$$IPR = -3109.126 + 0.1072153*GOS1_{-1} + 0.3283287*(K- K_{-1})$$
$$(-3.43) \qquad (4.08) \qquad (11.21)$$

$$+0.0943287*YCPR_{-1} + 0,09918881*IPR_{-1}$$
$$(3.91) \qquad (1.37)$$

t-values are given within parentheses.

$R^2 = 0.9865$ $h = 1.10729$ There is no autocorrelation

It can be observed that the above variables appear to have a significant effect on private investment, while it was not possible to find any effect of interest rate.

7.2.4 Imports and Exports equations

The international trade is very important for an open economy and its economic policy is very often constrained by foreign transactions. In the case of Greece, a small open economy, foreign trade equations are of the utmost importance.

Foreign trade - exports and imports - equations specifications are demand functions and as in every demand function the dependent variables are related positively to income and negatively to the relative prices. Income effect is represented in import equation by domestic demand and in export equation by foreign demand.

7.2.4.1 Exports equation

The exports function is influenced by foreign demand as well as by relative prices. The influence of foreign demand on exports is measured by the evolution of the demand for imports of OECD countries. The OECD's volume index of goods and

services is chosen as a proxy for foreign demand as a large part of Greek exports to countries other than OECD members was the result of bilateral agreement and could not be explained by a behavioral equation. The relative prices are measured as the ratio (PHI/PE) of producer prices in the non agricultural sector (PHI) and import prices (PE) .

The equation of Exports (XTR) can be written as follows:

XTR = f (PHI/PE, WFD)

An equation has been estimated in logarithmic form using the OLS method but the Durbin -Watson statistic indicated that serial correlation of residuals exist. For this reason an alternative equation was estimated assuming first-order autocorrelated errors and the AR(1) version was chosen. The exports equation for the period 1962-1990 has been estimated taking the OECD volume of imports as exogenous variable .

LXTR = 3.839781 - 0.02671733*LPHIE + 1.451489*LWFD

(7.63) (-0.16) (14.02) = t statistic

R^2 = 0.984 D-W = 1.7948

du = 1.56 < D-W = 1.7948 4-d = 4-1.7948 = 2.2052 > du = 1.56

There is no autocorrelation

explanatory

Looking at the results of the equation, we observe that both explained variables have the expected sign. On the other hand one of them, the relative price of exports to domestic prices, is not statistically significant at the 95% level but it is included in the equation due to its theoretical importance.

7.2.4.2 **Imports equation**

The assumption that demand is a function of income and prices is the starting point for estimating the imports.

The variable representing the income effect is explained by domestic production and the price effect by a composite price including GDP and imports deflators.

This equation can be written as follows :

MTR = f (Y, PM / PHI)

Where (MTR) is real imports of goods and services

(Y) domestic production - real gross domestic product

(PM /PHI) price index, (PM) import price and

(PHI) producer price in industry

The estimated imports equation for the period 1962-1990 in logarithmic form using the error structure AR(1) is presented as follows:

LMTR = - 9.005584 + 1.589988*LY - 0.9571448*LPMHI

(-8.93) (20.00) (-3.76) = t statistic

R^2 = 0.992 D-W = 1.8279

du = 1.56 < D - W = 1.8279 4 - d = 4 - 1.8279 = 2.1321 > du = 1.56

There is no autocorrelation

The signs of both explained variables are correct and they are statistically significant at the 95% level.

7.3 Wages and Prices equations

Wages and prices are determined simultaneously by behavioral equations and the change of prices is the result of adjustment,of wages to prices and of prices to cost.

A brief theoretical analysis of factors influencing endogenous variables, wages and prices, is presented.

7.3.1 Wages equation

According to the theoretical literature the rate of change in the nominal wage is usually influenced by inflation, the rate of change in productivity and by labour market pressure, the other explanatory variable could be the profit[13].

The average yearly wage in Greece is assumed to be determined by the rate of productivity change, price change,the employer contributions, the labour market pressure and the yearly wage in the previous year. There are many explanatory variables within the same equation with the accompanying complication of multicollinearity. Attempts to reduce the number of variables in the equation give the following form of the average yearly money wage (W).

$W = f (PYFLA, LDS, W_{-1})$ **$PYFLA = PHI + YFB/LI + 1/(1+A)$**

Where (PHI) is the producer price in non agricultural sector, which is the most appropriate variable for the measurement of the influence of prices on wages.
(YFB/LI) is the measure of productivity, - YFB measures real income in factor values and LI measures the effect of Employees.

The labour market pressure variable is constructed as the ratio labour supply (LS = LI + unemployment) / (LI) labour demand in non agricultural sector (employees).

The above function in logarithmic form estimates the average wage, using the ordinary least squares method.

$$LW = -0.615805 + 0.3509522*LPYFLA + 0.7933719*LLDS + 0.7316419*LW_{-1}$$
$$(-4.37) \qquad (4.36) \qquad (3.07) \qquad (10.17)$$

t-values are given within parentheses

$R^2 = 0.999$ $h = 1.43321$

LPYFLA : Log [PHI * YFB/LI * 1/(1+A)] YFB = Y - TIS/P1

The present estimated equation has the correct signs and its explanatory variables are significant from a the statistical point of view.

7.3.2 Prices equations

The main equations of prices are the GDP price, the consumer price and the producer price in the non agricultural sector. The three prices are assumed to be determined by labour costs as in most models. In addition, the GDP deflator is a function of changes in the import prices, the consumer price index is a function of this index in the previous year and the producer price in the non agricultural sector is a function of the oil price index.

The three equations of prices are explained explicitly in the model as follows :

- **GDP deflator P1 = f (W(1 + A), PM)**
- **Consumer price index PC = f (W(1 + A), PC_{-1})**
- **Producer price in non agricultural sector PHI = f (W(1 + A), Poil)**

Where: W(1 + A) is labour cost

- (W) average yearly money wage including social contributions of employees,
- (A) social contributions of employers,

(PM) import price and (Poil) oil price index.

Price equations have been estimated by :

a) **GDP deflator**

$$\mathbf{LP1 = -0.3942473 + 0.09468635*LWC1B + 0.295739*LPM + 0.6050922*LP1_{-1}}$$

(-4.1) (4.16) (7.85) (17.08)

$R^2 = 0.9996$ h = 0.740723 (D-W = 1.6255)

b) Consumer price index

$$LPC = -0.9309424 + 0.2241564*LWC1B + 0.7656688*LPC_{-1}$$
$$(-2.60) \qquad (2.9) \qquad (8.17)$$
$$R^2 = 0.996 \qquad D\text{-}W = 1.5759$$

c) Producer price in non agricultural setor

$$LPHI = -0.4732644 + 0.1170278*LWC1B + 0.07503626*LPoil +$$
$$(-2.46) \qquad (2.56) \qquad (3.37)$$
$$+ 0.786274*LPHI_{-1}$$
$$(15.91)$$
$$R^2 = 0.998 \qquad h = 1.06250 \quad (D\text{-}W = 1.5627)$$

$h = 1.06250 < Z = 1.96$ **There is no autocorrelation**

The method of estimation is OLS. The logarithm form was used in all of them. In the above equations which have been estimated for the period 1962-1990, all estimated parameters have the correct sign, are significant and in all the functions the R^2 is more than 99,6%.

7.4 Disposable income (YDP)

The real disposable income of households (YDP/PC) encompasses six components all in real prices. They are: real wage income, net capital income of household, total pension benefits, other public transfers to households, business income, and total direct taxes of households.

The basic identity determining the real disposable income is the following :

$$YDP/PC = WI/PC + YPP/PC + PENS/PC + OTR/PC + BIH/PC - TD/PC$$

WI/PC	=	wage income in real prices
YPP/PC	=	net capital income of household in real prices
PENS/PC	=	total pension benefits in real prices
OTR/PC	=	other real public transfers to households
BHI	=	business income of households, plus other components of household disposable income
TD/PC	=	total real direct taxes of households

Five variables - wage income, net capital income of household, other public transfers to households, business income and total direct taxes of households - are explained explicitly in the model. The net capital income of households has been left exogenous in the identity of disposable income. The specifications and estimations of the equations of the above five endogenous variables were as follow.

7.4.1 Real pension benefit per recipient (PEN/PC)

The employees, who pay contributions to the social insurance system today, expect to receive social insurance benefits in the future, the most important of which are pension benefits based on earned income. These social insurance benefits constitute a form of fictitious wealth and may provide a substitute for current savings. Old age pensions are financed with employer contributions levied on wages.

A specific importance in the present context is the equation modelling social security real pension benefits for the recipients. This factor is not simply an explanatory variable in a model but also a variable that has to be determined within the model and which is modelled here as a function of the real wage rate and the average pension per recipient in previous year. A dummy variable is designed to capture the effect of the introduction of the additional benefits for low-income pensioners in 1982.

Such a function can be written as

PEN/PC = f (W/PC, $(PEN/PC)_{-1}$, DIV)

which is the equation estimated in the model.

LPENR = 0.1180425*LWR + 0.8347222*$LPENR_{-1}$ + 0.1887624*DD82

(4.79) (22.28) (3.52) = t statistic

DUMMY : 1982 = 1, zero for remainder of the period.

R^2 = 0.984 h = 1.26942

h = 1.26942 < Z = 1.96 **There is no autocorrelation**

Estimations thus show appreciable influence from all explanatory variables.

7.4.2. **Other public transfers to households (OTP/PC)**

Other public transfers to households are child and sickness allowances and unemployment compensation. They are modelled in relation to wage income as well as the transfers from previous year,

OTP/PC = f (WI/PC, $(OTR/PC)_{-1}$) and

function is also estimated.

LOTRR = -1.147583 + 0.3961091*LWIR + 0.6301113*$LOTRR_{-1}$ -0.084826*DD90

(-1.80) (2.83) (5.65) (-1.38)

t-values are given within parentheses

R^2 = 0.991 h = 1.70144 (D-W = 1.4134)

h = 1.70144 < Z = 1.96 **There is no autocorrelation**

This equation performs sufficiently well to provide a satisfactory approximation for other public transfers to households.

7.4.3. **Total direct taxes of households (TD/PC)**

Total direct taxes of households are simply assumed to be a function of disposable income. Such a process can be modelled as

TD/PC = f [(WI/PC) + (PENS/PC) + (OTR/PC) + (YPP/PC) + BIH/PC)]

LTDR = Log(WI/PC + PENS/PC + OTP/PC + YPP/PC + BIH/PC) = (LWPOY)

LTDR = -7.187076 + 1.368023*LWPOY
(-7.24) (17.52)

R^2 = 0.988573 D-W = 2.0667

du = 1.48 < D-W = 2.0667 4-d = 4-2.0667 = 1.9333 > du = 1.48
There is no autocorrelation

7.4.4 **Other components of household disposable income (BIH/PC)**

Other components of household income include business income and other residual income of households excluding net capital income which is presently exogenous in the model.
BIH/PC = f (WI/PC)

LBIHR = 4.808802 + 0.5434123*LWIR
(8.40) (11.07)
R^2 = 0.9926 D-W = 1.7690

1.48 < D-W = 1.769 4-d = 4-1.769 = 2.231 > 1.48
There is no autocorrelation

The method of estimation is OLS for pension benefits and public transfers as well as AR(1) for business income and capital income.

The functional form for estimation is logarithmic for pension benefits, public transfers and business income. The coefficients of all variables have the expected signs and all of them are statistically significant at the 95% level of significance.

7.5 Labour Demand (LD) and Labour Supply (LS)

Labour supply can be considered as a very important variable in a macroeconometric model. It is a function of the working age of the population (18-64 age).

LS = F (WPOP), where WPOP is the working age of the population

Method: GLS with errors follows AR(1)

LS = -3700.474 + 0.8718544*WPOP + 92.96697*TT

(-24.25) (34.54) (7.25)

R^2 = 0.976 D-W = 1.6138

du = 1.56 < D-W = 1.6138 4-d = 4-1.6138 = 2.3862 > 1.56

There is no autocorrelation

TT is a dummy variable, which is introduced into the equation to take into account the errors in data of supply and demand.

Labour demand (LI) could be endogenous but is left exogenous because the specification and estimation of the equation for the Greek economy is difficult to attain.

7.6 The creation of the model

The objective of this section is to construct a simple annual macroeconomic model for the Greek economy. This is an aggregate (one product - one branch) demand orientated model consisting of 19 endogenous variables.

The model depicts the determination of gross domestic product and aggregate income. The major components of aggregate demand are modelled. In this model the public and housing sectors are treated exogenously. The model also includes a number of policy parameters, the most important of which, in the present context, are the average employment contribution rate and the average pension benefits.

The model consists of 19 equations as the endogenous variables, of which 13 are behavioral and six are identities. The model is summarized as follows.

E Q U A T I O N S

1.	CPR	= f (YDR, CPR_{-1})
2.	IPR	= f ($GOS1_{-1}$, IPR_{-1}, K01, $YCPR_{-1}$)
3.	XTR	= f (PHI/PE, WFD)
4.	MTR	= f (PM/PHI, Y,)
5.	W	= f [(PHI* YFB/LI * 1/1+A), LI/LS, W_{-1}]
6.	P1	= f [W*(1+A), PM, $P1_{-1}$]
7.	PC	= f [W*(1+A), PC_{-1}]
8.	PHI	= f [W*(1+A), Poil, PHI_{-1}]
9.	PEN/PC	= f [(W/PC), $(PEN/PC)_{-1}$, DD82]
10.	OTR/PC	= f [(WI/PC), $(OTR/PC)_{-1}$, DD90]
11.	TD/PC	= f [(WI/PC) + (PENS/PC) + (OTR/PC) + (YPP/PC) + (BIH/PC)]
12.	BIH/PC	= f (WI/PC)
13.	LS	= f (WPOP, TT)

I D E N T I T I E S

14. Y = [CPR + IPR + IPHR + INV + CGR + IGR + XTR-MTR + (ST)]

15. K = K_1 + IPR + IPHR + IGR + DA

16. WI = W * LI

17. PENS/RC = (PEN/PC) * R

18. YFB = Y - TIS/P1

19. YDP/PC = (WI/PC) + ((PEN*R)/PC) + (OTR/PC) + (YPP/PC) + (BIH/PC)-(TD/PC)

The endogenous and exogenous variables with their definitions and the dummy variables were listed before in section 7.2.

7.7 Estimation of the equations for 1975-1990

Further improvement of the model could be possible with a more detailed analysis of equations explaining the model over time.

We must answer the questions : a) is there a structural break in the functioned form of the endogenous variables over time? and b) is the difference of the coefficients of explanatory variables insignificant?

To answer these questions we may perform the F test suggested by C. G. Chow (reference No 19). The equality between sets of coefficients of the estimated equations for both periods 1962-1974 and 1975-1990 is tested in the following equations.

Consumption	$F^* = 0.17524 < F_{3,23} = 3.03$
Investments	$F^* = 2.64054 < F_{5,19} = 2.74$
Exports	$F^* = 2.03786 < F_{3,22} = 3.05$
Imports	$F^* = 6.66235 > F_{3,23} = 3.03$*
Average Yearly Money Wage	$F^* = 3.62015 > F_{4,21} = 2.84$*
GDP Deflator	$F^* = 8.94349 > F_{4,21} = 2.84$*
Consumer Price Index	$F^* = 6.27744 > F_{3,23} = 3.03$*
Producer Price Index	$F^* = 7.43638 > F_{3,23} = 3.03$*
Real Pension Benefit Per Recip.	$F^* = 3.72506 > F_{4,21} = 2.84$*
Other Public Transfers To Hous.	$F^* = 1.85233 < F_{3,23} = 3.03$
Total Direct Taxes of Hous.	$F^* = 1.66904 < F_{2,25} = 3.39$
Other Components of Dispos. Income	$F^* = 2.89741 < F_{3,23} = 3.03$
Labour Supply	$F^* = 5.16985 > F_{3,23} = 3.03$*

(* indicates structural break over time)

The above Chow test was also applied for imports, prices indices, pension benefits per recipient and labour supply equations. The null hypothesis has been rejected and it is accepted that these functions differ significantly over time.

Functions of the above predetermined variables have changed over time taking into account :

- the structural changes as well as the opening of frontiers due to EEC membership of Greece after 1981,

- the very high growth of inflation after the mid 1970s and during the 1980s,

- the effect of the additional benefits for low-income pensioners as well as the qualitative and quantitative extension of social insurance during the decade 1980-90.

Taking into account the above changes, we decided to re-estimate the equations for the period 1975-1990, although the economic results of the equations for the period 1962-1990 were good. The estimated equations which are incorporated in the model are given below.

7.8 The estimated equations for the period 1975-90.

1. C O N S U M P T I O N

Method : OLS

$CPR = 21296 + 0.3177\ YDR + 0.5503\ CPR_{-1}$

(2.6) (3.9) (5.2) = t statistic

$R^2 = 0.990$ $h = 1.795$

$h = 1.795 < Z = 1.96$ **There is no autocorrelation**

2. I N V E S T M E N T S

Method : OLS

$IPR = -7396.815 + 0.0441384*Y12 + 0.1366397*GOS1_{-1} +$

(-1.99) (1.15) (4.78)

$+0.2508312*IPR_{-1} + 0.2746738*K01 + 0.0657477*YCPR_{-1}$

(2.08) (4.14) (1.58)

(t-values are given within parentheses)

$R^2 = 0.95$ $h = -0.797274$

3. E X P O R T S

METHOD OLS

$DXTR = 0.849 - 0.4725*PHIE + 0.0157*WFD + 0.4698*DII$

(1.9) (-1.5) (11.1) (4.8)

(t-values are given within parentheses)

DUMMY : 1975, 1976, 1977 = -1, 1987, 1988 = 1

zero remainder of period

$R^2 = 0.969$ D-W = 1.7987

$du = 1.73 < D\text{-}W = 1.7987$ $4\text{-}d = 4\text{-}1.7987 = 2.2013 > du$

There is no autocorrelation

4. IMPORTS

METHOD : GLS with errors following AR(1)

LMTR = -8.27377 - 1.16371* LPMHI + 1.53747*LY

(-2.2) (-4.4) (5.3) = t statistic

R^2 = 0.998 D-W = 1.7958

du = 1.54 < D-W = 1.7958 4-d = 4-1.7958 = 2.3042 > du

There is no autocorrelation

5. AVERAGE YEARLY MONEY WAGE

YFB = Y - TIS/P1

LPYFLA : Log [PHI * YFB/LI * 1/(1+A)]

Method : OLS

LW = 0.153047*LPYFLA + 0.050725*LLDS + 0.85093*LW_{-1}

(2.46) (0.17) (11.24) = t statistic

R^2 = 0.998 h = 0.173306

h = 0.173306 < Z = 1.96 **There is no autocorrelation**

6. GDP DEFLATOR

Method : OLS

LP1 = -0.9788 + 0.21075*LWC1B + 0.30818*LPM + 0.4817*$LP1_{-1}$

(-3.5) (3.5) (5.7) (7.9)

R^2 = 0.9996 h = -1.27815

7. CONSUMER PRICE INDEX

$$LPC = -0.93818 + 0.221626*LWC1B + 0.776961*LPC_{-1}$$

(-2.7) (3.1) (10.0)

(t-values are given within parentheses)

$R^2 = 0.999$ h = 1.39330

h = 1.39330 < Z = 1.96 **There is no autocorrelation**

8. PRODUCER PRICE IN NON AGRICULTURAL SECTOR

$$LPHI = -1.395 + 0.3026*LWC1B + 0.070*LPoil + 0.6167*LPHI_{-1}$$

(-3.1) (3.13) (3.3) (6.1)

(t-values are given within parentheses)

$R^2 = 0.998$ h = 1.16705

h = 1.16705 < Z = 1.96 **There is no autocorrelation**

9. REAL PENSION BENEFIT PER RECIPIENT

$$LPENR = -0.63245 + 0.25286*LWR + 0.83814*LPENR_{-1} +$$

(-0.6) (1.1) (13.4)

$$+ 0.1755*DD82$$

(3.2) = t statistic

$R^2 = 0.956$ h = -0.465026

10. OTHER PUBLIC TRANSFERS TO HOUSEHOLDS

$LOTRR = -3.4933 + 0.741746*LWIR + 0.44274*LOTRR_{-1} -$

(-1.9) (3.03) (3.40)

$-0.10629*DD90$

(-2.31) = t statistic

$R^2 = 0.968$ $h = 0.593425$

$h = 0.593425 < Z = 1.96$ **There is no autocorrelation**

11. TOTAL DIRECT TAXES OF HOUSEHOLDS

$TD/PC = -46059 + 0.198(WI/PC + PENS/PC + OTP/PC + YPP/PC + BIH/PC) + 12.6D$

(-7.2) (14.4) (5.1)

(t-values are given within parentheses)

DUMMY : 1989 and 1990 = -1,

zero remainder of period.

$R^2 = 0.936$ D-W = 2.1173

$du = 1.54 < D\text{-}W = 2.1173$ 4-d = 4-2.1173 = 1.8827 > du

There is no autocorrelation

12. OTHER COMPONENTS OF HOUSEHOLD DISPOSABLE INCOME

$LBIHR = 7.54687 + 0.31649*LWIR$

(9.1) (4.6) = t statistic

$R^2 = 0.571$ D-W = 2.1925

du = 1.36 < 2.1925 4-d = 4-2.1925 = 1.8075 > du

There is no autocorrelation

13. LABOUR SUPPLY IN NON-AGRICULTURAL SECTOR

LS = -3378.141 + 0.823403*WPOP

(-19.2) (29.6) = t statistic

R^2 = 0.981 D-W = 1.6961

du = 1.37 < D-W = 1.6961 4-d = 4-1.6961 = 2.3039 > du

There is no autocorrelation.

As the economic relationship being studied changes over time, the re-estimation of the equations, taking into account the above remarks, is preferable, because of better statistical criteria. The actual (marked with □) and fitted value (marked with +) as well as the residuals over time and the residuals of fitted value have demonstrated the appropriateness of these equations of the annual macroeconomic model of the Greek economy for the period 1975-1990 and are given in figures in appendix (I).

CHAPTER 8

ESTIMATION OF THE MODEL SIMULTANEOUSLY

ESTIMATION OF THE MODEL SIMULTANEOUSLY

8.1 Introduction

The application of ordinary least squares to each equation of the model proposed in chapter 7 assumes that the explanatory variables are truly exogenous, but the specification of the model involves a considerable degree of interrelationship between the endogenous variables and any equation belonging to a simultaneously estimated system. In order to understand the behaviour of equations in a system a simultaneous solution and historical simulation must be applied for the entire model.

Econometric simulation models are having increasing use in the design of public policy. These models have an econometric orientation and are made up of equations which (except for accounting identities) are estimated using the standard econometric techniques.

The multi-equations simulation allows us to account simultaneously for all the interrelationships between a set of variables. Often these models consist of a set of regression equations which, after having been estimated, are solved simultaneously.

The general form adopted for determining as well as the estimation and results of historical simulations of this annual macroeconomic model of the Greek economy

are presented in this chapter, while policy simulations with shocks on predetermined variables will be presented in the next chapter.

8.2 Historical simulations of the model for period 1962-1990

Even when the results obtained by estimating the equations have been satisfactory, the consistency of the estimated equations must be verified by simulation technique. For this reason, the estimated equations of the entire model in the previous chapter are re-estimated by means of simulation techniques.

A necessary condition for the final adoption of such a model is the examination and analysis of its properties. The goodness of fit of the model is verified by historical simulation and the ability of the equations is further tested by carrying out a policy simulation.

In order to understand the behaviour of the equations of the model, which has 19 endogenous variables and equations (13 equations are behavioural and 6 are identities). A policy simulation analysis has been implemented and an estimation has been simultaneously applied using the **full information maximum likelihood** method for the period 1975-1990.

The following 19 figures represent the observed and the simulated value of the endogenous variables. Obsderved values are marked with □, fitted values are marked with +.

Figure 1

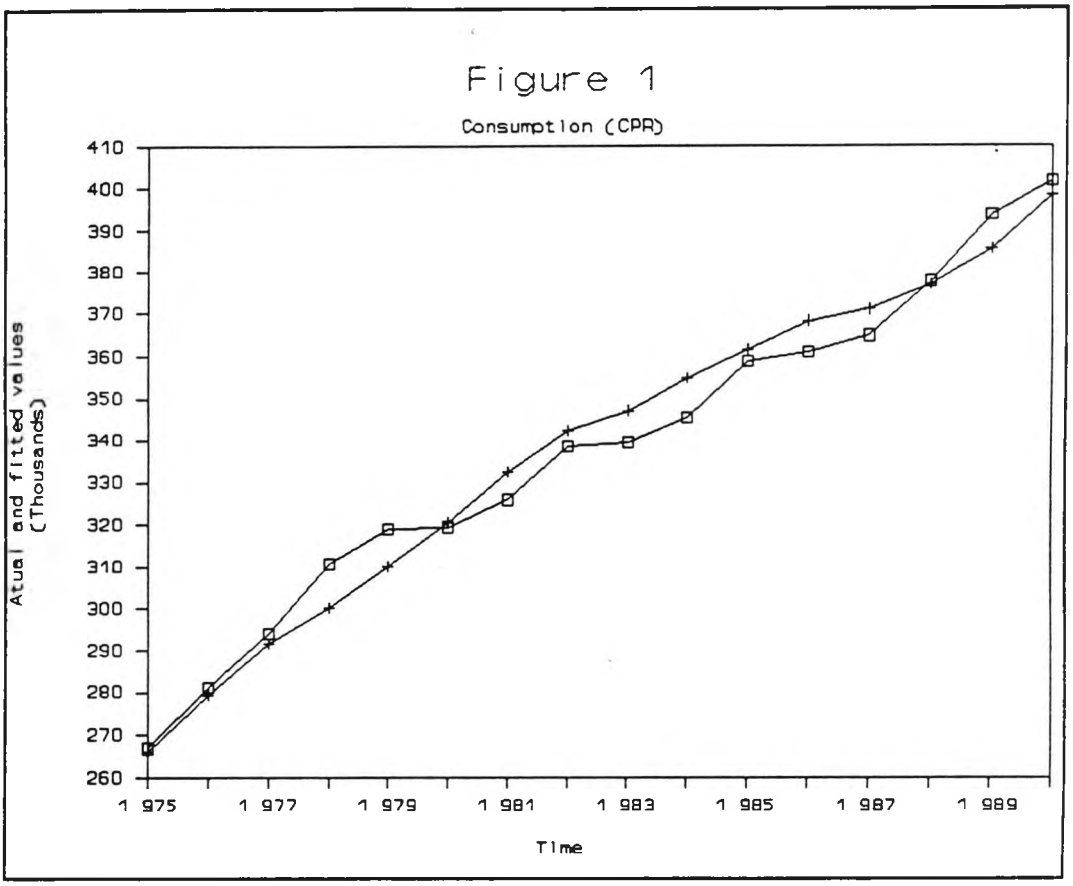
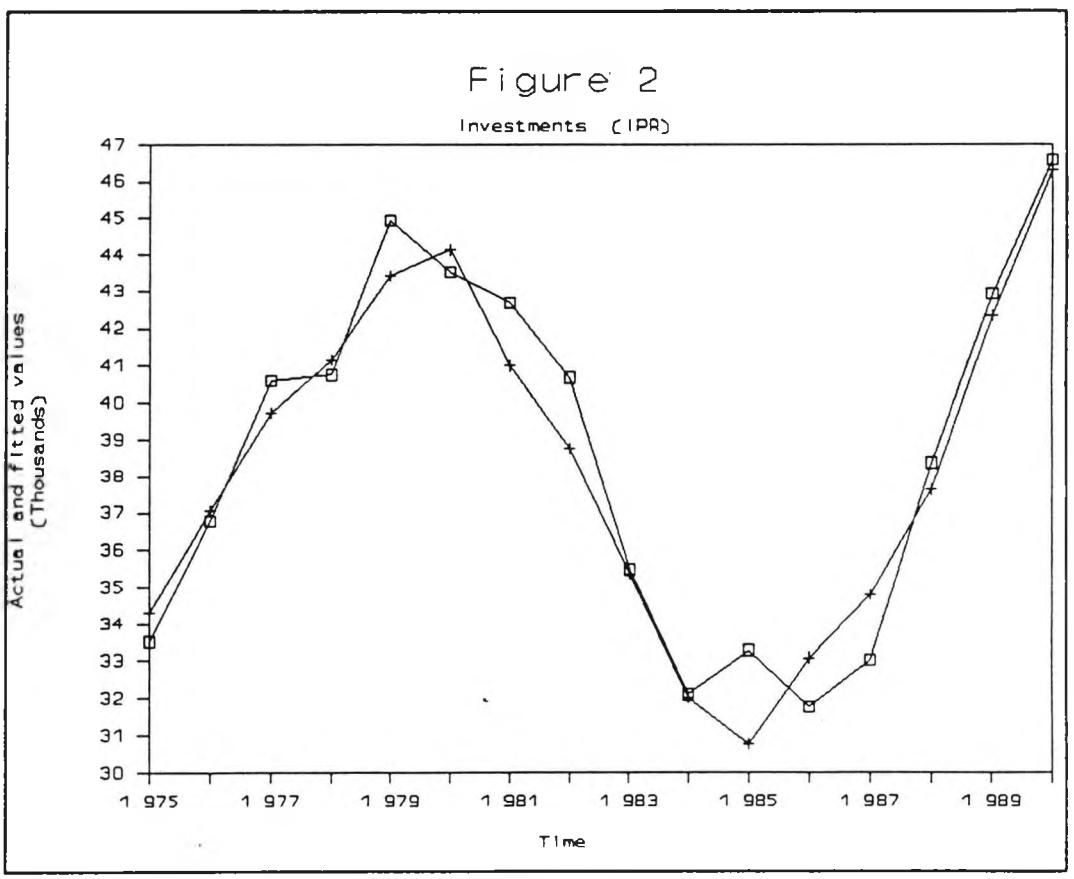


Figure 2



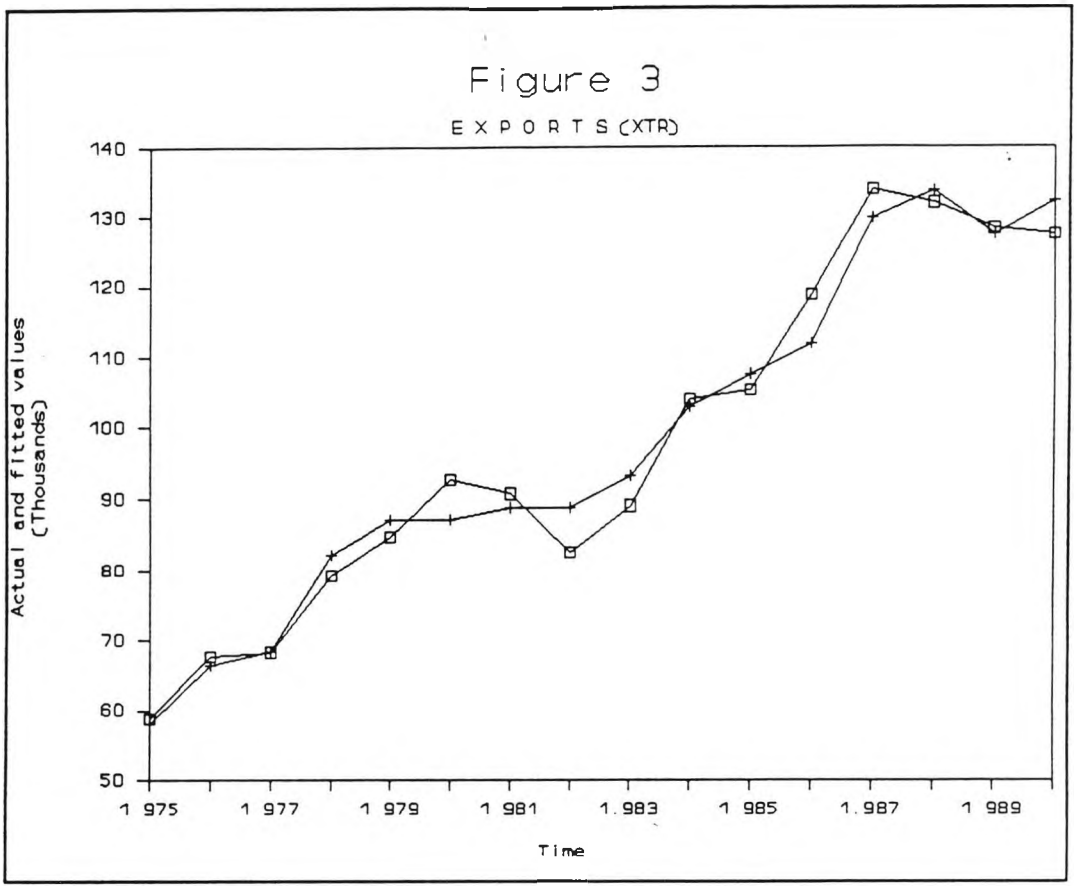


Figure 3
EXPORTS (XTR)
Actual and fitted values
(Thousands)
140
130
120
110
100
90
80
70
60
50
1 975
1 977
1 979
1 981
1.983
1 985
1.987
1 989
Time

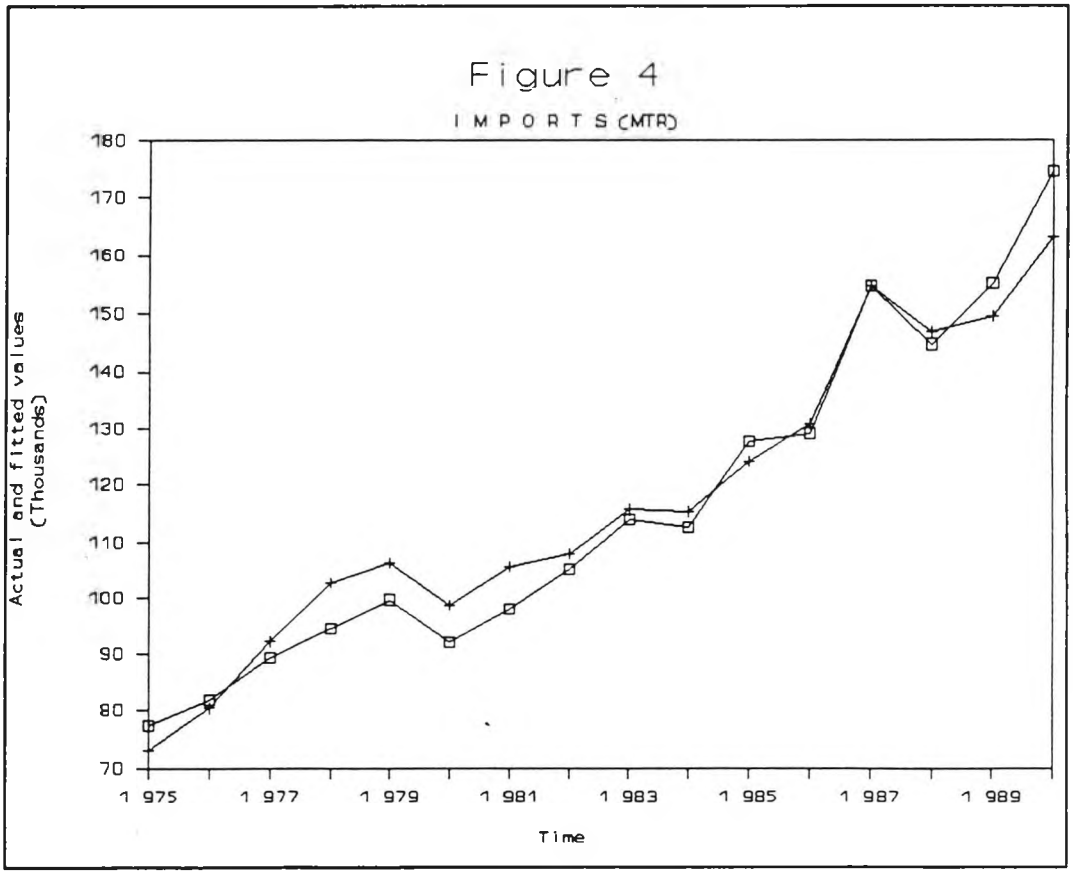


Figure 4
IMPORTS (MTR)
Actual and fitted values
(Thousands)
180
170
160
150
140
130
120
110
100
90
80
70
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
Time

Figure 5

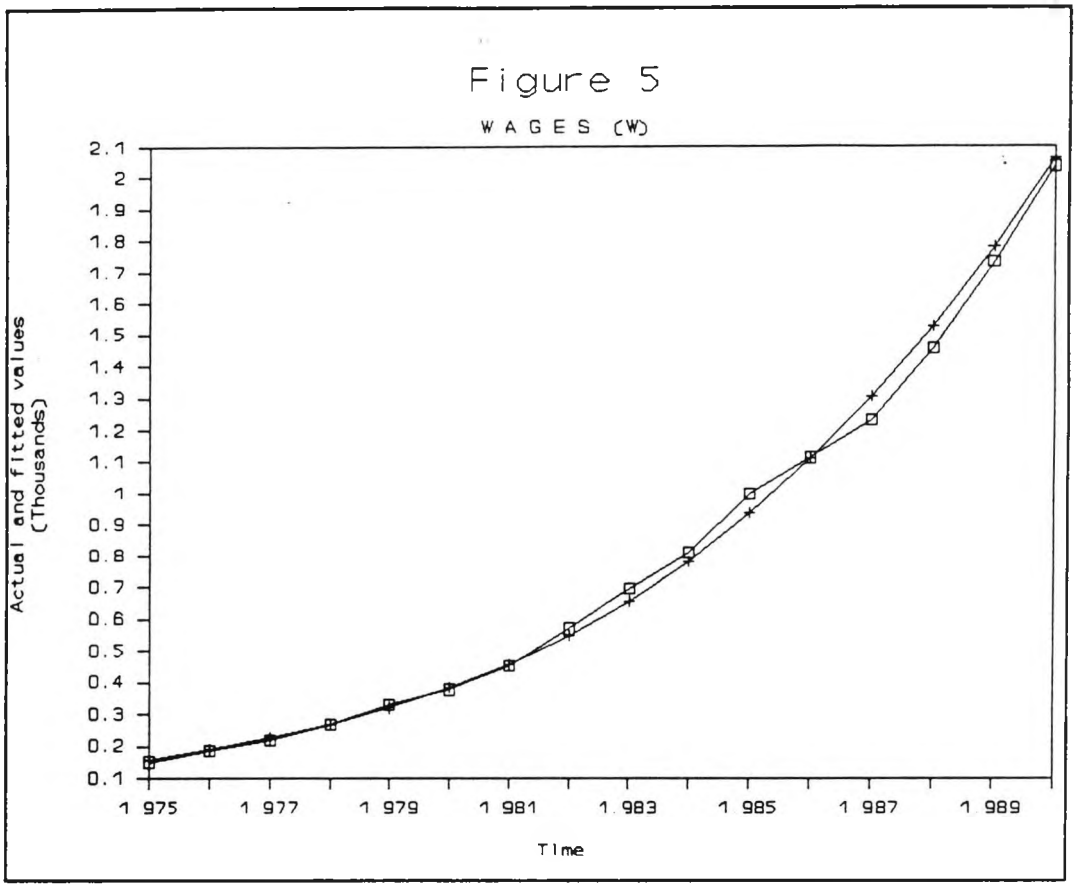


Figure 6

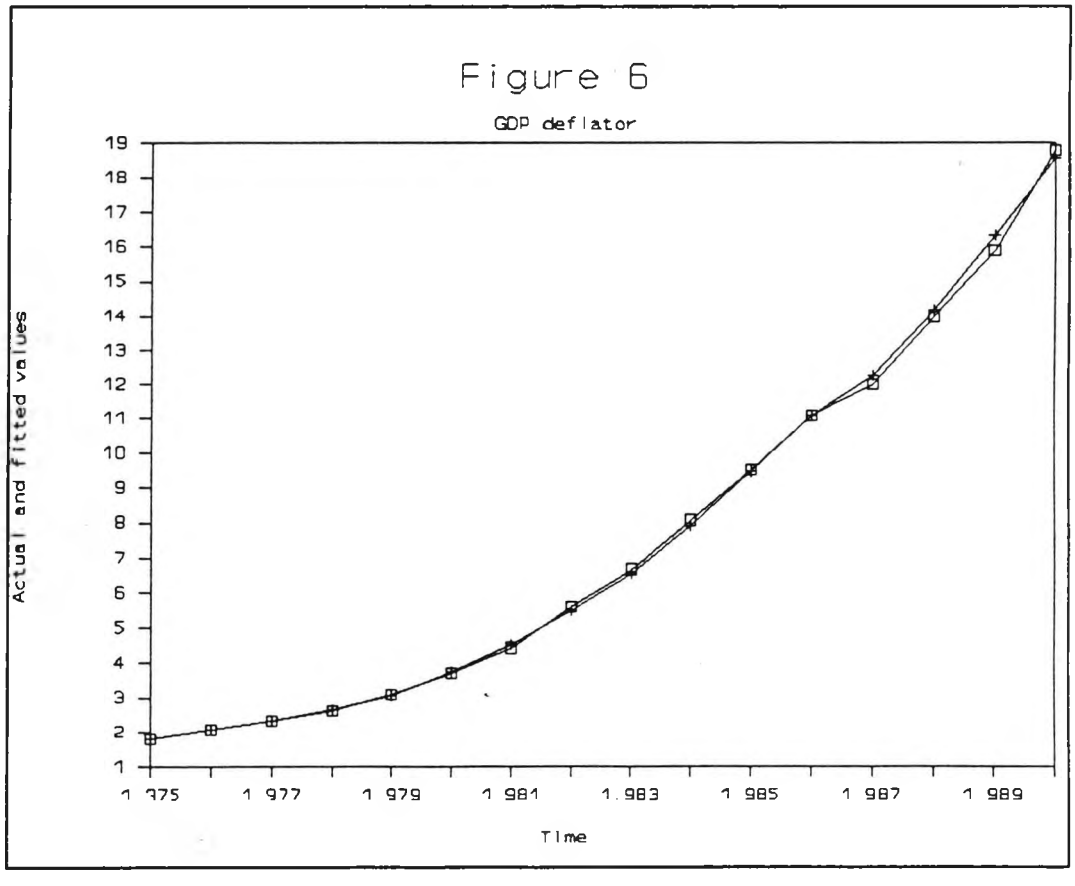


Figure 7

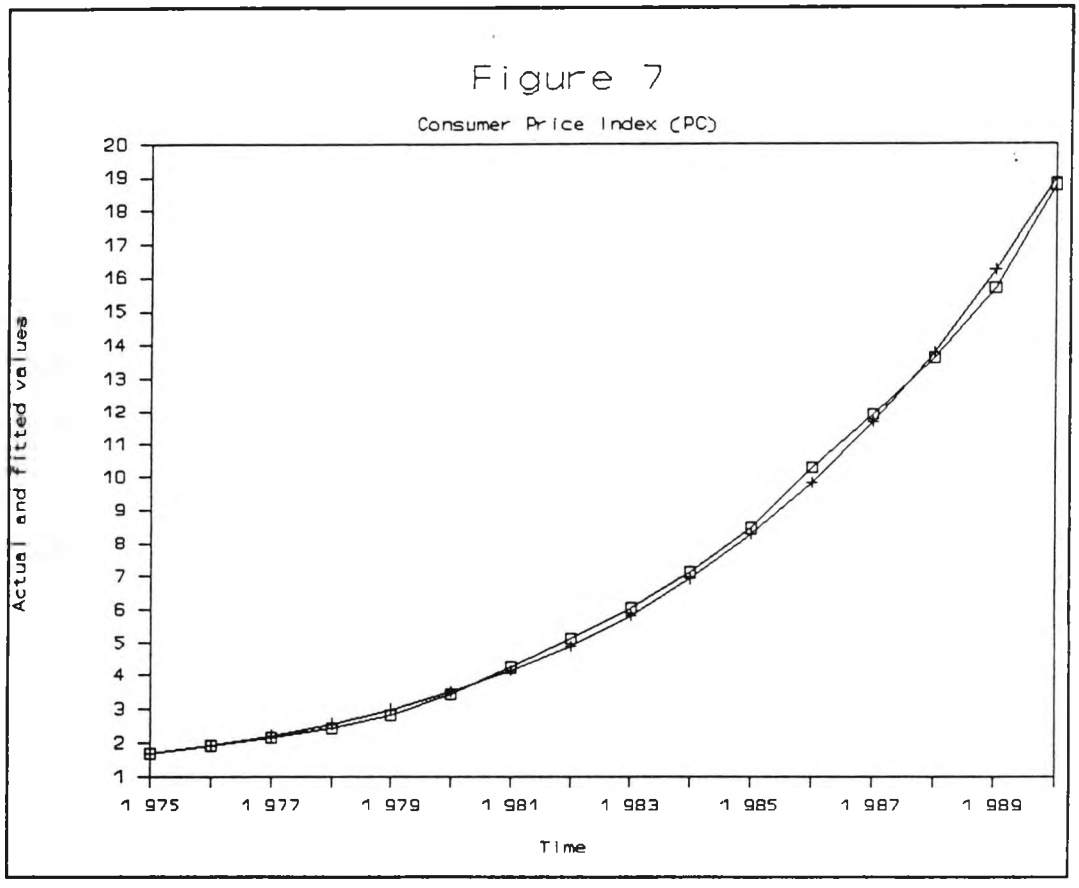


Figure 8

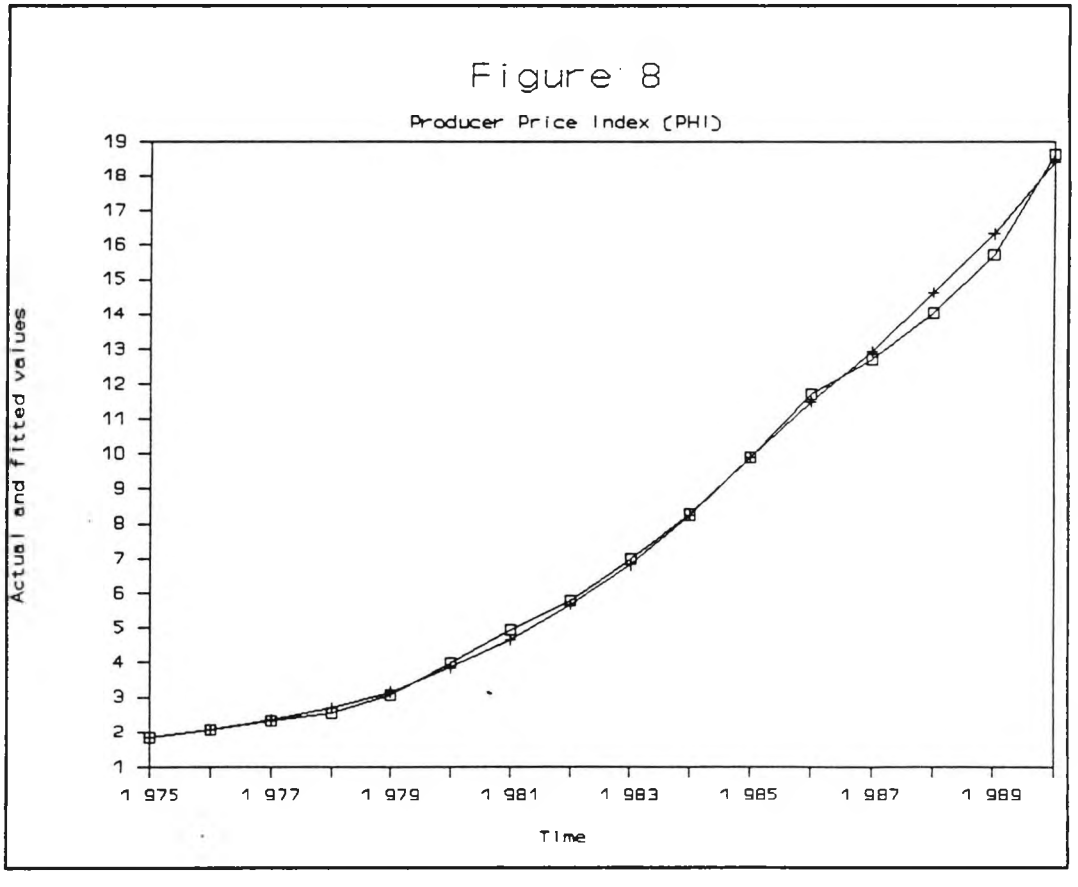


Figure 9

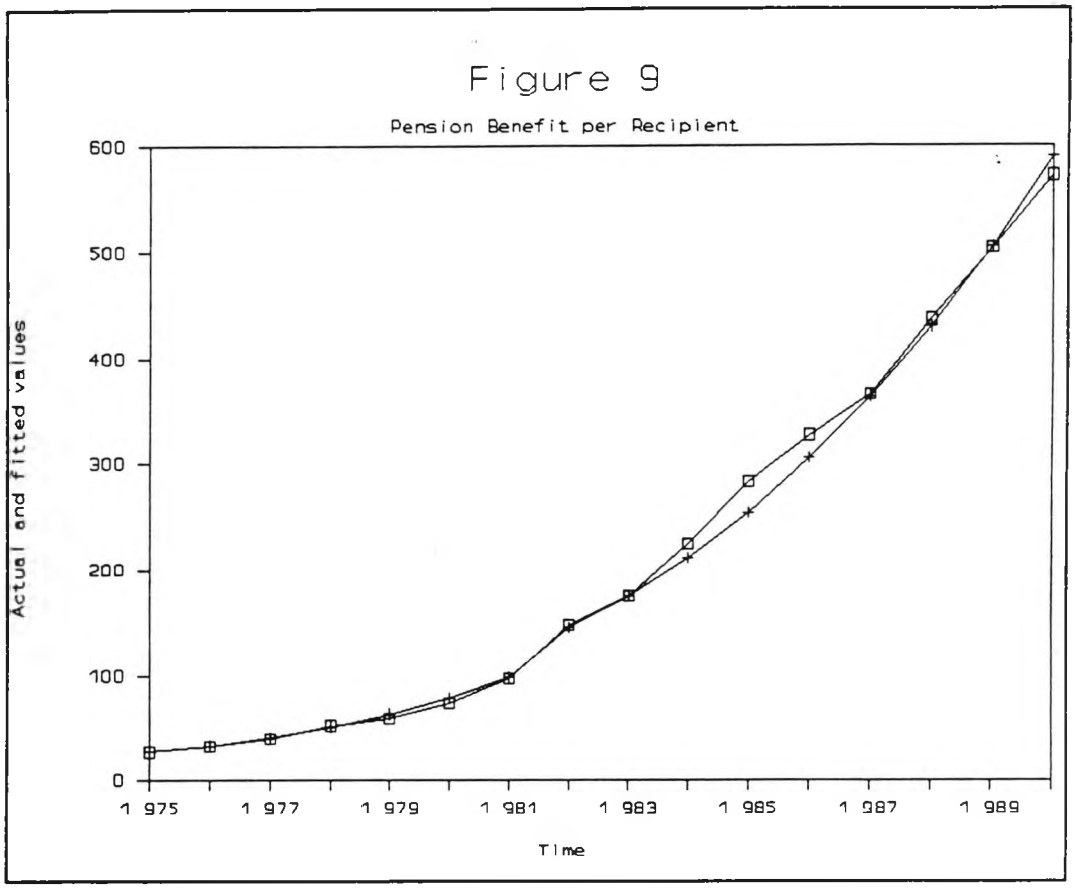


Figure 10

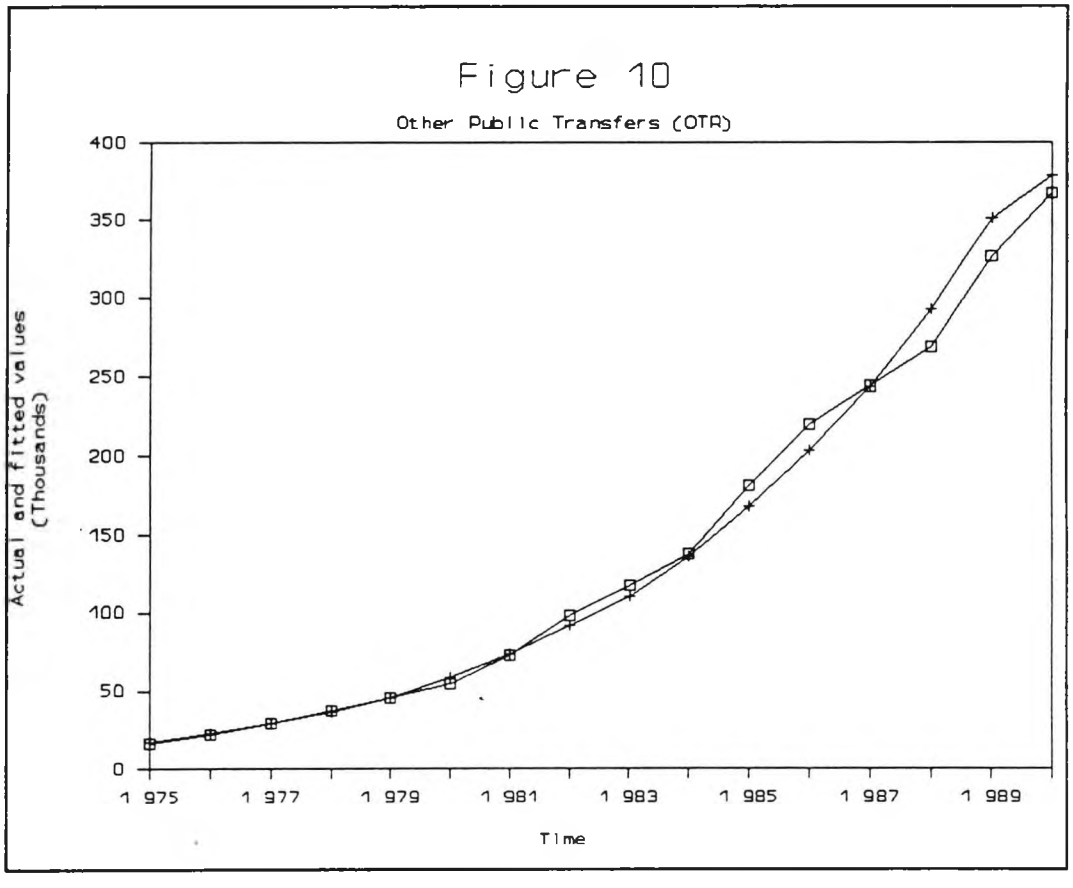


Figure 11

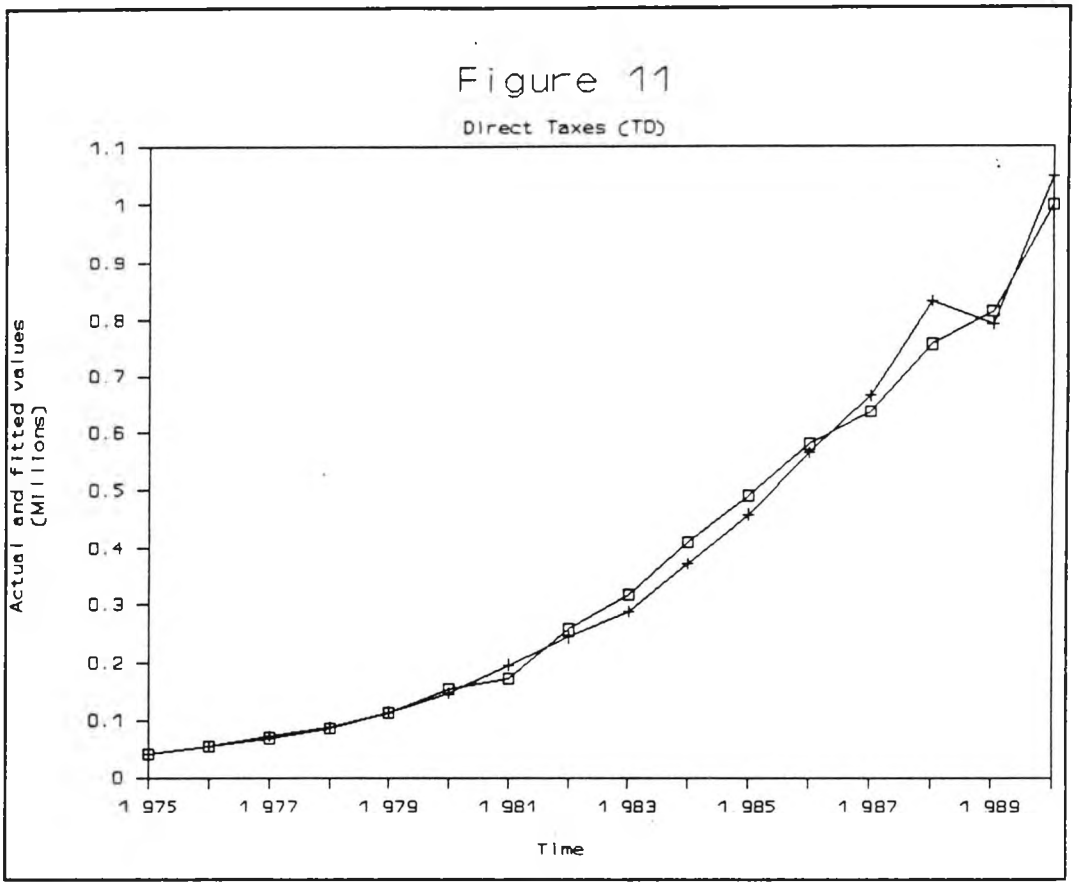
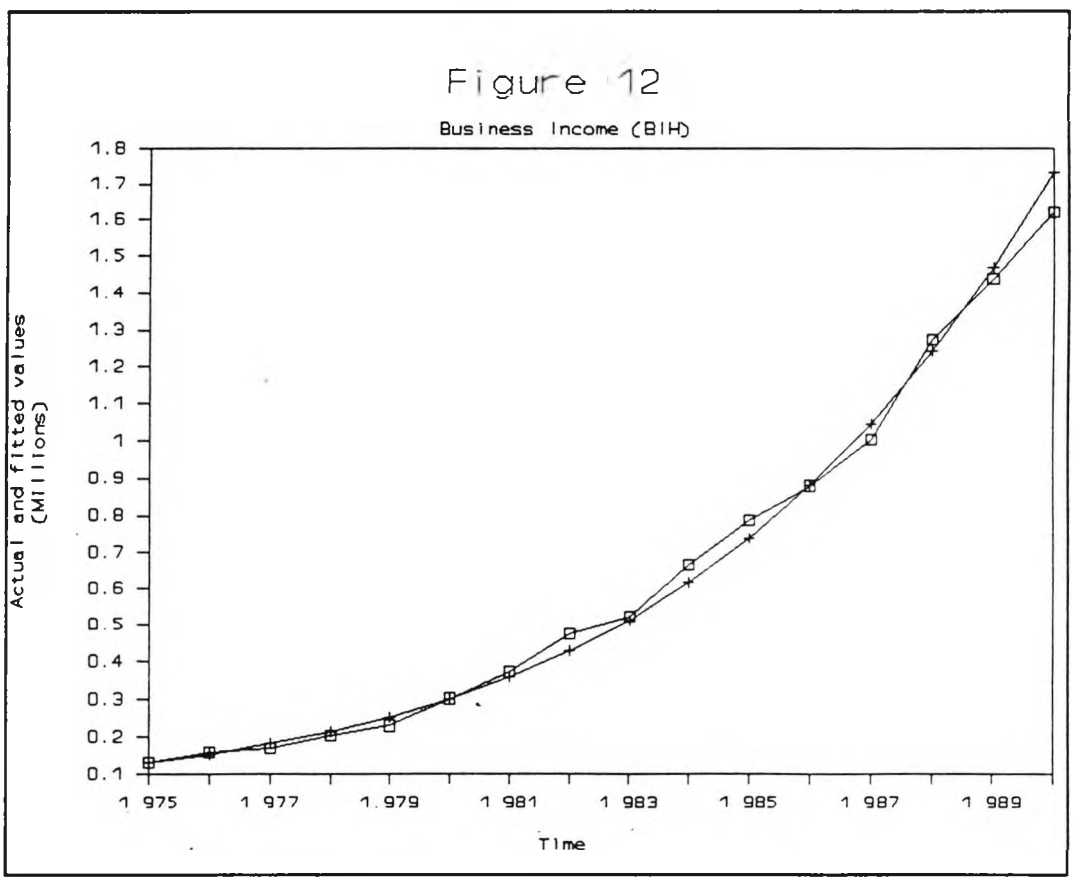


Figure 12



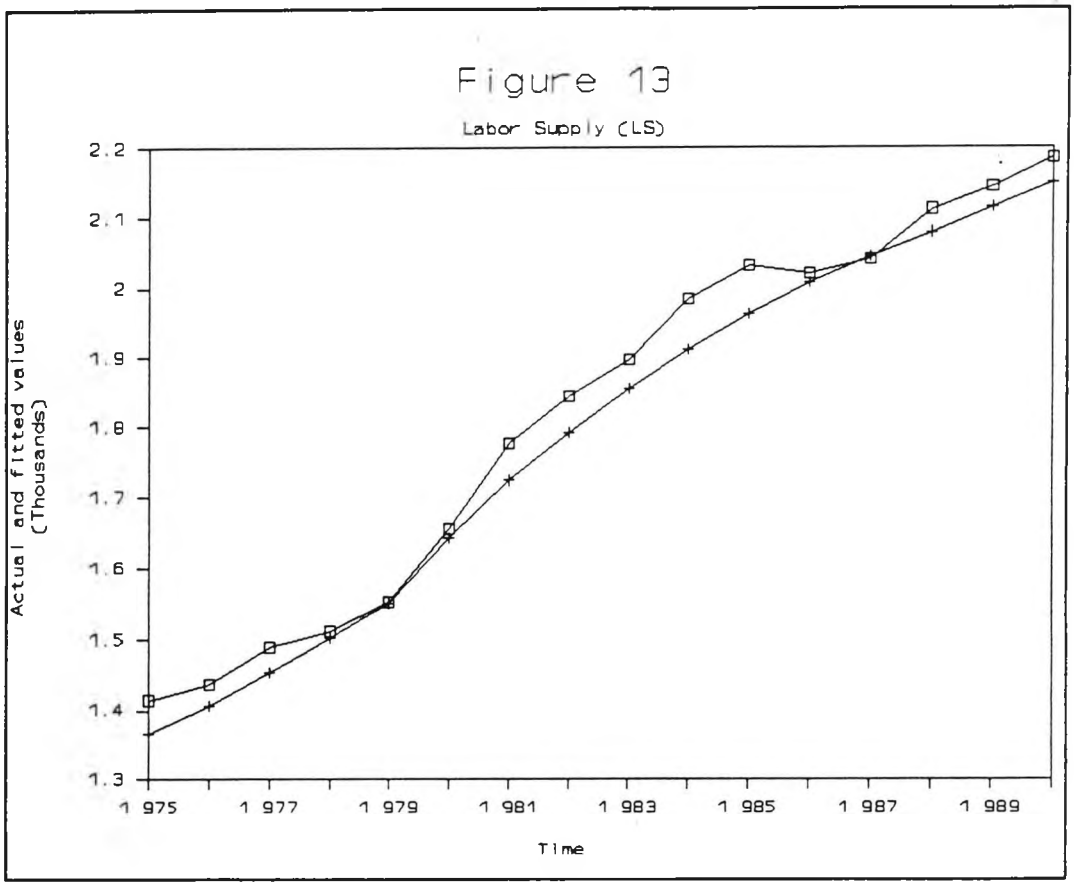


Figure 13
Labor Supply (LS)
Actual and fitted values
(Thousands)
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
Time

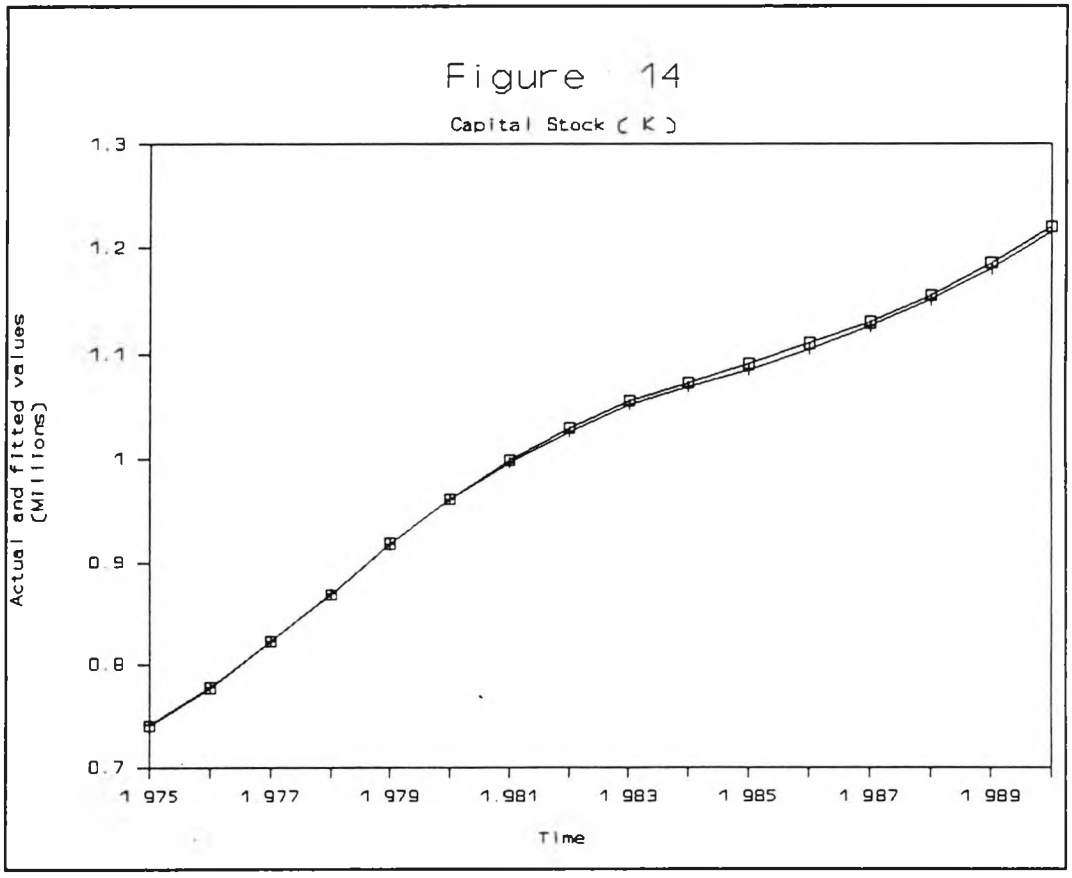


Figure 14
Capital Stock (K)
Actual and fitted values
(Millions)
1.3
1.2
1.1
1
0.9
0.8
0.7
1 975
1 977
1 979
1.981
1 983
1 985
1 987
1 989
Time

Figure 15

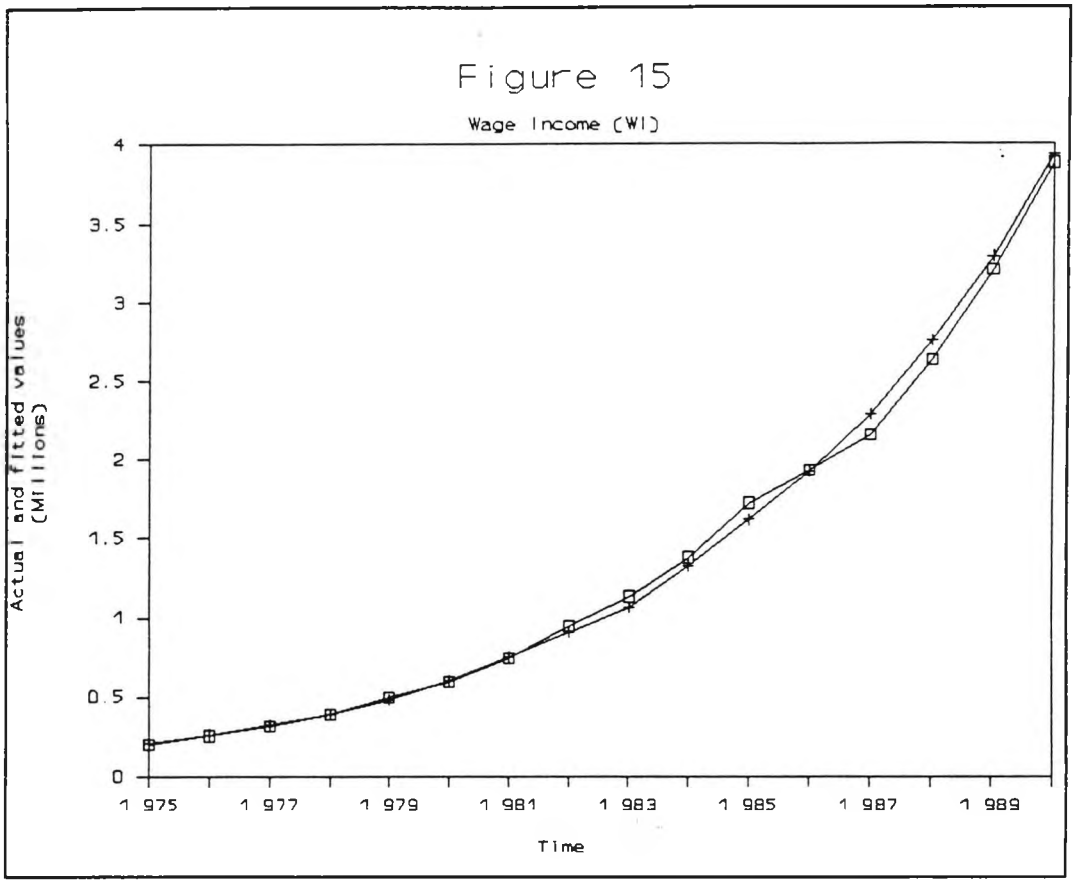


Figure 16

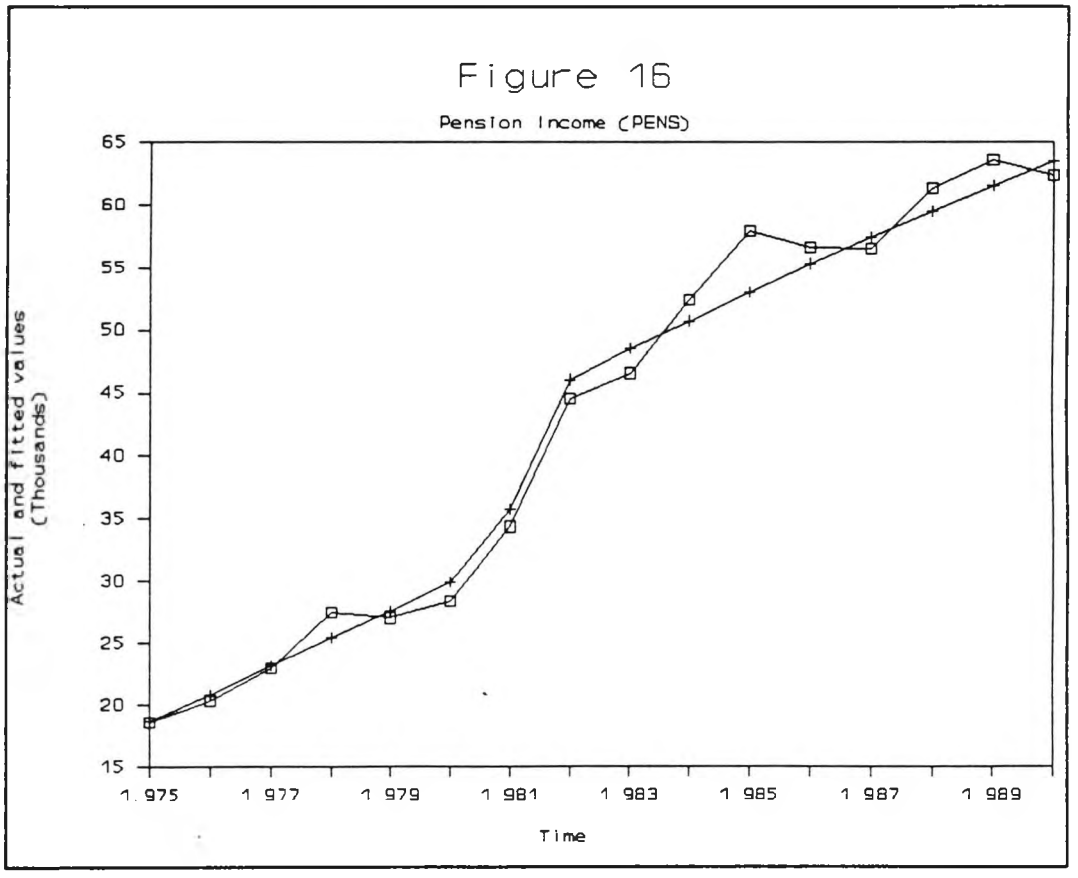


Figure 17

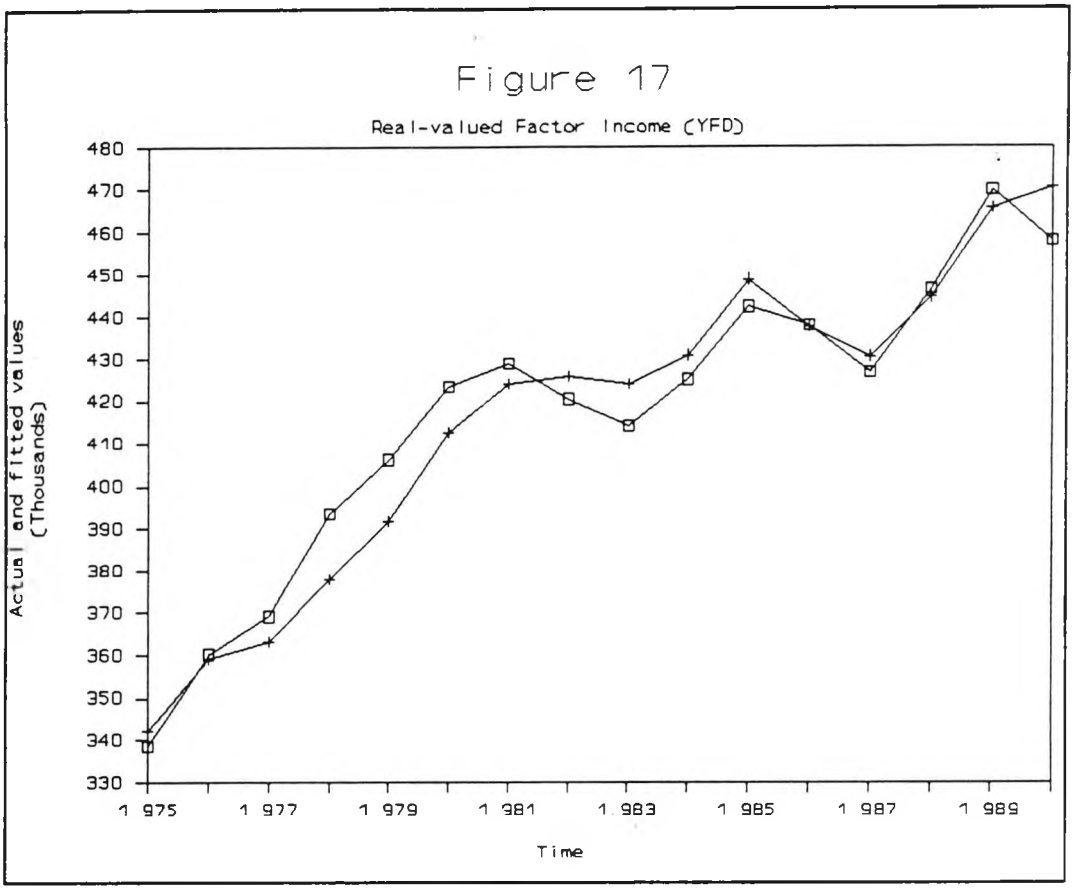
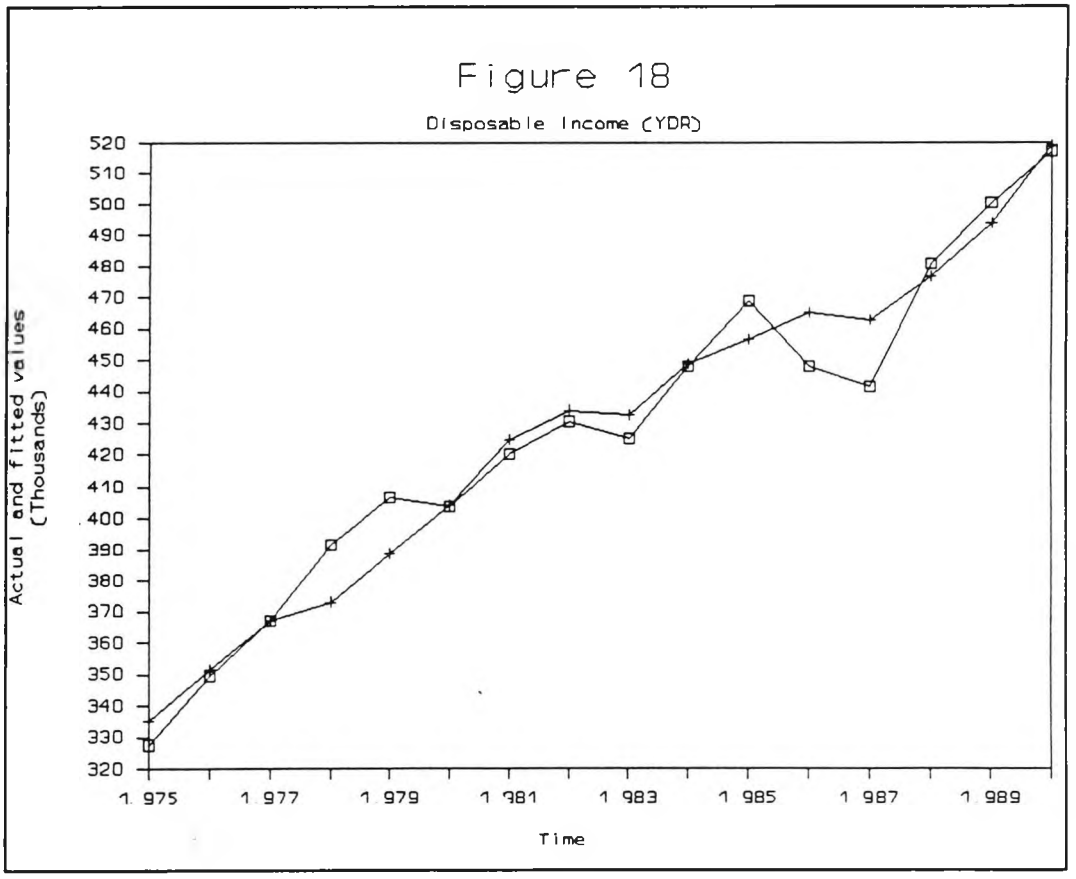
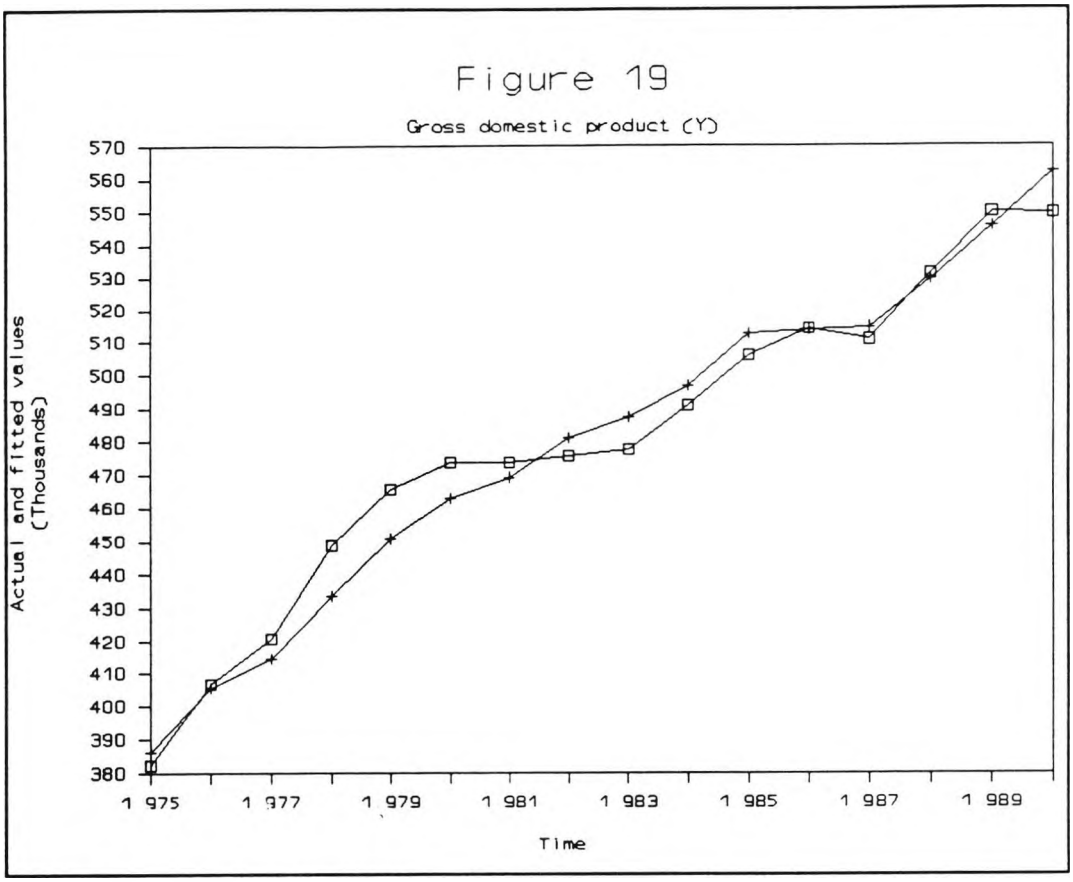


Figure 18





8.3 The accuracy of the model

A necessary condition for the final adoption of a model is the examination and analysis of its properties as well as its accuracy.

The accuracy of historical simulations of the model is measured by calculating the Root-Mean-Square-Error as a percentage of the mean of the dependent variable :

$$RMSE(\%) = \sqrt{1/N * \Sigma(Y_i - Y^*_i)^2} / \Sigma Y_i/N$$

Where Y_i = observed values, Y^*_i = simulated values and N = number of observations.

In the following table, the RMSEs (%) of the dependent variables are presented from simultaneous dynamic simulations of the model

SAMPLE 1975-1990

VARIABLES	ROOT-MEAN SQUARED ERROR	MEAN OF DEPENDENT VARIABLE	%
CPR	6,001.3995	337,328.250	1.78
IPR	1,201.6285	38,564.375	3.12
XTR	3,592.5692	97,738.088	3.68
MTR	5,291.2263	115,723.800	4.57
W	35.4055	788.325	4.49
P1	0.1639	7.612	2.15
PC	0.2367	7.238	3.27
PHI	0.2537	7.782	3.26
PEN	11.0435	214.071	5.16
OTR	10,722.1	140,116.7	7.65
TD	29,431.6	372,442.0	7.90
BIH	38,759.9	640,266.6	6.05
LS	39.8	1,818.7	2.19
Y	8,042.0	479,831.6	1.68
K	3,662.2	1,008,870.7	0.004
WI	62,436.8	1,375,175.7	4.54
PENSR	1,821.6	42,556.2	4.28
YFB	8,042.0	416,245.4	1.93
YDR	10,528.8	426,670.4	2.46

Looking at the above figures we notice that the historical simulation errors are quite low for the period 1975-1990. Given its small errors we can decide that this is a very satisfactory model which can be a useful tool for improving economic policy.

8.4 Simulation and accuracy of the model for period 1975-1990

The presentation of the equations in the previous chapters gave an overall view of the model. In order to test the predictive capacity of the estimated equations a dynamic simulation was made for the period 1962-90.

The estimation of this model has only an investigative character and its comparison with the previous model shows appreciative differences. The estimation results and simulation of the model gave satisfactory results but not as satisfactory as the previous one.

A judgment of the predictive accuracy of the model can be shown where the equations perform quite satisfactorily, when giving a ratio of RMSE to the mean of dependent variables less than 10% for fifteen of these equations and more than 10% for exports, pension benefits, other transfers and direct taxes. This can be explained, due to the fact that there were changes in policy in the decade 1980-90.

The figures of observed and simulated values of the endogenous variables are given in appendix II. The following are the results of a dynamic simulation of the model.

The following table presents the results of a dynamic simulation of the model.

SAMPLE 1962-1990

VARIABLES	ROOT-MEAN SQUARED ERROR	MEAN OF DEPENDENT VARIABLE	%
CPR	8,843.7	273,594. 0	3.2
IPR	2,085.3	33,541. 1	6.3
XTR	7,975.9	68,400. 5	11.7
MTR	4,718.0	88,322. 5	5.3
W	39.303	479.686	8.1
P1	0.138	4.782	2.9
PC	0.276	4.571	6.0
PHI	0.239	5.274	4.5
PEN	20.055	128.437	15.6
OTR	10,491.3	83,030.8	12.6
TD	41,186.7	220,651.0	18.7
BIH	29,937.7	391,850.1	7.6
LS	36.5	1,557.2	2.3
K	6,139.1	786,995.0	0.78
WI	67,206.7	821,417.0	8.2
PENSR	2,936.7	29,873.7	9.8
YFB	12,522.8	340,136.0	3.7
YDR	12,932.0	340,296.0	3.8
Y	12,522.7	3,911.6	3.2

The construction of a better proxy for equations improves the overall fit and enriches the properties of the model. A better proxy of the equations has been obtained, following the re-estimation of them for the period 1975-90, so an improvement of the overall fit of the model was possible using the re-estimated equations for this period.

The availability of a satisfactory model including the estimated equations for the period 1962-90 and the very satisfactory model including the re-estimated equations for the period 1975-90, allows us to make short term forecasts. For investigative reasons we adopted both models in forecasting form for the period 1987-90. The results of these forecasts are very good for 18 endogenous variables, but not for the 19th of them, which is the endogenous variable of exports. We did not expect to have a good forecast of exports for this period, because in 1987 the Greek government took special measures to increase exports, the most important being the devaluation of drachma.

The results of the equations, which are incorporated in these models are presented in appendix (III). For these results, we conclude that such models are good for forecasting too, and our model can be used for forecasting as well.

CHAPTER 9

RESULTS OF SIMULATION

RESULTS OF SIMULATION

9.1 Introduction

Social insurance directly affects certain variables of the economic circuit. These influences are observed on two important points:

- the impact of the policy changes in social insurance on the distribution of income, and
- the effects of the policy changes in social insurance on the final demand and the foreign trade balance.

The important aim of this chapter is to study the effects of the policy changes in the area of social insurance on the rest of the economy. Three fictitious policy changes are performed:

a) A permanent increase in the employer contribution rate by 10%.

b) A permanent increase in pensions benefits by 5% and

c) A permanent increase in pensions benefits by 5% with an accompanying increase in the employer contribution rate of 10%, assuming that everything else remains unchanged.

The policy changes are introduced in 1984 and the model is simulated through 1990, so separate simulations will be performed for the above fictitious policy changes for the period 1985-1990, using the 1975-90 model only.

A policy simulation analysis has been implemented in order to understand the behaviour of the model. The injection of exogenous shocks on some variables and the comparison of the results with those of the base line simulation gave a more synthetic picture of the model. The effects of these policy alternatives on the endogenous variables will be estimated as the difference between the resultant values of variables in the policy simulation and the original simulation in the absence of any parameter changes. This difference is expressed as a percentage of the simulation result without any policy change.

The difference between the values before and after policy simulation are presented below. **All these results will be explained from the economic point of view**.

9.2 The results of simulation from policy change in employer contribution rate.

The difference between the values before and after policy changes in employer contribution rate as a percent of the simulation result without any policy change, are estimated using the model which incorporates the re-estimated equations for the period 1975-1990. These results, after 10% increase of employer contribution rate, are presented in the following Table.

CURRENT SAMPLE : 1985 TO 1990

Year	CPRPC	IPRPC	XTRPC	MTRPC	WPC	P1PC
1985	-0.69339	0.16962	-0.01996	-0.33482	-1.01308	0.11094
1986	-0.71366	0.21537	-0.01799	-0.39106	-1.09243	0.08289
1987	-0.73053	0.30192	-0.01315	-0.42502	-1.16882	0.05706
1988	-0.73786	0.34539	-0.00781	-0.47223	-1.23628	0.02519
1989	-0.72670	0.33724	-0.00047	-0.52157	-1.28526	-0.02069
1990	-0.69921	0.35716	0.00620	-0.54568	-1.32769	-0.05784

Year	PCPC	PHIPC	PENPC	OTRPC	TDPC	BIHPC
1985	0.35471	0.24371	-1.16420	-1.40903	-1.35289	-0.08021
1986	0.30653	0.19257	-1.31857	-1.50925	-1.38483	-0.13834
1987	0.25614	0.14335	-1.46437	-1.60185	-1.47500	-0.19705
1988	0.19655	0.08508	-1.60566	-1.68585	-1.46866	-0.25916
1989	0.11811	0.00532	-1.74477	-1.75317	-1.90818	-0.32819
1990	0.04136	-0.06547	-1.86369	-1.79968	-1.71300	-0.39398

Year	KPC	WIPC	PENSRPC	YFBPC	YDRPC	YPC
1985	-0.01475	-1.01308	-1.51354	-0.45841	-0.83559	-0.40158
1986	-0.00770	-1.09243	-1.62014	-0.46915	-0.84378	-0.39967
1987	0.00115	-1.16883	-1.71612	-0.46025	-0.85961	-0.38471
1988	0.01242	-1.23628	-1.79866	-0.44250	-0.85152	-0.37156
1989	0.02437	-1.28527	-1.86068	-0.40271	-0.81060	-0.34356
1990	0.03740	-1.32769	-1.90426	-0.36557	-0.75411	-0.30585

From the above differences, we can see that the effects of the increase in the employer contribution 10% to the endogenous variables are as following :

- **Wage rate (WPC)**: an increase in the employer contribution rate has a direct negative effect on the wage rate.
- **GDP deflator (P1PC),**
- **Consumer price (PCPC),**
- **Producer price (PHIPC)**: the increase in labour cost due to the increase in the employer contribution rate has a positive effect on all three of the price variables.

- **Wage sum (WIPC)** : the effect of the increase in the employer contribution rate on the real wage sum, summarizes the effects on the nominal wage rate and the price level. This effect is negative.
- **Pension (PENPC),**
- **Total Pens. PENSPC**: pension benefit per recipient follows the wage rate and its effect is negative. Real total pension benefits summarize the effects on the wage rate and the price level and its effect due to the increase in the contribution rate is negative.

  This can be explained by the fact that the negative effect resulting from the wage rate is bigger than the positive effect resulting from the price level.

- **Direct taxes (TDPC),**

- **Other Income transfers (OTRPC),**

- **Business income (BIHPC):** direct taxes on households, other income transfer to the household and business income of households plus other components of household disposable income follow the wage sum in the model, so their effect is negative.

- **Disposable income (YPRPC):** the development of real disposable income reflects all the effects of its components - wage sum, other public transfers to households and direct taxes. The real disposable income is negative due to the negative effects of the aforesaid components.

- **Investment (IPRPC),**

- **Capital stock (KPC) :** investment of business enterprises are affected by an increase in the saving where the private consumption is decreased. The effect in investment is positive.

  Capital stock is affected by the increase in the investment and this effect is positive and increasing after the second year.

- **Consumption (CPRPC)** : the effect on consumption has the same - negative - pattern with disposable income.

- **Imports (MTRPC)** : the decrease in consumption demand with contribution rate increase has a negative effect on imports.

- **Exports (XTRPC)** : exports of goods and services are affected by the increase in the contribution rate and this effect is negative.
  This is due to the increase in the domestic price level relative to the prices of foreign competitors.

- **Gross Domestic Product (Y)** : the increase in the contribution rate has a negative effect on real GDP.
  The effects of changes in the contribution rate on aggregate demand are synonymous with the sum of the effects on the individual demand components.

- **Real-valued factor income (YFBPC)** : the development of real factor income reflects the effects of real GDP and real net of indirect taxes and subsidies due to the increase in GDP deflator. This effect is negative.

9.3 The results of simulation from policy change in pension benefits per recipient.

The differences between the values before and after 5% increase of pension benefits per recipient as percent of the simulation results without any policy change, have been estimated and are presented in the following table.

Year	CPRP	IPRP	XTRP	MTRP	WP	P1P
1985	0.59109	-0.21004	-0.00743	0.52813	0.15943	0.05243
1986	0.90014	-0.28526	-0.01173	0.79250	0.23015	0.07372
1987	0.92970	-0.50257	-0.01525	0.80304	0.29367	0.09735
1988	0.72177	-0.65097	-0.01861	0.66523	0.33171	0.11673
1989	0.64127	-0.58060	-0.02089	0.62726	0.35941	0.13190
1990	0.51276	-0.49961	-0.02439	0.54380	0.37424	0.14232

Year	PCP	PHIP	PENP	OTRP	TDP	BIHP
1985	0.08865	0.09065	10.92116	0.16373	2.15634	0.11104
1986	0.11987	0.12553	15.15891	0.23493	3.01321	0.15476
1987	0.15819	0.16625	11.11916	0.30966	2.38147	0.20105
1988	0.19640	0.20286	5.59994	0.36386	1.25820	0.23920
1989	0.23222	0.23384	6.56095	0.40076	1.78854	0.27246
1990	0.26335	0.25741	4.83673	0.42026	1.22783	0.29843

Year	KP	WIP	PENSRP	YFBP	YDRP	YP
1985	-0.02661	0.15943	10.82292	0.31322	1.01448	0.27439
1986	-0.03504	0.23016	15.02103	0.49226	1.44612	0.41935
1987	-0.04895	0.29366	10.94364	0.47288	1.10507	0.39528
1988	-0.06922	0.33170	5.39295	0.33136	0.54297	0.27823
1989	-0.08856	0.35941	6.31406	0.26984	0.62189	0.23019
1990	-0.10523	0.37425	4.56137	0.18919	0.41366	0.15828

The effects of the increase in pension benefits per recipient to the endogenous variables are explained below.

- **Wage rate (WP):** the increase in the pension benefit has a positive effect on the wage rate through the influence of an increase in aggregate demand.

- **GDP deflator (P1P),**
- **Consumer price (PCP),**
- **Producer price (PHIP):** the increase in pension benefits has a demand effect on the rate of inflation, so the prices are increased.

- **Wage sum (WIP):** the effects on the real wage sum is positive and follow the increase in pension benefits

- **Total pensions (PENSRP)**: the effect of the increase in pension benefits plus the effects on the prices level have a positive effect on real total pension benefits.

- **Direct taxes (TDP)**,
- **Income transfers (OTRP)**: both direct taxes on households and other income transfers to the households sector follow the wage sum in the model

- **Disposable income (YDRP)**: all components of households disposable income have a positive effect due to the increase in the pension benefits per recipient.

- **Consumption (CPRP)**: the increase in pension benefits increases consumption by increasing real GDP.

- **Investment (IPRP)**,
- **Capital stock (KP)** : a decrease in savings, after an increase in consumption has as result a decrease in investment, which influenced the capital stock. The effects on investment and capital stock, from an increase in pension benefits, are negative .

- **Exports (XTRP)** : exports of goods and services are affected negatively by the increase in pension benefits.

- **Imports (MTRP)** : imports of goods and services are affected positively due to the positive effect of increased pension benefits.

- **Gross Domestic Product (YP)**:

an increase in the pension benefit increases aggregate demand particularly domestic on the services oriented industry. The effect of the increase in pension benefits leads to an increase of real GDP.

- **Real valued factor income (YDRP)**:

the increase of the real GDP and the increase of the GDP deflator have a positive effect on the real factor income.

9.4 The results of simulation from policy change in employer contribution rate and in the pension benefits per recipient

There are two kinds of influences to be taken into account,the first is connected with the influence that can be exerted by 10% increase of employer contribution and the second by 5% increase in the pension benefits per recipient. The results of both influences are estimated as a percentage of simulation results without any policy changes and these are as the follows:

Year	CPRC	IPRC	XTRC	MTRC	WC	P1C
1985	-0.04974	-0.06223	-0.02794	0.23876	-0.84217	0.16747
1986	0.24949	-0.09850	-0.03063	0.45658	-0.84671	0.16247
1987	0.27536	-0.24196	-0.02963	0.44275	-0.85497	0.16229
1988	0.07397	-0.35555	-0.02800	0.27092	-0.87878	0.15209
1989	0.01683	-0.29530	-0.02332	0.19539	-0.89391	0.12384
1990	-0.07383	-0.19938	-0.02071	0.09736	-0.91486	0.09978

Year	PCC	PHIC	PENC	OTRC	TDC	BIHC
1985	0.44916	0.34111	10.58338	-1.23395	0.96672	0.03867
1986	0.43509	0.32790	14.78663	-1.25874	1.81688	0.02764
1987	0.42650	0.32297	10.74336	-1.27187	1.13432	0.01916
1988	0.40918	0.30538	5.22607	-1.29594	0.04244	-0.00024
1989	0.37113	0.26099	6.16348	-1.31989	0.22967	-0.03098
1990	0.33053	0.21857	4.44470	-1.33970	-0.13596	-0.06531

Year	KC	WIC	PENSRC	YFBC	YDRC	YC
1985	-0.04255	-0.84217	10.08890	-0.11711	0.25302	-0.10259
1986	-0.04482	-0.84671	14.28936	-0.05695	0.68846	0.04852
1987	-0.05104	-0.85497	10.27302	0.05179	0.35088	0.04329
1988	-0.06160	-0.87879	4.79725	-0.06526	-0.18714	-0.05480
1989	-0.07076	-0.89391	5.77094	-0.08240	-0.05644	-0.07031
1990	-0.07639	-0.91486	4.10061	-0.12179	-0.19994	-0.10191

The effects from the increase in the empoyer contribution rate and in pension benefits per recipient on the endogenous variables are:

- **Wage rate (WC)** : the positive effect on the wage rate of an increase in pension benefits is weaker than the negative effect associated with the employer contribution rate increase, the result of which is a net negative effect on the wage rate.

- **GDP deflator (P1C),**
- **Consumer price (PCC),**
- **Producer price (PHIC):** the effects of the increases in pension benefits and employer contribution reinforce each other thus to push up the rate of inflation.

- **Gross Domestic Product (YC),**
- **Consumption (CPRC):** Real gross domestic product and consumption summarize the negative effects due to the increase in the employer contribution and the positive effects due to the increase in the pension benefits per recipient.
- **Wage sum (WIC),**
- **Direct taxes(TDC),**
- **Other income transfers (OTRC):**

The three of them decrease because the positive effect of the increase in pension benefits is smaller than the negative effect of the increase in the employer contribution

- **Total pensions (PENSRC)**:

as the effect due to the increase in the contribution rate is very weak , the total pension benefits have a positive effect due to the increase in the pension benefits per recipient.

- **Exports (XTRC)**: the negative effects of the increase in pension benefits as well as in employer contribution reinforce each other combining to push down the exports

- **Imports (MTRC)**: the negative effect on the imports after the increase in employer contribution is smaller than the positive effect associated with the pension benefit per recipient, so the result is positive.

- **Investment (IPRC)**,
- **Capital stock (KC)**: the effect of the increase in pension benefits is bigger than the effect of the increase in contribution on investments so the result is negative in investment as well as in capital stock.

CHAPTER 10

CONCLUSIONS

CONCLUSIONS

Social insurance protection provides a liberating experience for the individuals and the society as a whole. The Greeks lay their hope for the future on social insurance.

The social insurance system and more specifically the pension benefits sector play an increasingly important role in the entire Greek economy.

The level of the social insurance protection in Greece is near to that of the United Kingdom, the United States and that of Spain, but there are appreciative differences, between the Greek social insurance system and the other three systems, concerning the structures, the kind of benefits and the requirements as well as the way of financing.

The Greek social insurance system as "a pay as you go system" is more similar to the Spanish system and provides quite satisfactory protection for the employees and self-employed.

The welfare system provides low protection as the greek public assistance scheme is small. The private insurance has not been developed in Greece as the complementary social insurance is widely spread.

The Greek social protection system did not take place during the time when there was a substantial economic growth nor when the great social security development in industrial countries took place. The extension of the Greek system was not

secured by the necessary revenues. The receipts of the Greek system are fewer than the expenditures.

The enormous and escalating costs of funding the social insurance systems, which is due to the economic crisis, recession and demographic factors, is a common problem - amongst most members of the EEC - and a very serious one in the Greek system. The much later qualitative and quantitative extension of the Greek insurance protection has created more problems.

The social insurance funds fragmentation of the Greek system , which is not to be found in any other social insurance system, is an organizational important problem and needs a solution; so do the large and social unjust disparities, among the beneficiaries, of the main and complementary pension benefits, and the same must be done with the rest of benefits and allowances.

The solutions to any problem arising from social insurance ought to be and can be sought within the framework of the social protection system and not to be left in the hands of individuals. These solutions ought not to create serious problem to the aggregate economy either.

The Greek social insurance system has to redefine its field of action and particularly so, in the pension benefits sector taking into account the current economic situation. The reconsideration of the social insurance system must be based on the

social insurance principles of repayment and social solidarity, and must influence positively the economic development.

The future reformation, of the very big branch of pension benefits, will be very useful if they are taking into account some experiences from the British, American and Spanish systems as well as the systems of other developed countries.

The social insurance protection constitutes the main element of the general programme of the Greek economic policy. The measures which will be taken for solving the social insurance problems must be carefully examined and carefully assess their influences in the aggregate economy before they are implemented. These estimations of the effects on the economy from the changes in the social insurance could be used as a guideline on the social and economic programming.

The model created for the social insurance system of Greece, linking social insurance and macroeconomic system, is a suitable one for exploring the effects, resulting from the changes in the area of the social insurance sector, on the rest of the economy.

This model will highlight the direct and indirect influences, resulting in increase or decrease in pension benefits and/or in employer contributions, on the major components of the disposable income and on the real domestic product components.

The good fit of this model allows us to assess simultaneously the interrelationships between the variables of the Greek economy included in the model; it also allows us to make short term forecasts for the social insurance and the macroeconomic sector. This satisfactory model will be a useful tool for economic planning and decisions making and for a large variety of policy purposes.

A model is never complete and its utility is proved if it can be continuously applicable. This model of the Greek social insurance system has to be applied in two specific cases.

Firstly, the revision of the National Accounts system and their harmonization to the European system of Accounts according to the Community Directive 89/130/13.2.89 of EEC/EURATOM will give a systematic description of the economic phenomena occurring in the economy during a specific period. Secondly, the next step for the model of the Greek social insurance system must be the re-estimation of this model according to the new data of the National Accounts. The results of this estimation will help the users to understand the harmonization of the GDP. This model will estimate the effects on the social insurance sector (pension, other benefits, contribution, etc.) resulting from policy change on other sectors of the economy or the effects on the economy resulting from changes brought about the social insurance sector.

The results from the application of the 1902/1990 Law will be obtained in 1997. The number of beneficiaries will be expected to increase considerably so will the

expenditures of social insurance. The model is suitable to be applied for this time period and to give estimations from this policy change, which will allow the users of the model to utilise it for improving the economic policy.

The model will be useful for future research as it could give answers to the policy makers, when measures are taken in the social insurance sector concerning the cost on the economy, or when measures are taken in the rest of the economy concerning the cost on the social sector. This model is needed for the social and economic programming as well as for government policy making in future years.

APPENDICES

APPENDIX I

C O N S U M P T I O N

CURRENT SAMPLE : 1975 TO 1990

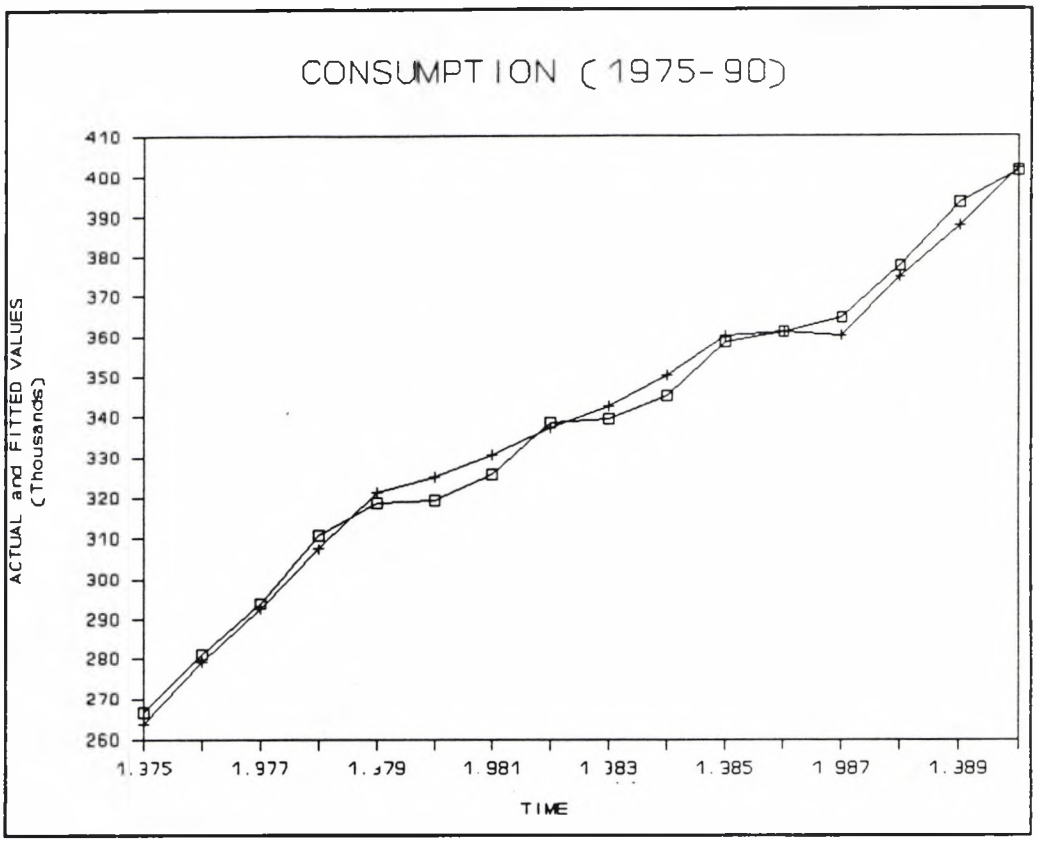
EQUATION 1 : CPR = f(YDP, CPR_{-1})
* * * * * * * * * * * *

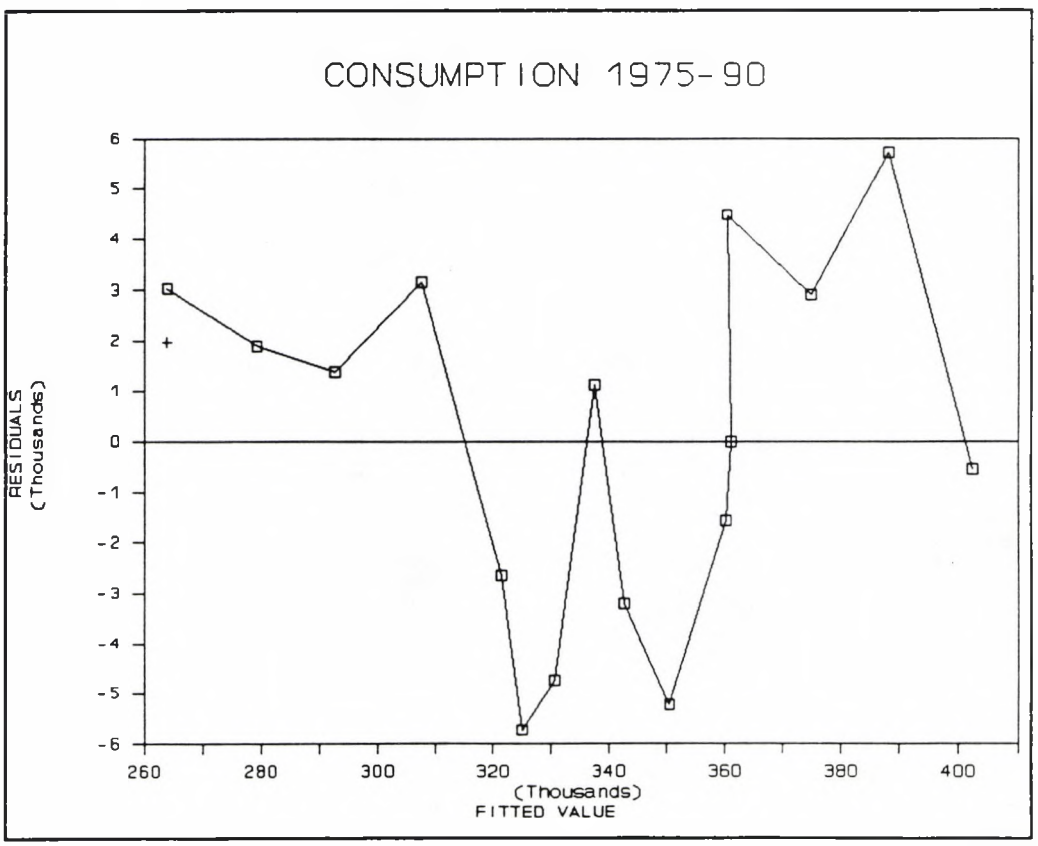
METHOD OF ESTIMATION = ORDINARY LEAST SQUARES

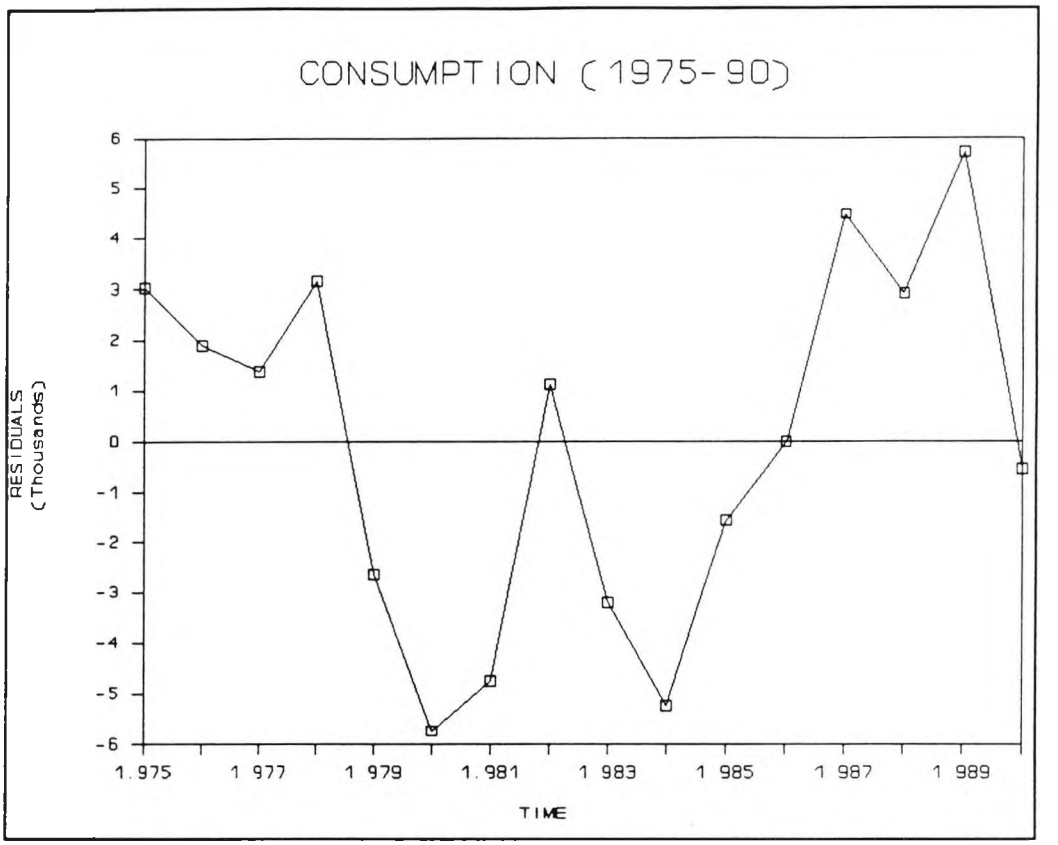
NOTE: Lagged dependent variable(s) present
DEPENDENT VARIABLE: CPR

SUM OF SQUARED RESIDUALS = 0.189645E+09
STANDARD ERROR OF THE REGRESSION = 3819.44
MEAN OF DEPENDENT VARIABLE = 337328.
STANDARD DEVIATION = 38573.4
R-SQUARED = 0.991503
ADJUSTED R-SQUARED = 0.990196
DURBIN-WATSON STATISTIC = 1.0093
F-STATISTIC(2, 13) = 758.462
LOG OF LIKELIHOOD FUNCTION = -153.008
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	21295.82	8170.411	2.606456
YDR	0.3176866	0.8133667E-01	3.905822
CPR(-1)	0.5503487	0.1060850	5.187811


CONSUMPTION (1975-90)
ACTUAL and FITTED VALUES
(Thousands)
410
400
390
380
370
360
350
340
330
320
310
300
290
280
270
260
1.375
1.977
1.379
1.981
1 383
1.385
1 987
1.389
TIME


CONSUMPTION 1975-90
RESIDUALS
(Thousands)
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
260
280
300
320
340
360
380
400
(Thousands)
FITTED VALUE


CONSUMPTION (1975-90)
RESIDUALS (Thousands)
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
1.975
1 977
1 979
1.981
1 983
1 985
1 987
1 989
TIME

INVESTMENTS

CURRENT SAMPLE : 1975 TO 1990

EQUATION 2 : IPR = f(Y12, $GOS1_{-1}$, KO1, $YCPR_{-1}$, IPR_{-1})

****

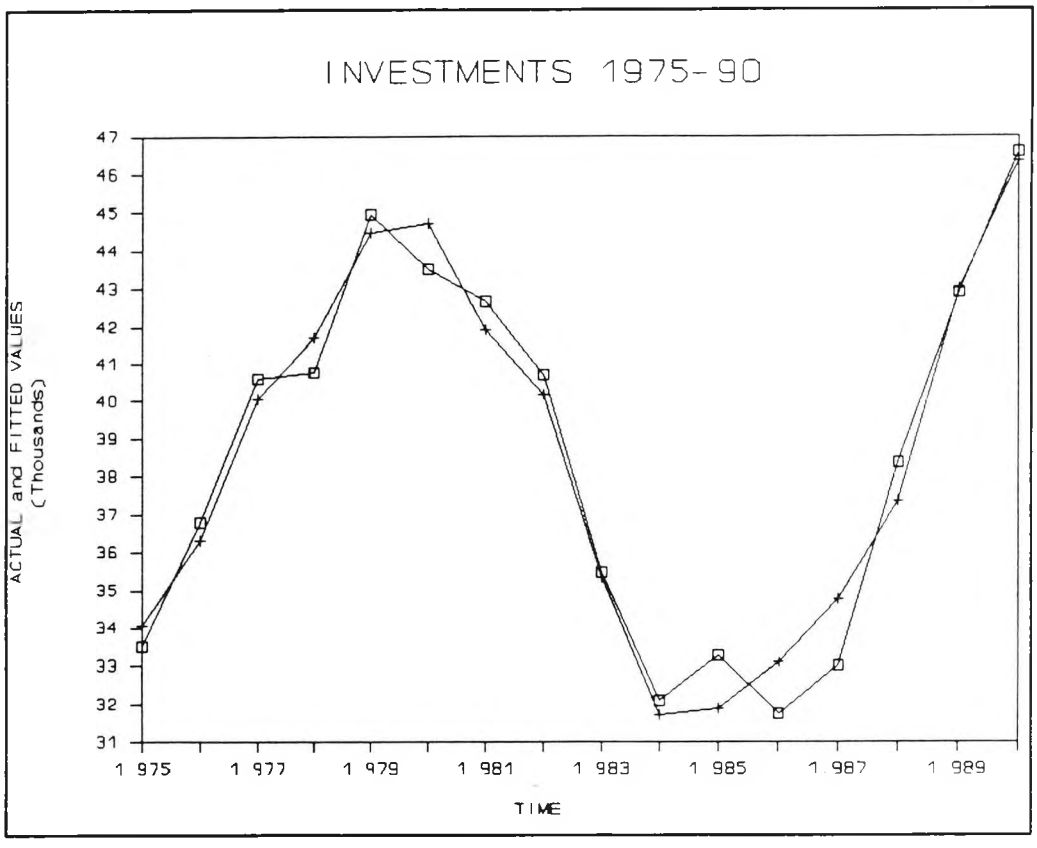
METHOD OF ESTIMATION = ORDINARY LEAST SQUARES

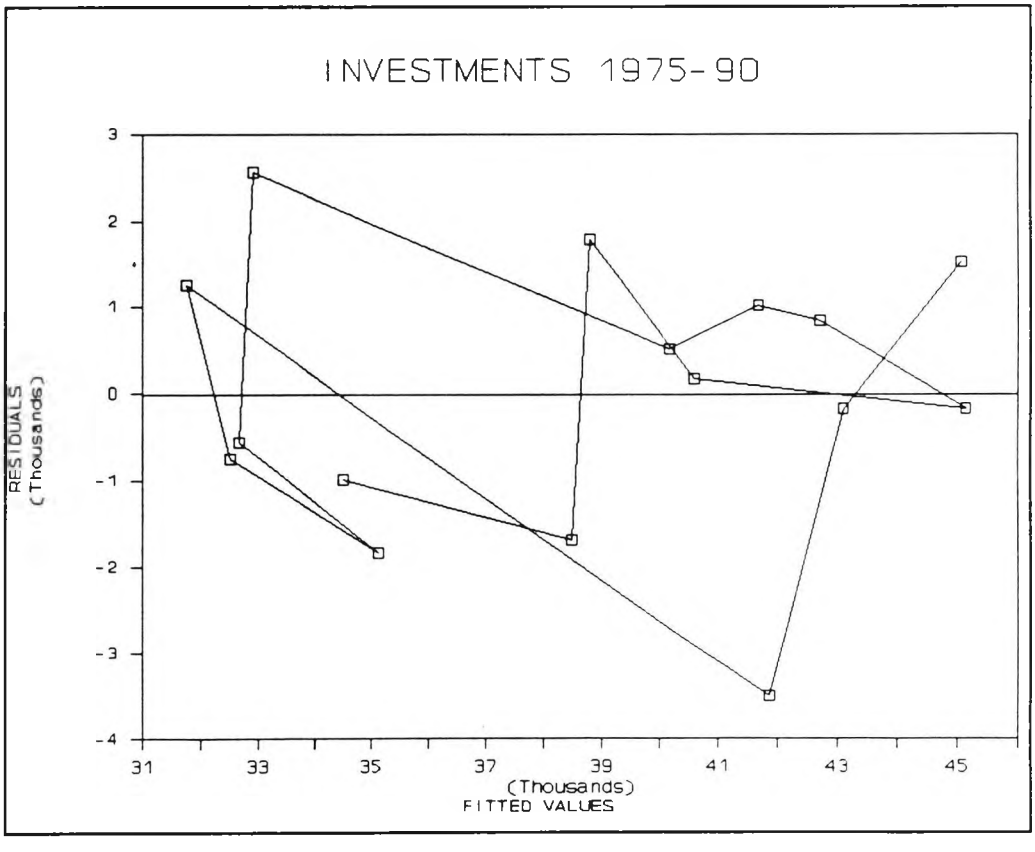
NOTE: Lagged dependent variable(s) present
DEPENDENT VARIABLE: IPR

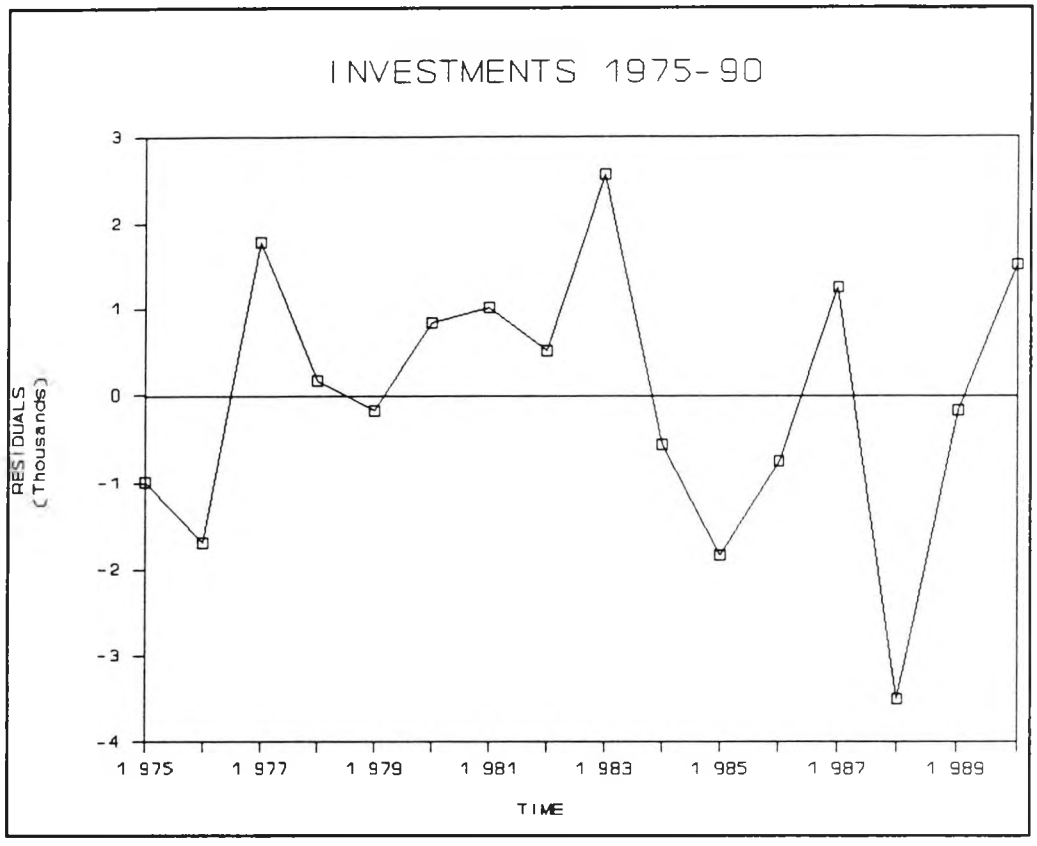
SUM OF SQUARED RESIDUALS = 0.121175E+08
STANDARD ERROR OF THE REGRESSION = 1100.80
MEAN OF DEPENDENT VARIABLE = 38564.4
STANDARD DEVIATION = 4927.99
R-SQUARED = 0.966735
ADJUSTED R-SQUARED = 0.950103
DURBIN-WATSON STATISTIC = 2.4213
F-STATISTIC(5, 10) = 58.1240
LOG OF LIKELIHOOD FUNCTION = -131.004
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-7396.815	3709.981	-1.993761
Y12	0.4413839E-01	0.3841752E-01	1.148913
GOS1(-1)	0.1366397	0.2857822E-01	4.781254
KO1	0.2746738	0.6633449E-01	4.140738
YCPR(-1)	0.6574774E-0	0.4167530E-01	1.577619
IPR(-1)	0.2508312	0.1203456	2.084258

DURBIN(1970) T-STAT FOR AR(1) = -0.797274


INVESTMENTS 1975-90
ACTUAL and FITTED VALUES
(Thousands)
47
46
45
44
43
42
41
40
39
38
37
36
35
34
33
32
31
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME


INVESTMENTS 1975-90
RESIDUALS
(Thousands)
3
2
1
0
-1
-2
-3
-4
31
33
35
37
39
41
43
45
(Thousands)
FITTED VALUES


INVESTMENTS 1975-90
RESIDUALS (Thousands)
3
2
1
0
-1
-2
-3
-4
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME

EXPORTS

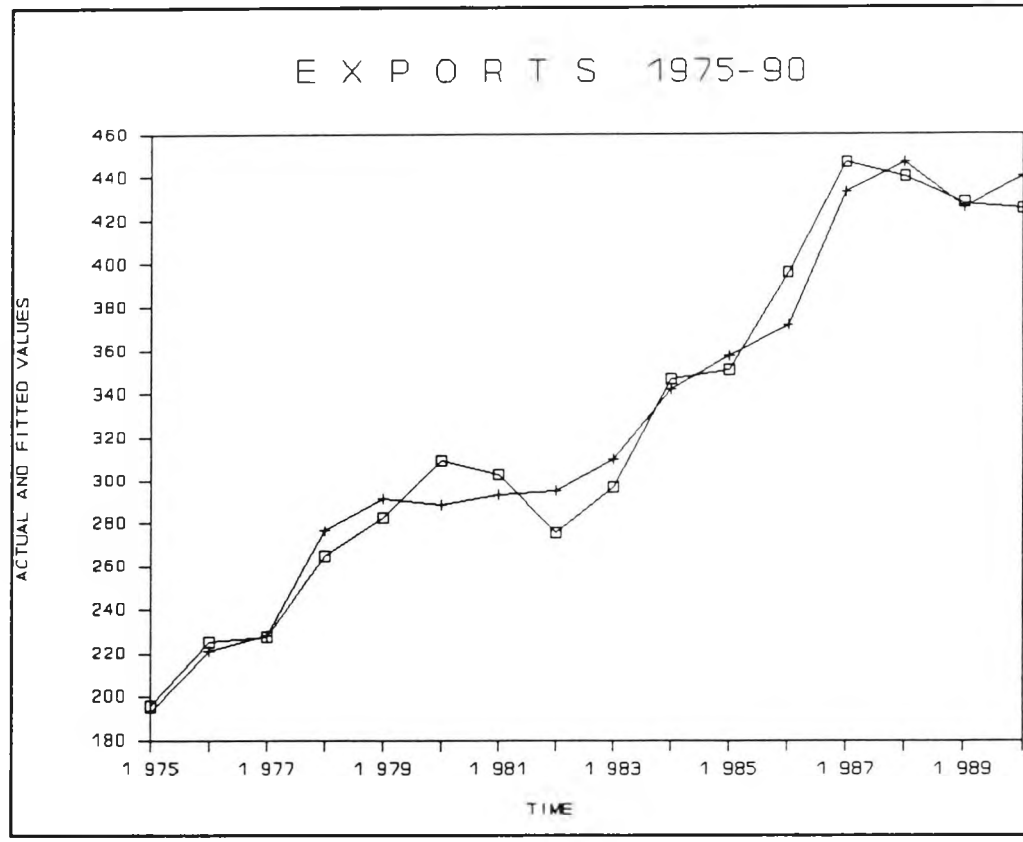
EQUATION 3 : XTR = f(PHI/PE, WFD)
****

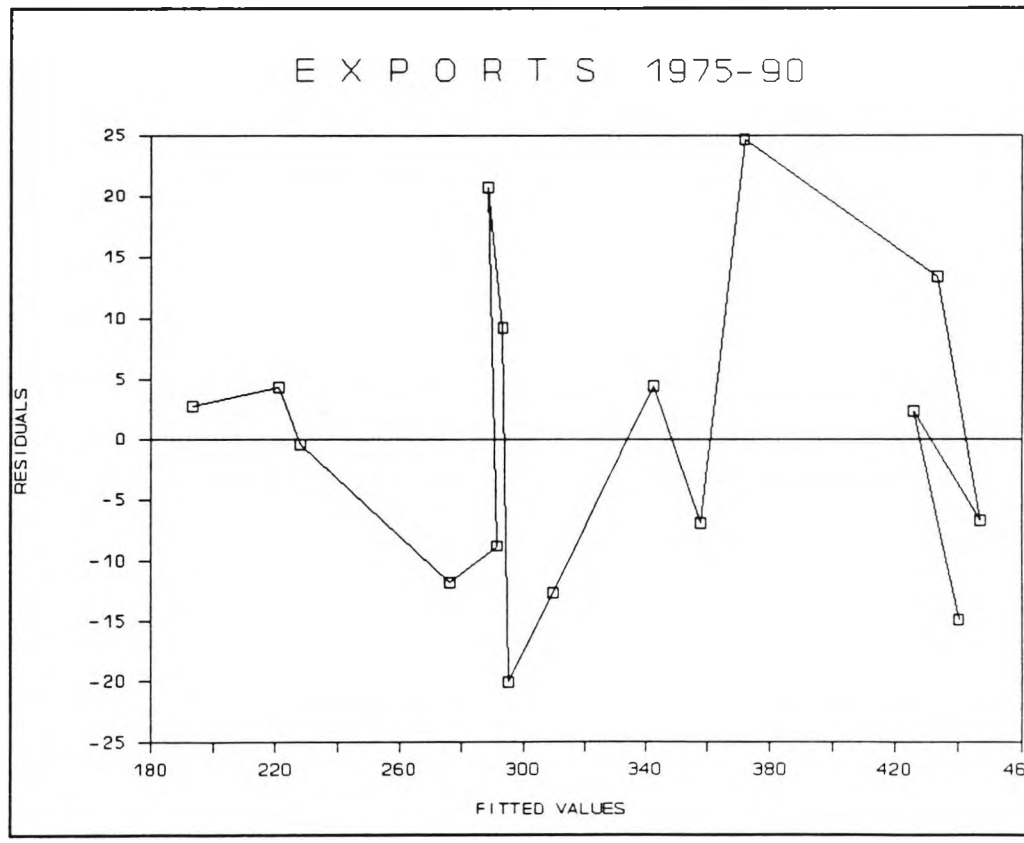
METHOD OF ESTIMATION = ORDINARY LEAST SQUARES

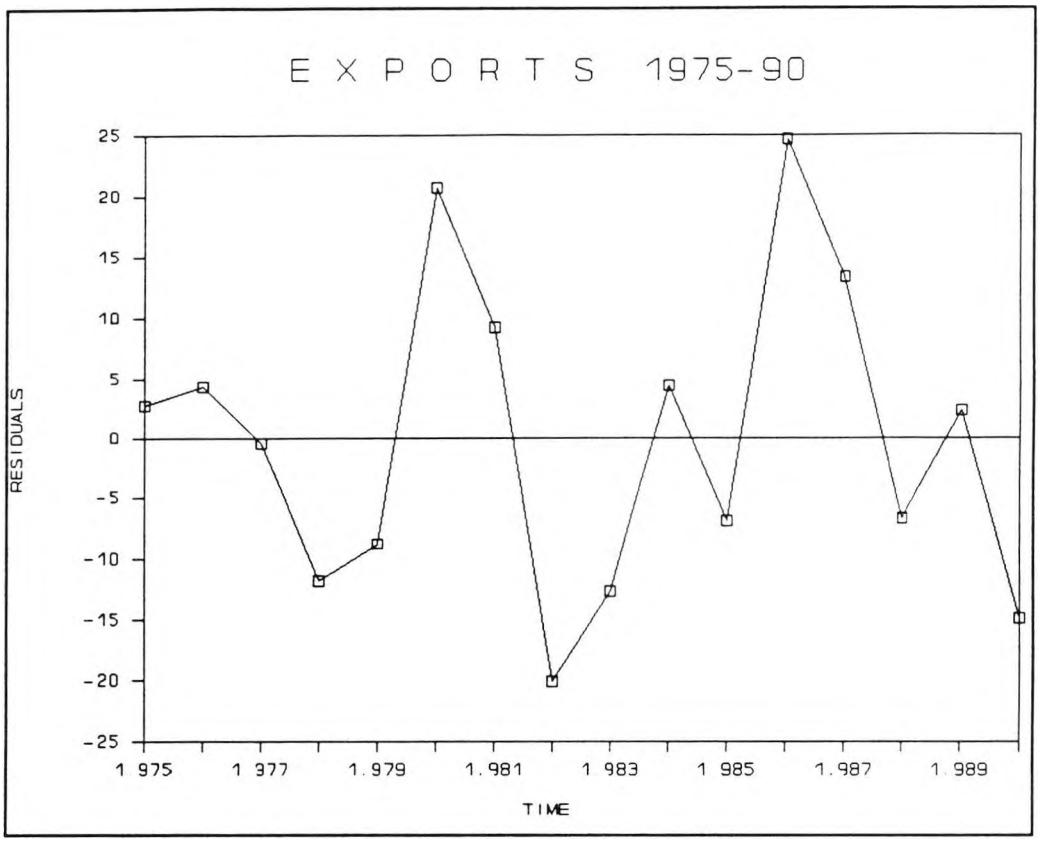
DEPENDENT VARIABLE: DXTR

SUM OF SQUARED RESIDUALS = 0.244842
STANDARD ERROR OF THE REGRESSION = 0.142841
MEAN OF DEPENDENT VARIABLE = 3.25924
STANDARD DEVIATION = 0.818265
R-SQUARED = 0.975621
ADJUSTED R-SQUARED = 0.969527
DURBIN-WATSON STATISTIC = 1.7987
F-STATISTIC(3, 12) = 160.079
LOG OF LIKELIHOOD FUNCTION = 10.7348
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	0.8490639	0.4463414	1.902275
PHIE	-0.4072463	0.2697811	-1.509543
WFD	0.1570336E-01	0.1417157E-02	11.08089
DII	0.4169778	0.8705851E-01	4.789627


EXPORTS 1975-90
ACTUAL AND FITTED VALUES
460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME


EXPORTS 1975-90
RESIDUALS
25
20
15
10
5
0
-5
-10
-15
-20
-25
180
220
260
300
340
380
420
460
FITTED VALUES


EXPORTS 1975-90
RESIDUALS
25
20
15
10
5
0
-5
-10
-15
-20
-25
1.975
1.977
1.979
1.981
1.983
1.985
1.987
1.989
TIME

IMPORTS

CURRENT SAMPLE : 1975 TO 1990

EQUATION 4 : MTR = f(PM/PHI, Y)
****

FIRST-ORDER SERIAL CORRELATION OF THE ERROR

MAXIMUM LIKELIHOOD ITERATIVE TECHNIQUE

CONVERGENCE ACHIEVED AFTER 3 ITERATIONS

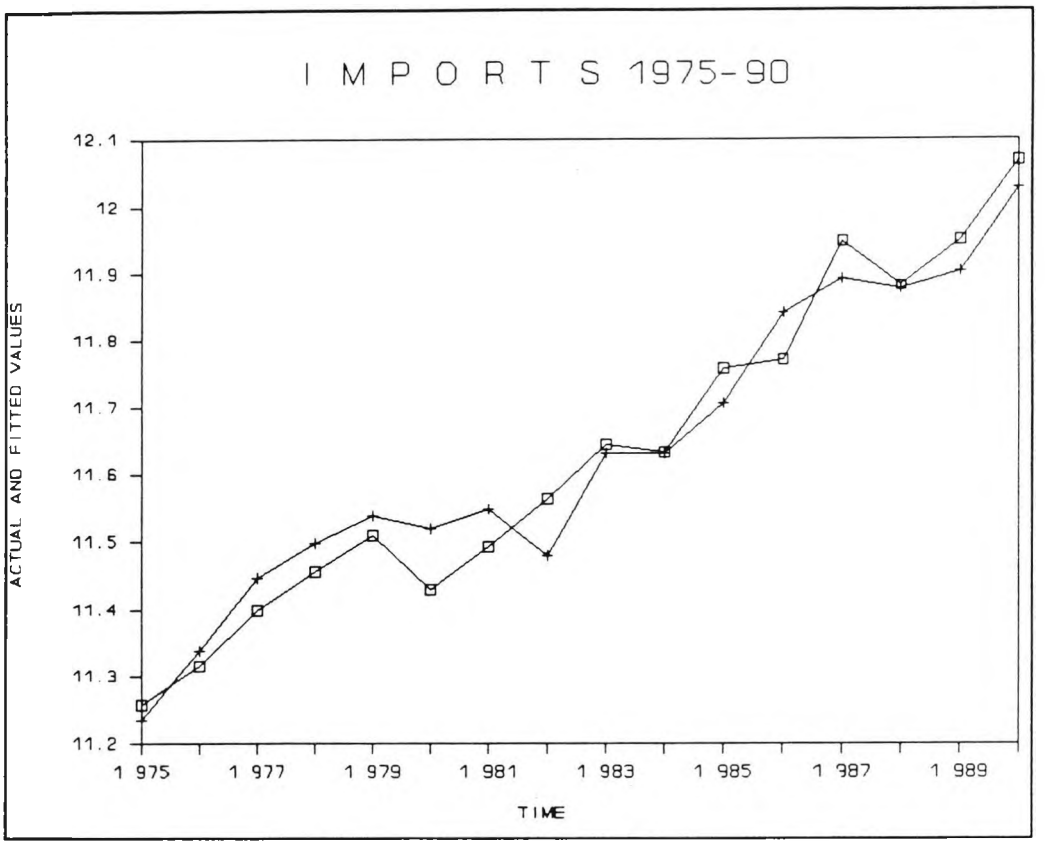
FINAL VALUE OF RHO = 0.724017
STANDARD ERROR OF RHO = 0.177531
T-STATISTIC FOR RHO = 4.07825

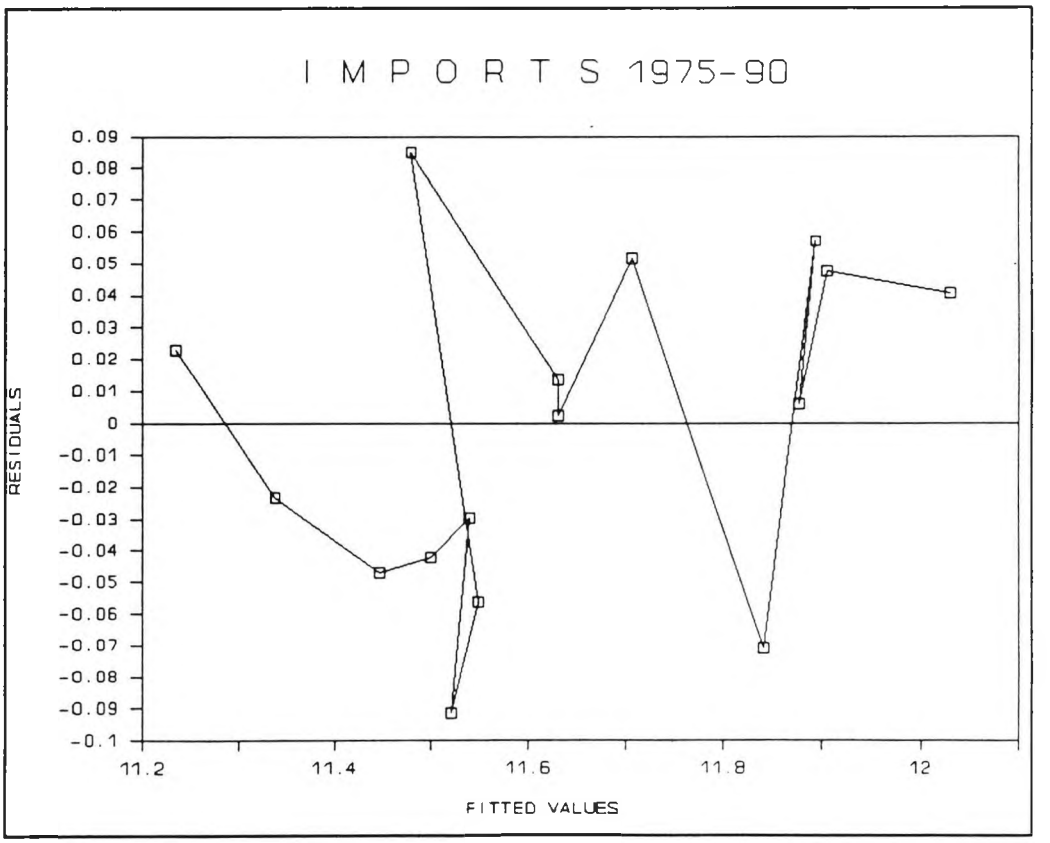
STATISTICS BASED ON RHO-TRANSFORMED VARIABLES
****

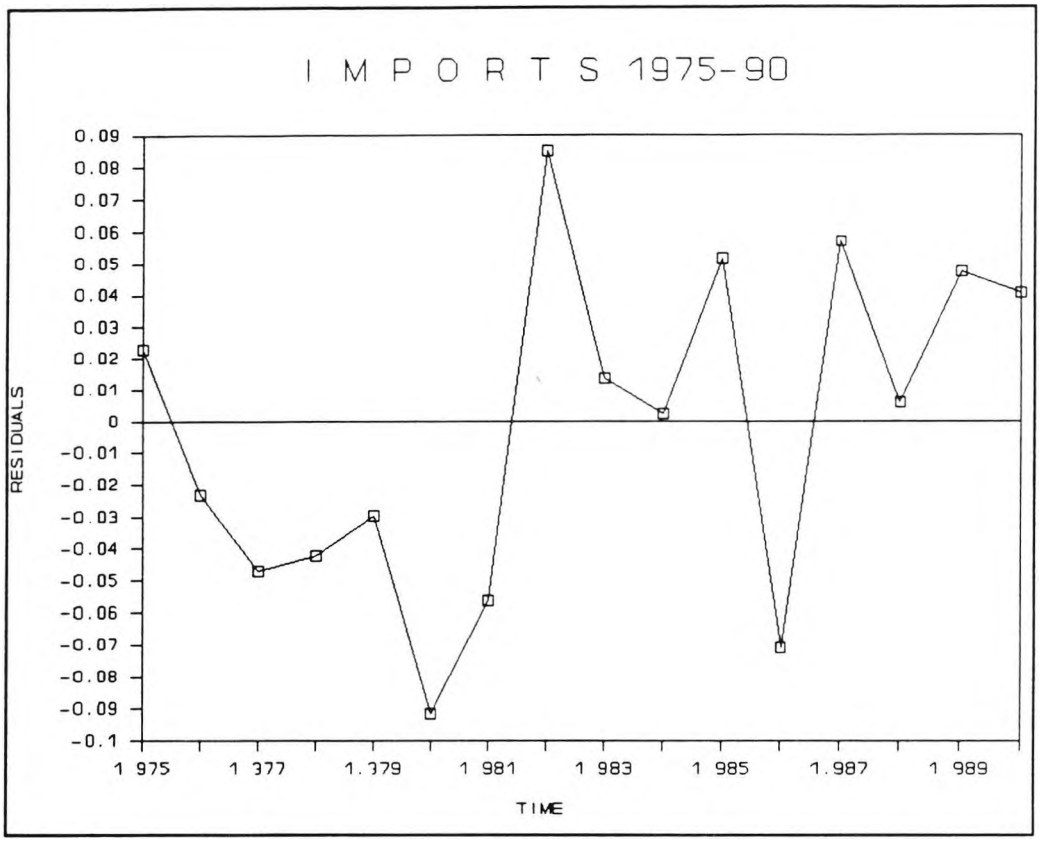
DEPENDENT VARIABLE: LMTR

SUM OF SQUARED RESIDUALS = 0.397166E-01
STANDARD ERROR OF THE REGRESSION = 0.552731E-01
MEAN OF DEPENDENT VARIABLE = 3.53770
STANDARD DEVIATION = 1.13079
R-SQUARED = 0.997973
ADJUSTED R-SQUARED = 0.997662
DURBIN-WATSON STATISTIC = 1.7962
F-STATISTIC(2, 13) = 3132.54
LOG OF LIKELIHOOD FUNCTION = 24.9142
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-8.273772	3.813113	-2.169821
LPMHI	-1.163710	0.2651353	-4.389118
LY	1.537473	0.2912449	5.278971


I M P O R T S 1975-90
ACTUAL AND FITTED VALUES
12.1
12
11.9
11.8
11.7
11.6
11.5
11.4
11.3
11.2
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME


I M P O R T S 1975-90
RESIDUALS
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
-0.08
-0.09
-0.1
11.2
11.4
11.6
11.8
12
FITTED VALUES


I M P O R T S 1975-90
RESIDUALS
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
-0.08
-0.09
-0.1
1 975
1 977
1.979
1 981
1 983
1 985
1.987
1 989
TIME

AVERAGE YEARLY MONEY WAGE

EQUATION 5 : W = f((PHI*YFB/LI*1/(1+A)), LI/LS, W_{-1}))

****

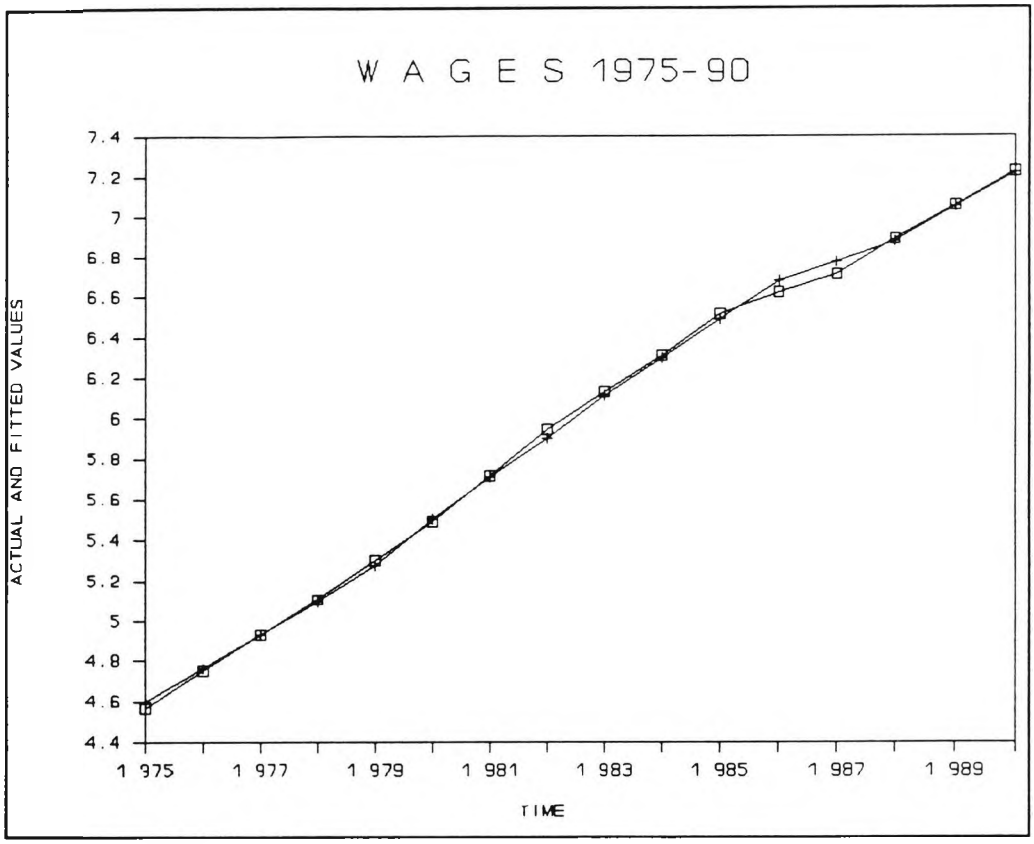
METHOD OF ESTIMATION = ORDINARY LEAST SQUARES

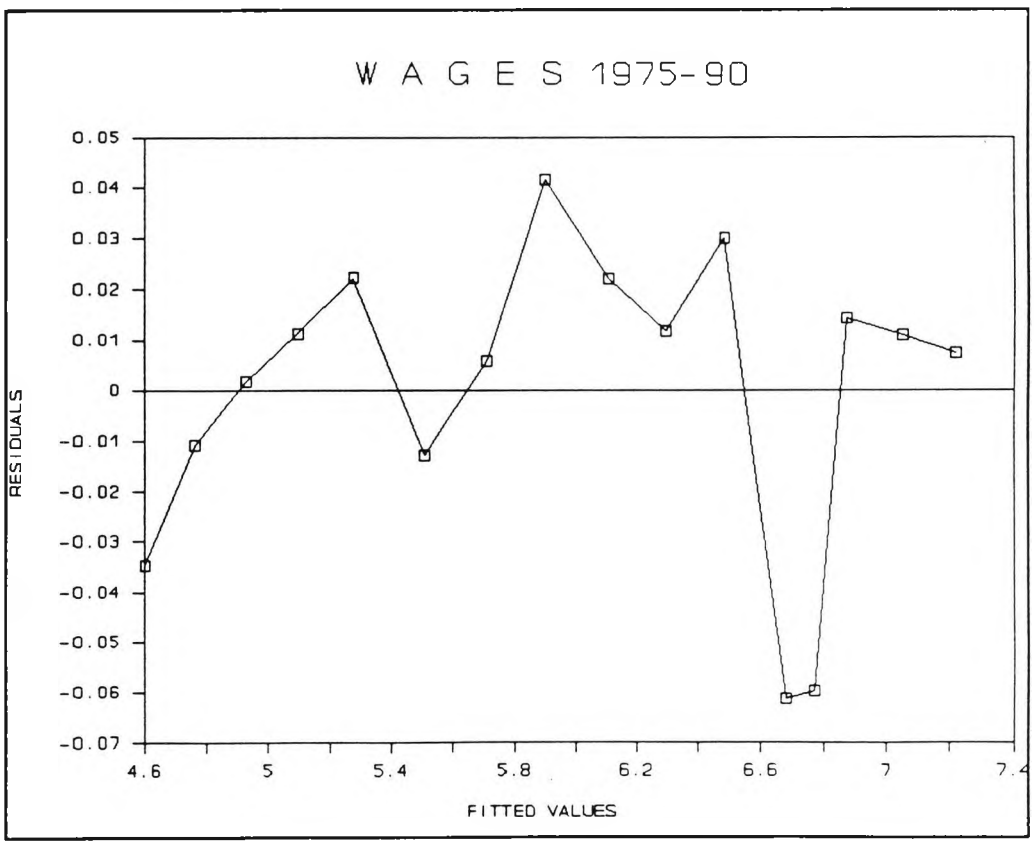
NOTE: Lagged dependent variable(s) present
DEPENDENT VARIABLE: LW

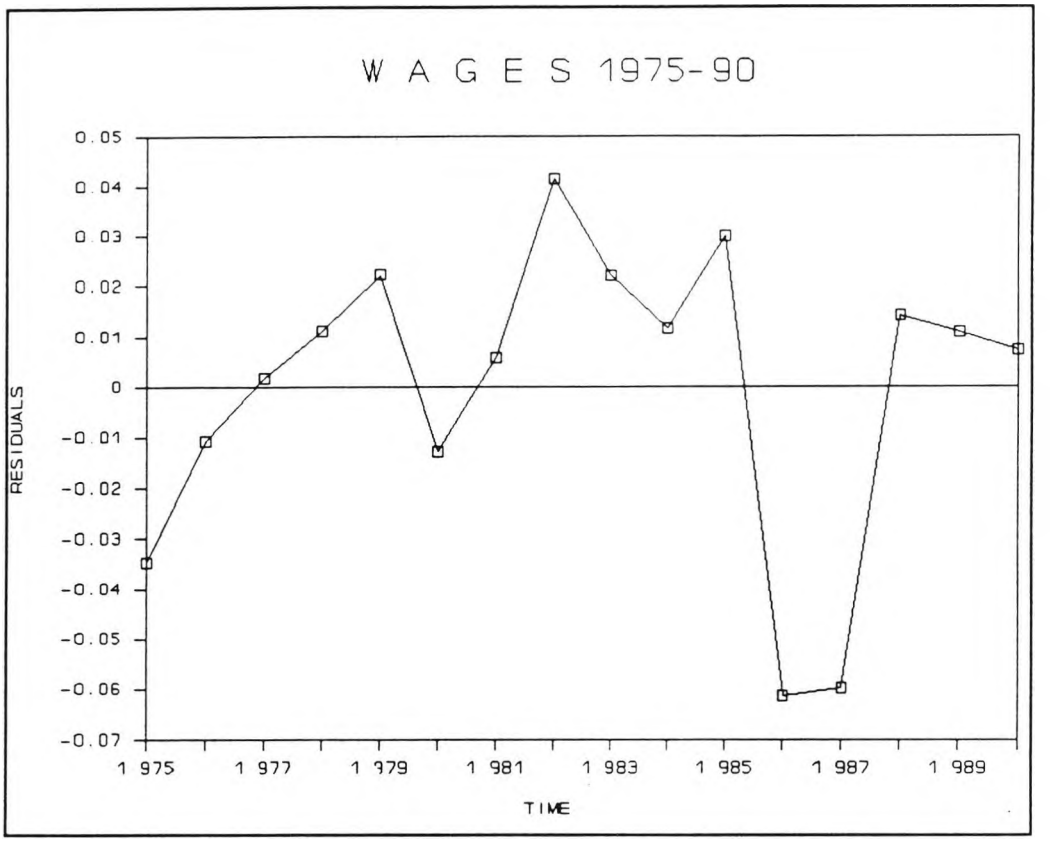
SUM OF SQUARED RESIDUALS = 0.160776E-01
STANDARD ERROR OF THE REGRESSION = 0.351673E-01
MEAN OF DEPENDENT VARIABLE = 6.37678
STANDARD DEVIATION = 0.827761
R-SQUARED = 0.998436
ADJUSTED R-SQUARED = 0.998195
DURBIN-WATSON STATISTIC = 1.8475
F-STATISTIC(2, 13) = 4148.71
LOG OF LIKELIHOOD FUNCTION = 32.5203
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
LPYFLA	0.1530247	0.6210740E-01	2.463873
LLDS	0.5072477E-0	0.2969957	0.1707930
LW(-1)	0.8509261	0.7569897E-01	11.24092

DURBIN(1970) T-STAT FOR AR(1) = 0.173306


W A G E S 1975-90
ACTUAL AND FITTED VALUES
7.4
7.2
7
6.8
6.6
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME


W A G E S 1975-90
RESIDUALS
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
4.6
5
5.4
5.8
6.2
6.6
7
7.4
FITTED VALUES


W A G E S 1975-90
RESIDUALS
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME

G D P DEFLATOR

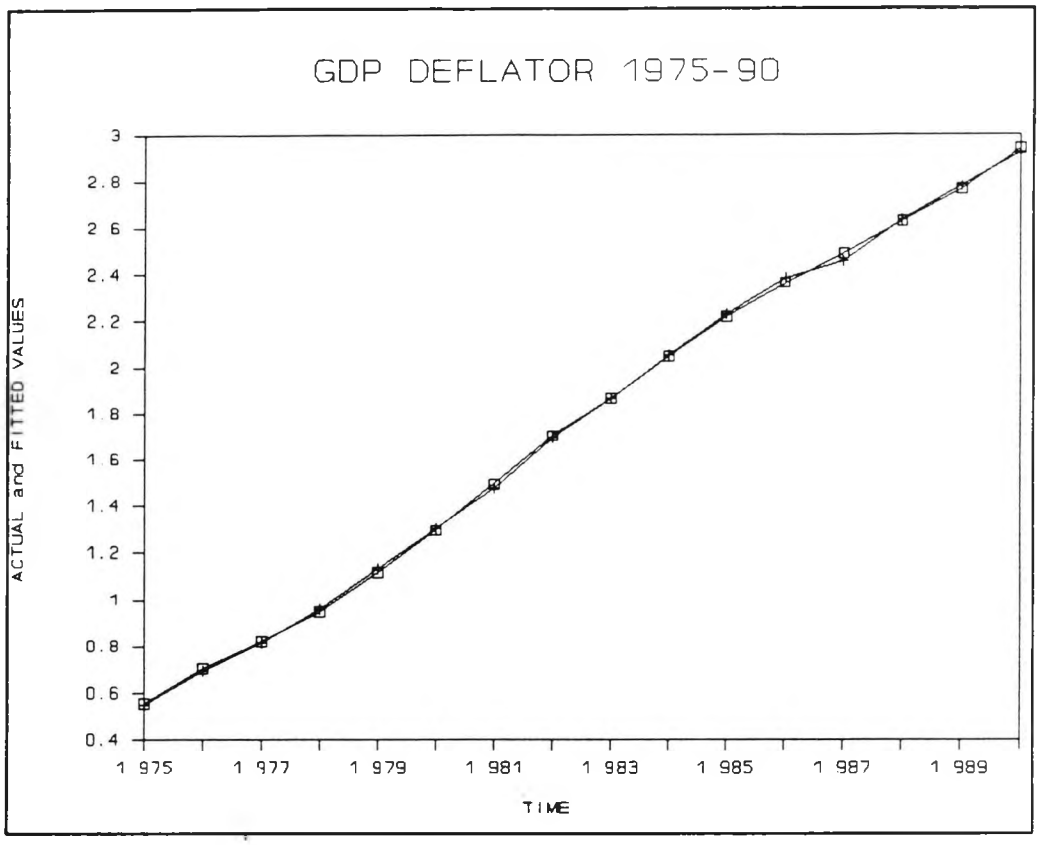
EQUATION 6 : P1 = f(W*(1 + A), PM, $P1_{-1}$)
****

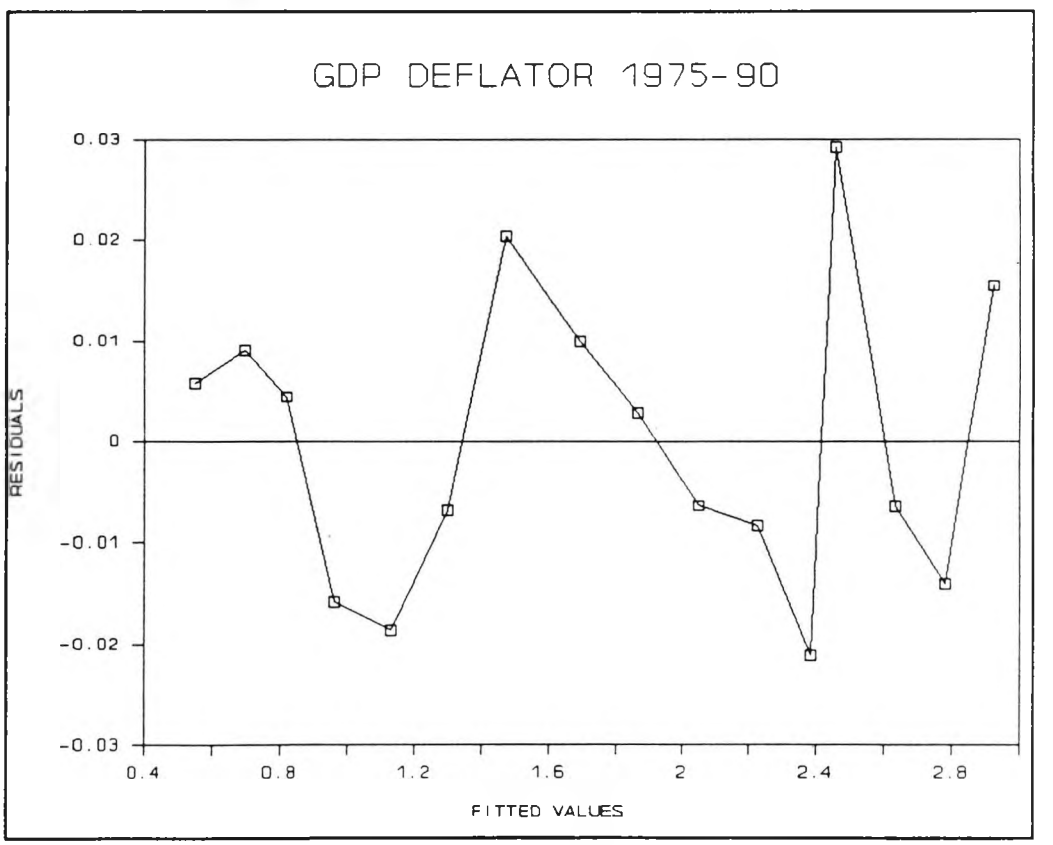
METHOD OF ESTIMATION = ORDINARY LEAST SQUARES

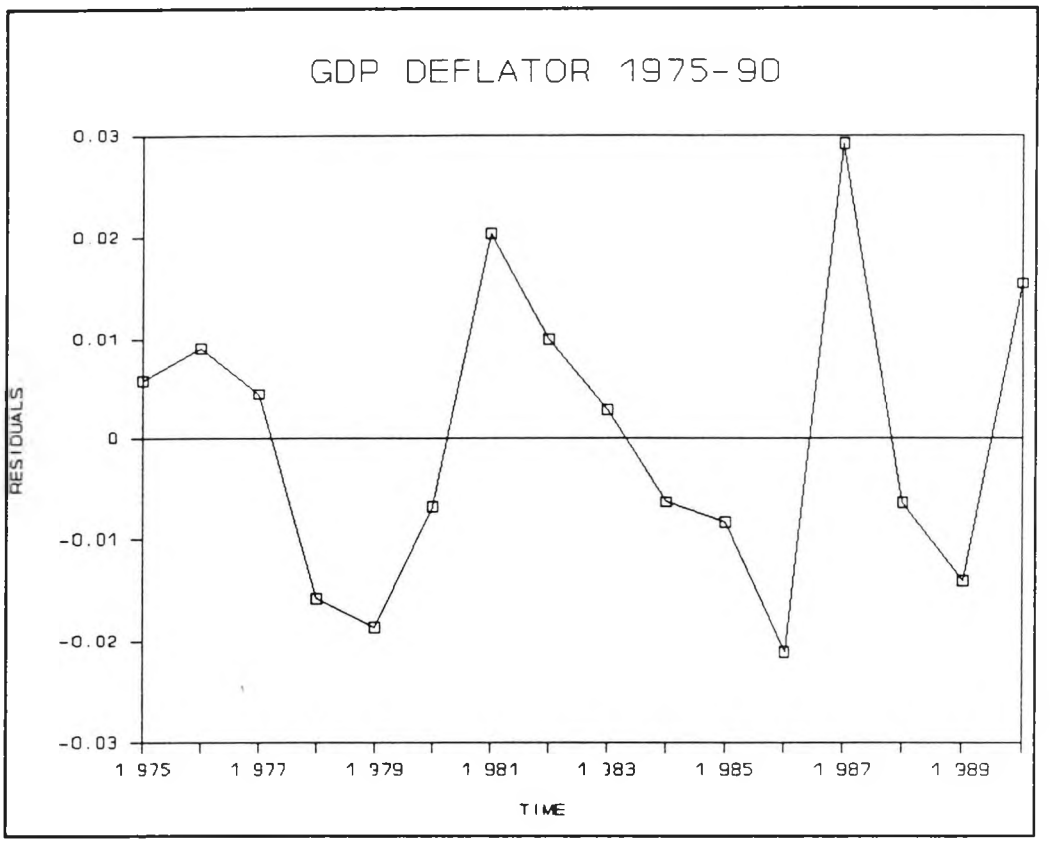
NOTE: Lagged dependent variable(s) present
DEPENDENT VARIABLE: LP1

SUM OF SQUARED RESIDUALS = 0.255484E-02
STANDARD ERROR OF THE REGRESSION = 0.145912E-01
MEAN OF DEPENDENT VARIABLE = 1.76583
STANDARD DEVIATION = 0.778006
R-SQUARED = 0.999719
ADJUSTED R-SQUARED = 0.999648
DURBIN-WATSON STATISTIC = 2.2675
F-STATISTIC(3, 12) = 14211.2
LOG OF LIKELIHOOD FUNCTION = 47.2358
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-0.9788418	0.2784285	-3.515595
LWC1B	0.2107546	0.6036547E-01	3.491310
LPM	0.3081834	0.5383064E-01	5.725055
LP1(-1)	0.4817247	0.6145762E-01	7.838324


GDP DEFLATOR 1975-90
ACTUAL and FITTED VALUES
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME


GDP DEFLATOR 1975-90
RESIDUALS
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
0.4
0.8
1.2
1.6
2
2.4
2.8
FITTED VALUES


GDP DEFLATOR 1975-90
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
RESIDUALS
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME

CONSUMER PRICE INDEX

EQUATION 7 : PC = f(W*(1 + A), PC_{-1})

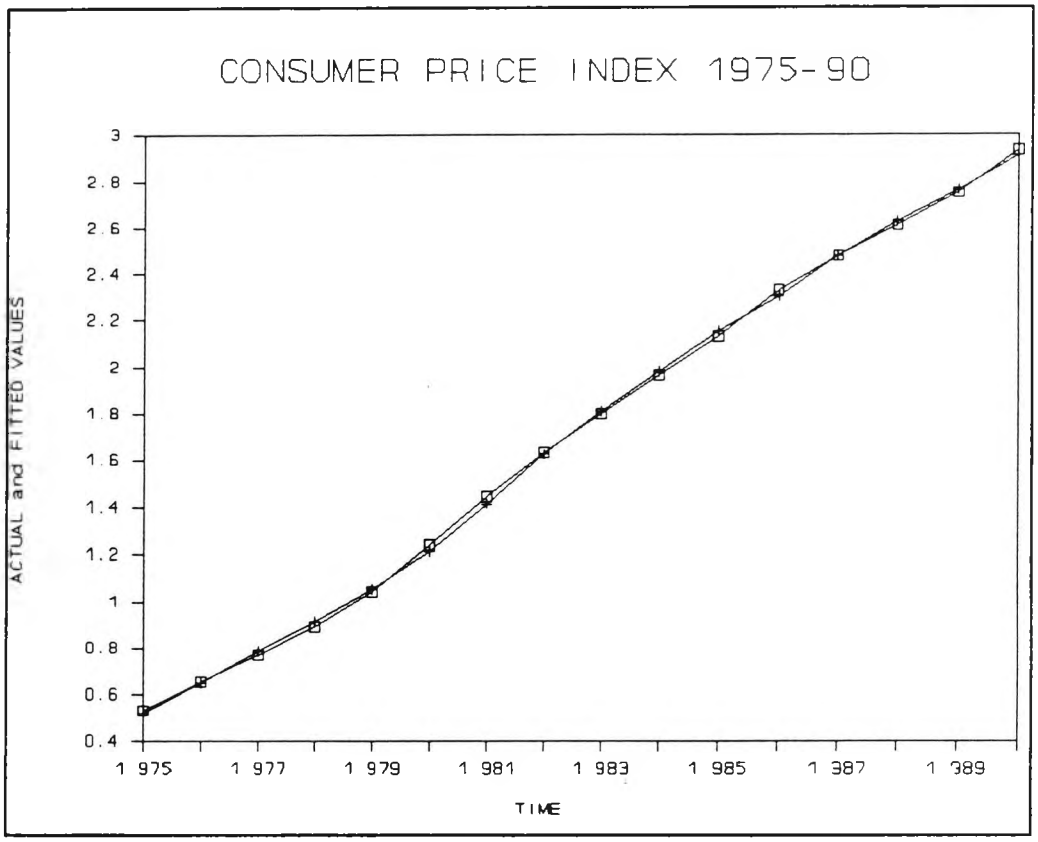
****

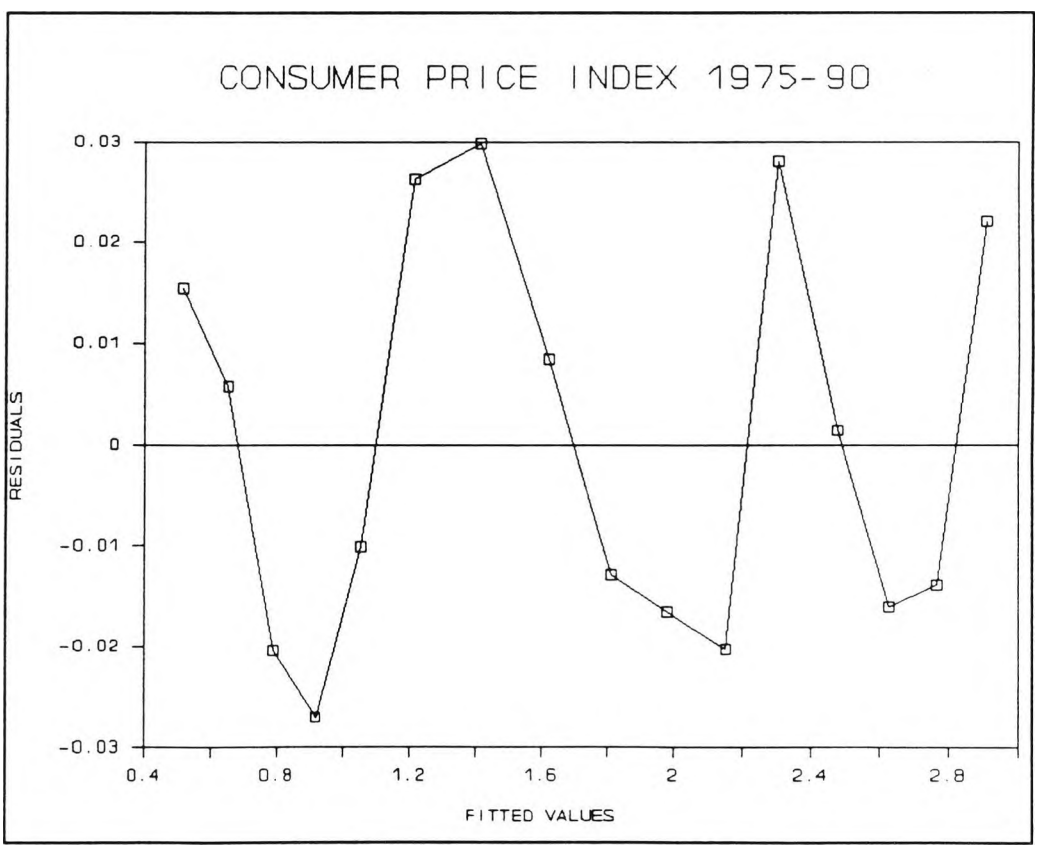
METHOD OF ESTIMATION = ORDINARY LEAST SQUARES

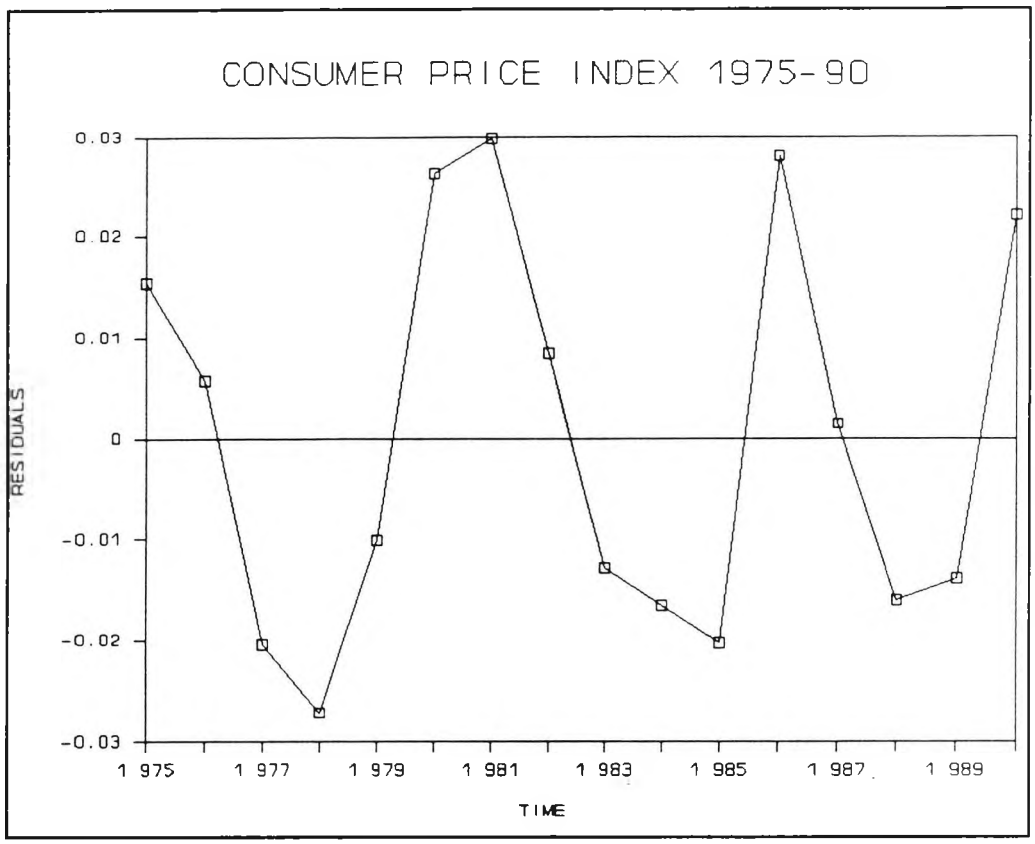
NOTE: Lagged dependent variable(s) present
DEPENDENT VARIABLE: LPC

SUM OF SQUARED RESIDUALS = 0.730959E-02
STANDARD ERROR OF THE REGRESSION = 0.237124E-01
MEAN OF DEPENDENT VARIABLE = 1.70105
STANDARD DEVIATION = 0.792201
R-SQUARED = 0.999224
ADJUSTED R-SQUARED = 0.999104
DURBIN-WATSON STATISTIC = 1.2895
F-STATISTIC(2, 13) = 8364.60
LOG OF LIKELIHOOD FUNCTION = 38.8262
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-0.9381825	0.3516167	-2.668196
LWC1B	0.2216264	0.7238606E-01	3.061728
LPC(-1)	0.7769611	0.7746904E-01	10.02931


CONSUMER PRICE INDEX 1975-90
ACTUAL and FITTED VALUES
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
1 975
1 977
1 979
1 981
1 983
1 985
1 387
1 389
TIME


CONSUMER PRICE INDEX 1975-90
RESIDUALS
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
0.4
0.8
1.2
1.6
2
2.4
2.8
FITTED VALUES


CONSUMER PRICE INDEX 1975-90
RESIDUALS
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME

PRODUCER PRICE IN NON AGRICULTURAL SECTOR

CURRENT SAMPLE : 1975 TO 1990

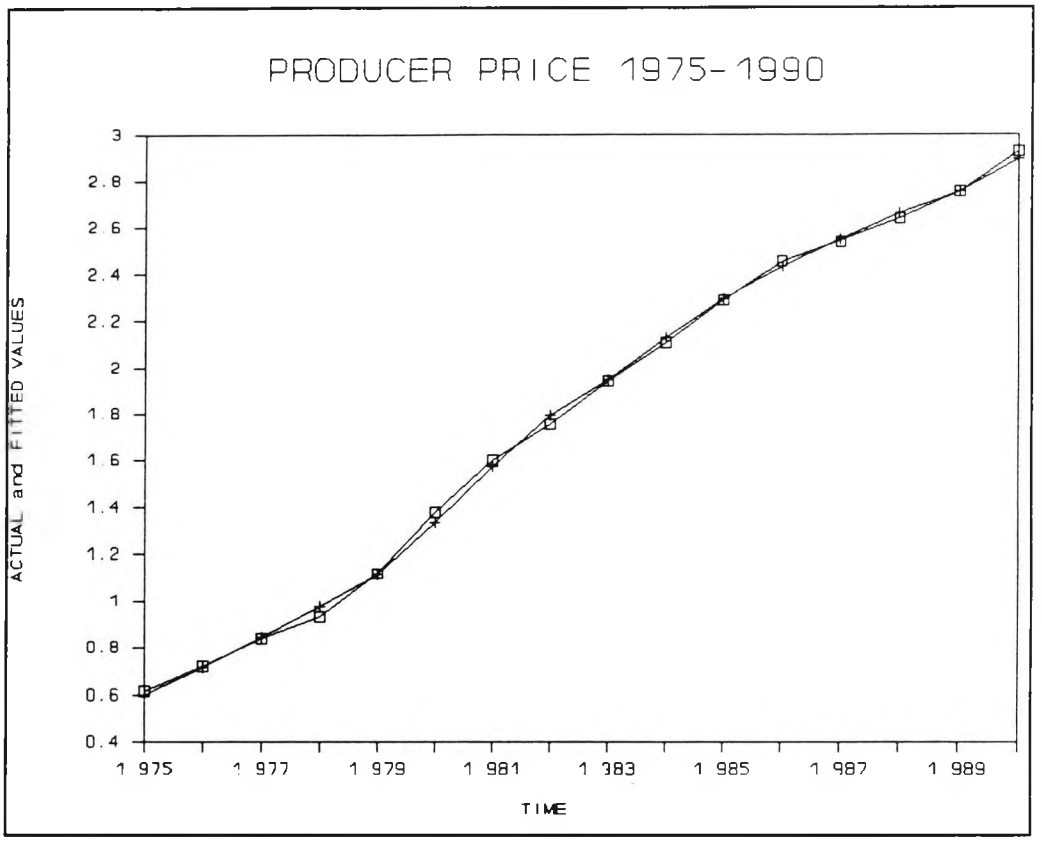
EQUATION 8 : PHI = f(W*(1 + A), Poil, PHI_{-1})

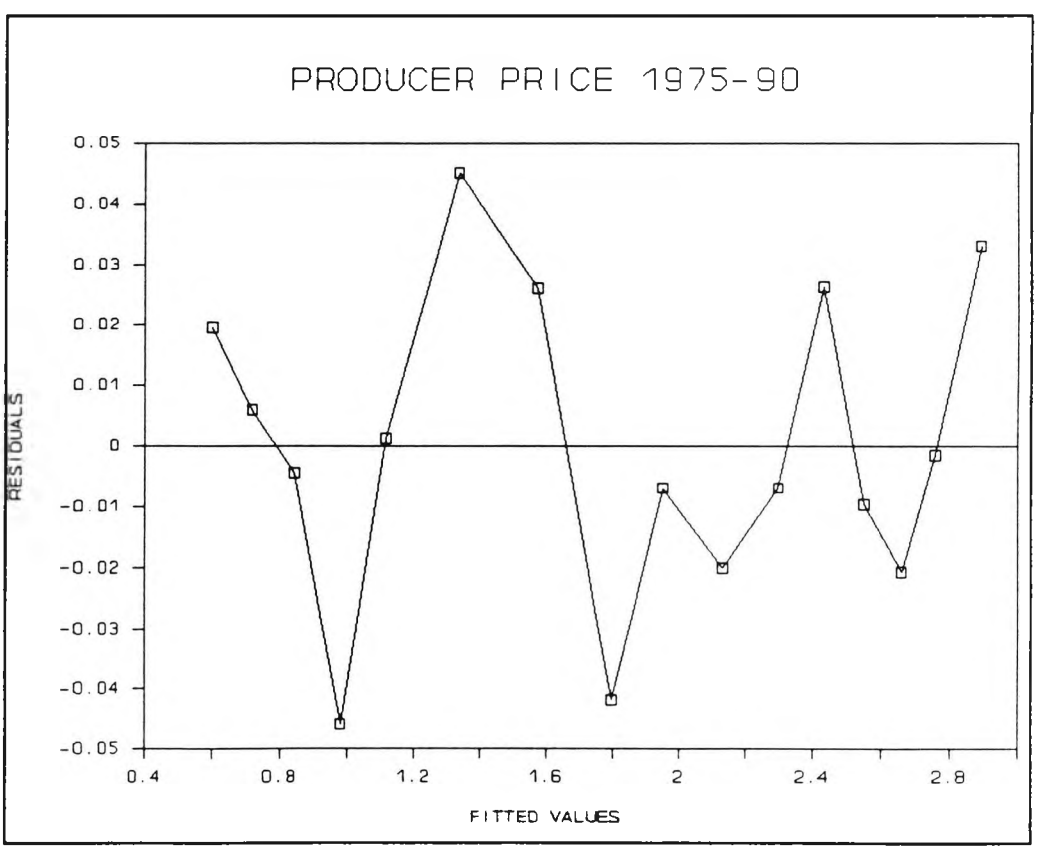
****

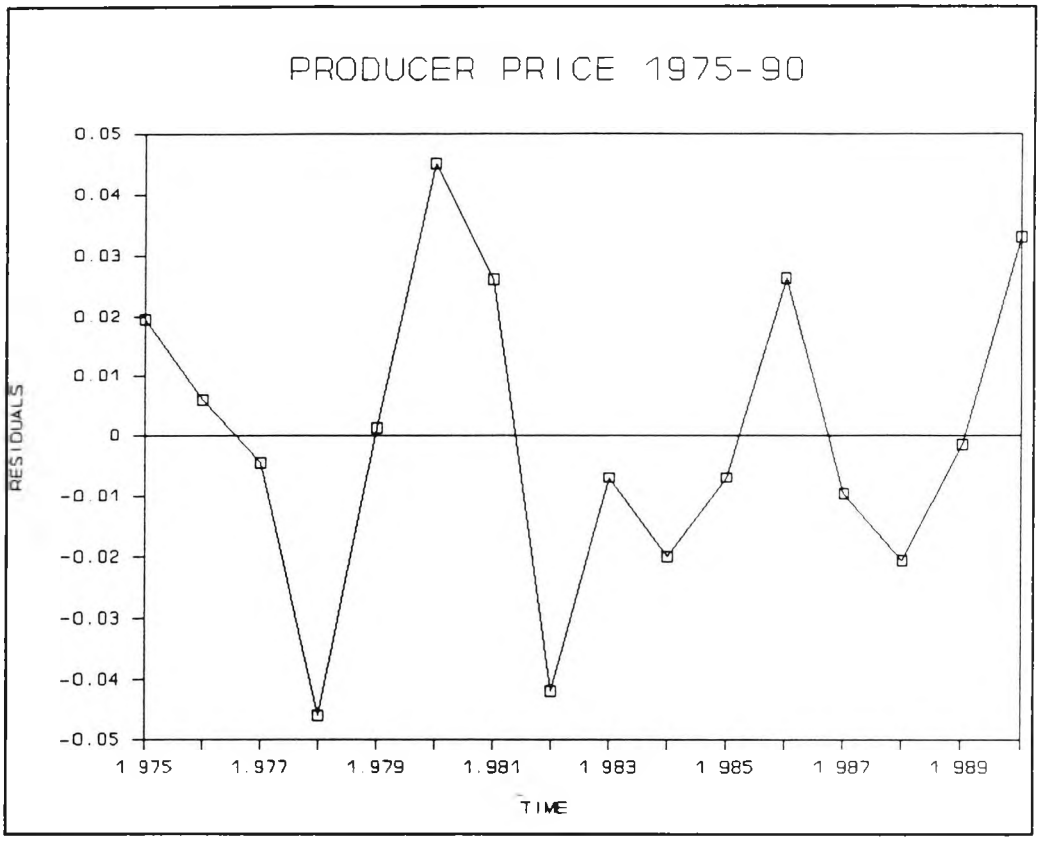
METHOD OF ESTIMATION = ORDINARY LEAST SQUARES
NOTE: Lagged dependent variable(s) present
DEPENDENT VARIABLE: LPHI

SUM OF SQUARED RESIDUALS = 0.124691E-01
STANDARD ERROR OF THE REGRESSION = 0.322350E-01
MEAN OF DEPENDENT VARIABLE = 1.79002
STANDARD DEVIATION = 0.780892
R-SQUARED = 0.998637
ADJUSTED R-SQUARED = 0.998296
DURBIN-WATSON STATISTIC = 1.5153
F-STATISTIC(3, 12) = 2930.26
LOG OF LIKELIHOOD FUNCTION = 34.5537
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-1.394571	0.4512569	-3.090415
LWC1B	0.3026328	0.9672368E-01	3.128839
LPOIL	0.6965354E-01	0.2108028E-01	3.304204
LPHI(-1)	0.6167125	0.1004765	6.137876


PRODUCER PRICE 1975-1990
ACTUAL and FITTED VALUES
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
1 975
1 977
1 979
1 981
1 383
1 985
1 987
1 989
TIME


PRODUCER PRICE 1975-90
RESIDUALS
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
0.4
0.8
1.2
1.6
2
2.4
2.8
FITTED VALUES


PRODUCER PRICE 1975-90
RESIDUALS
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME

REAL PENSION BENEFIT PER RECIPIENT

CURRENT SAMPLE : 1975 TO 1990

EQUATION 9 : PEN/PC = f((W/PC), $(PEN/PC)_{-1}$, DD82))

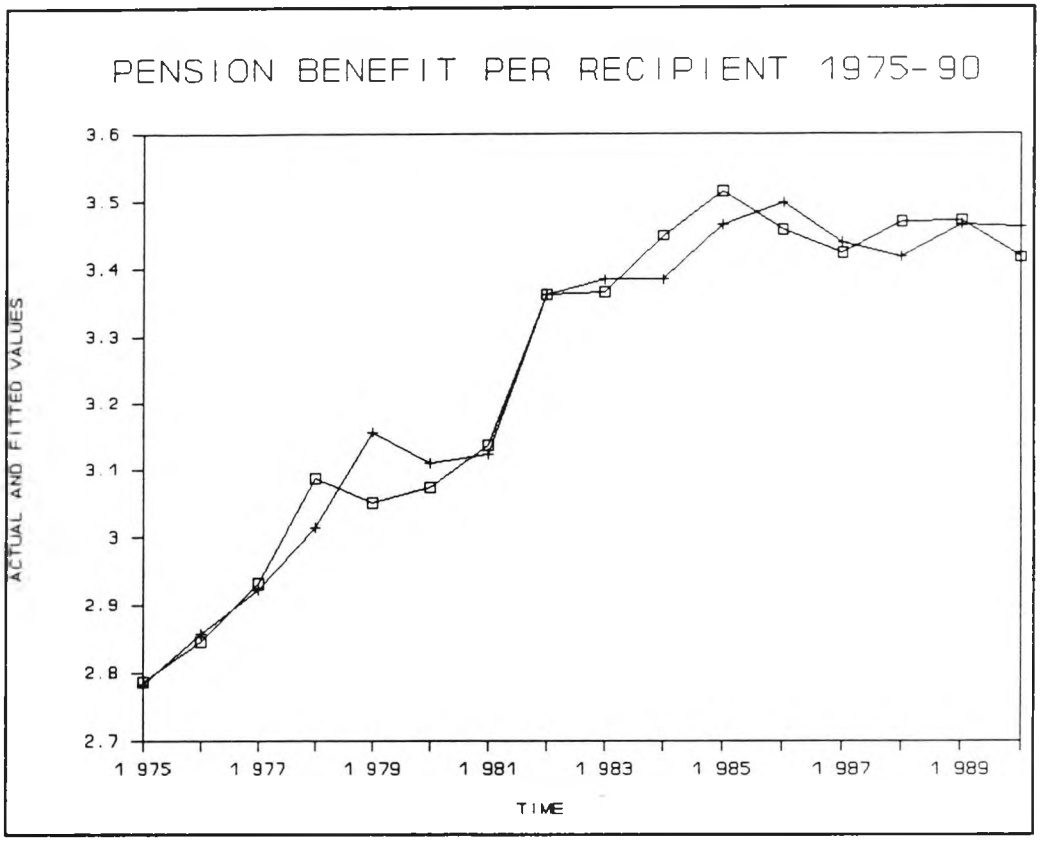
****

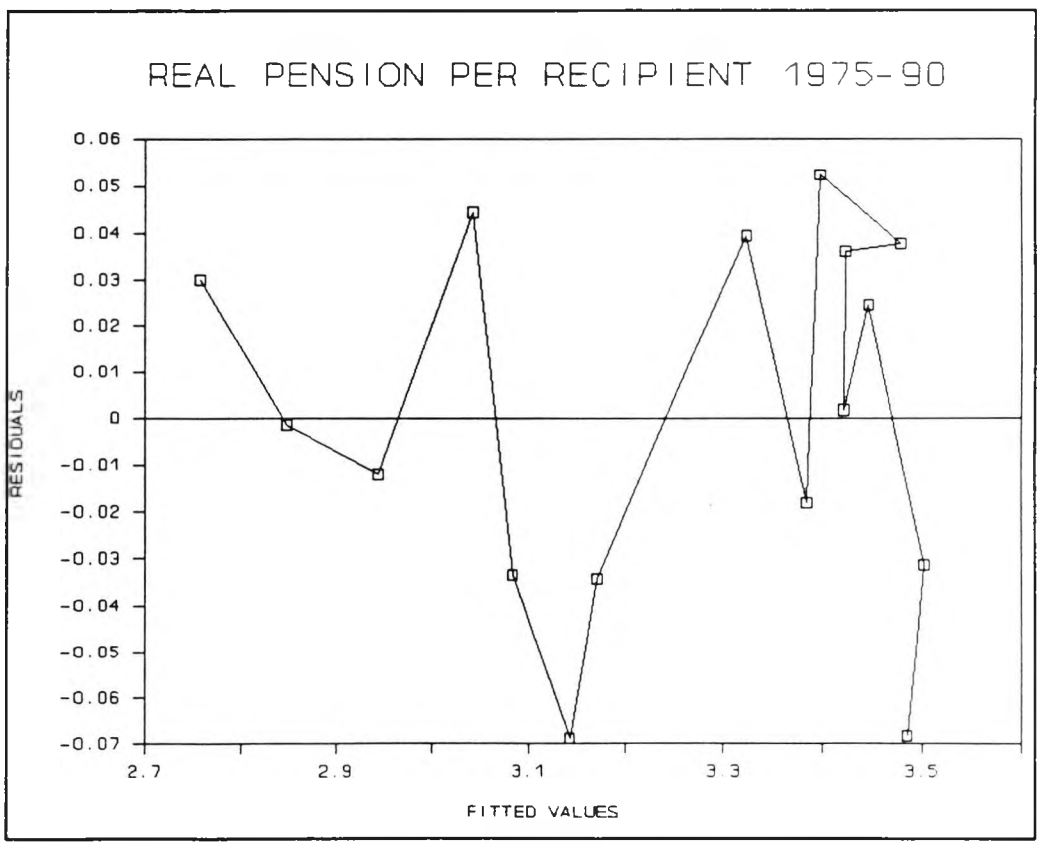
METHOD OF ESTIMATION = ORDINARY LEAST SQUARES

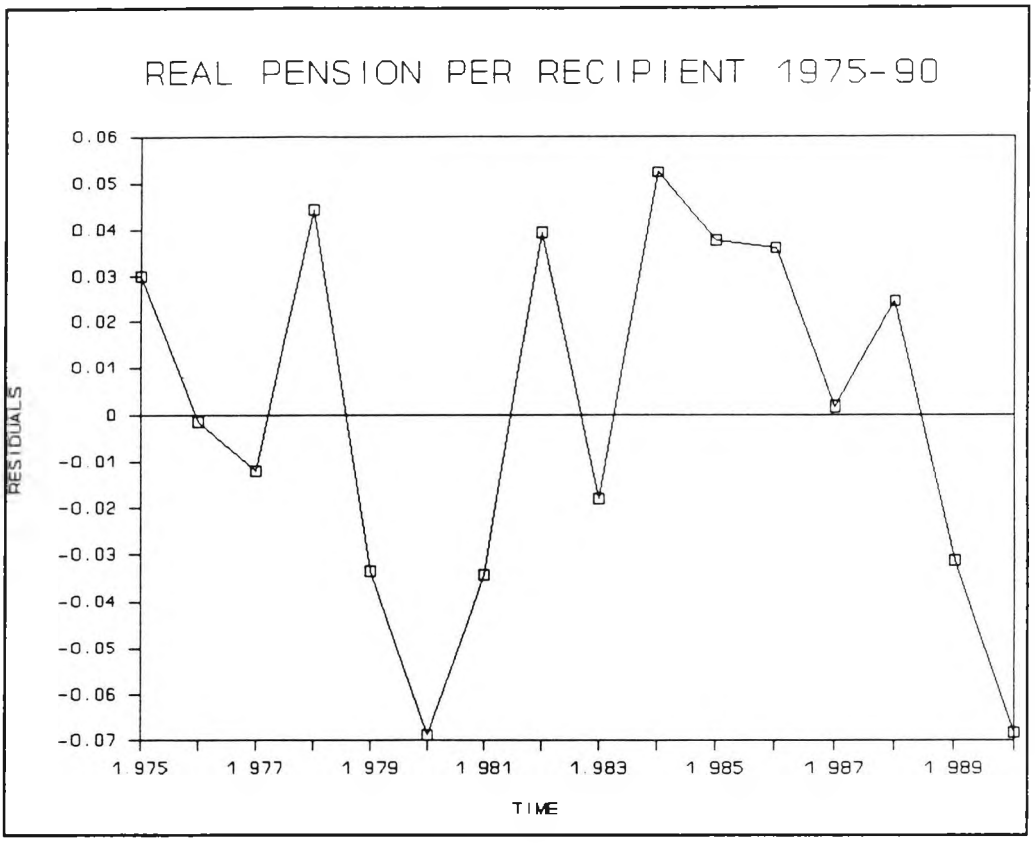
NOTE: Lagged dependent variable(s) present
DEPENDENT VARIABLE: LPENR

SUM OF SQUARED RESIDUALS = 0.321570E-01
STANDARD ERROR OF THE REGRESSION = 0.517663E-01
MEAN OF DEPENDENT VARIABLE = 3.24019
STANDARD DEVIATION = 0.247969
R-SQUARED = 0.965135
ADJUSTED R-SQUARED = 0.956419
DURBIN-WATSON STATISTIC = 2.1805
F-STATISTIC(3, 12) = 110.728
LOG OF LIKELIHOOD FUNCTION = 26.9747
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-0.6324529	0.9933899	-0.6366613
LWR	0.2528590	0.2367966	1.067832
LPENR(-1)	0.8381447	0.6265300E-01	13.37757
DD82	0.1755406	0.5470771E-01	3.208700


PENSION BENEFIT PER RECIPIENT 1975-90
ACTUAL AND FITTED VALUES
3.6
3.5
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME


REAL PENSION PER RECIPIENT 1975-90
RESIDUALS
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
2.7
2.9
3.1
3.3
3.5
FITTED VALUES


REAL PENSION PER RECIPIENT 1975-90
RESIDUALS
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
1.975
1.977
1.979
1.981
1.983
1.985
1.987
1.989
TIME

OTHER PUBLIC TRANSFERS OF HOUSHOLDS

CURRENT SAMPLE : 1975 TO 1990

EQUATION 10 : OTR/PC =f((WI/PC), $(OTR/PC)_{-1}$,DD90)

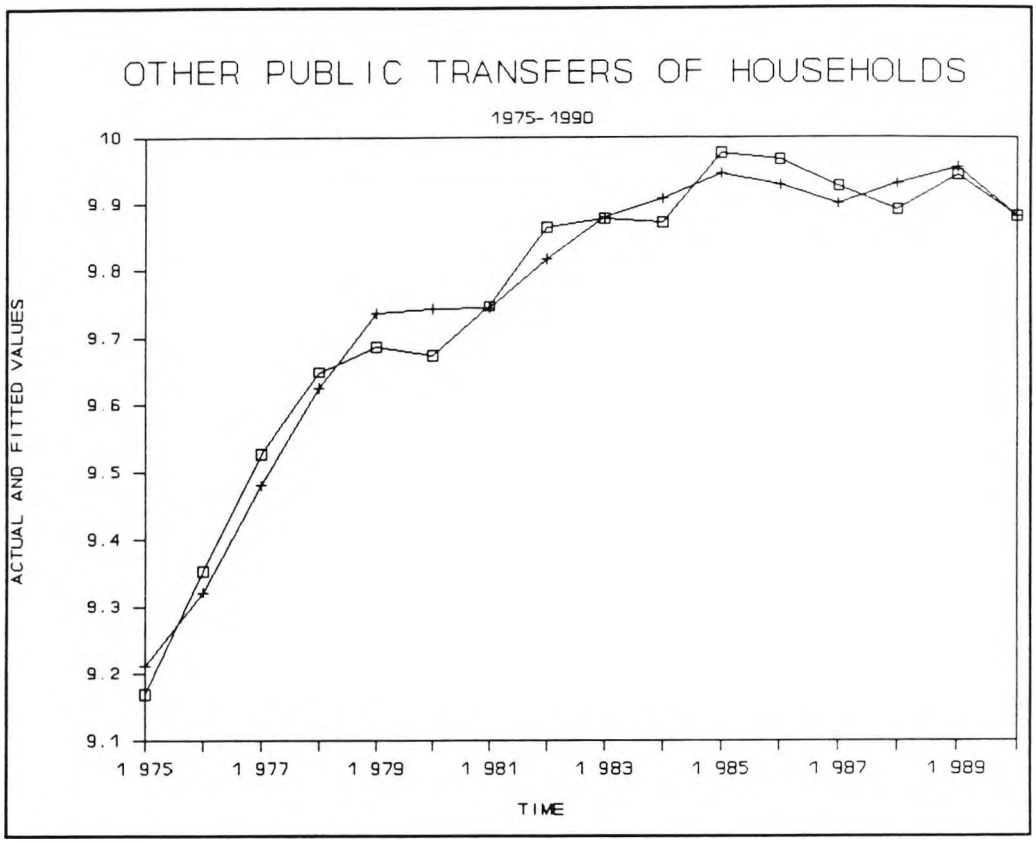
****

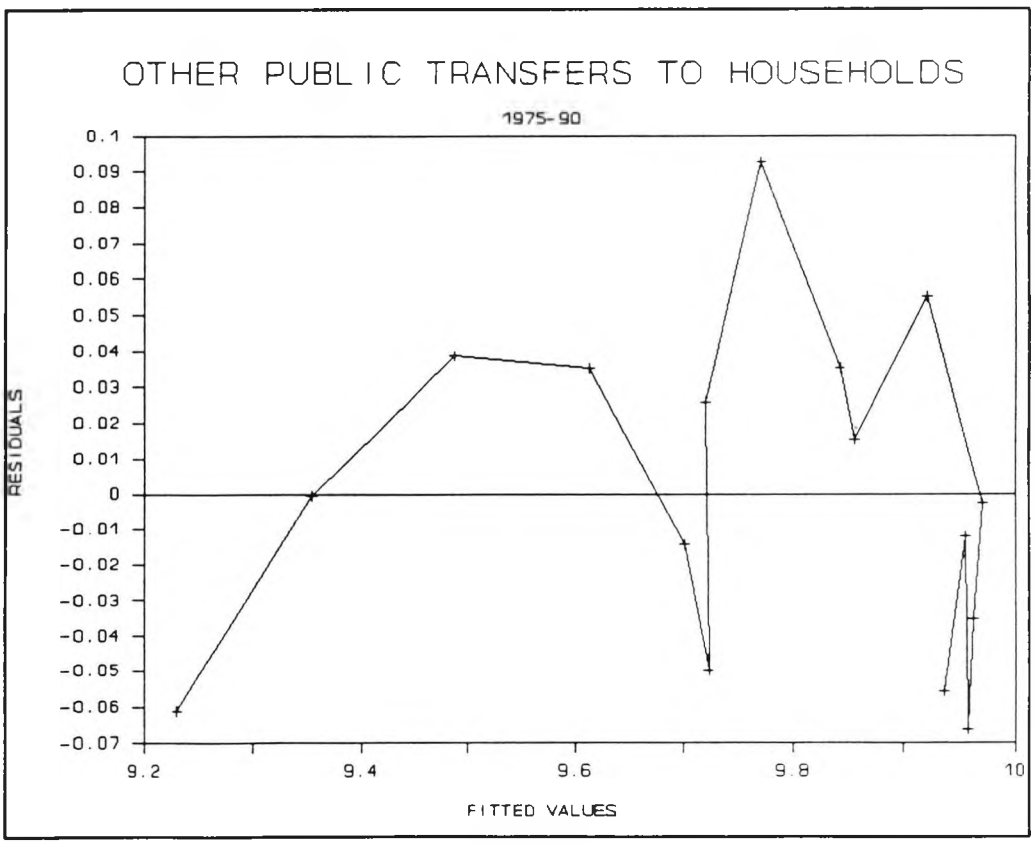
METHOD OF ESTIMATION = ORDINARY LEAST SQUARES

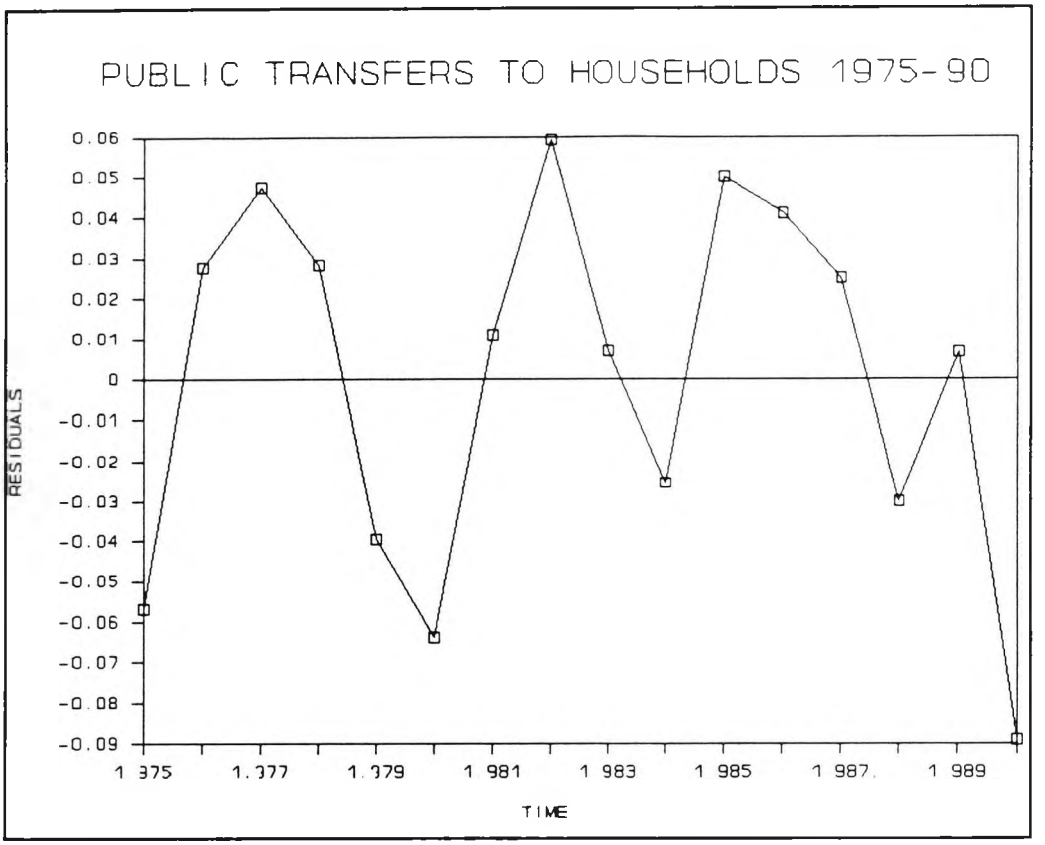
NOTE: Lagged dependent variable(s) present
DEPENDENT VARIABLE: LOTRR

SUM OF SQUARED RESIDUALS = 0.211444E-01
STANDARD ERROR OF THE REGRESSION = 0.419766E-01
MEAN OF DEPENDENT VARIABLE = 9.75024
STANDARD DEVIATION = 0.232968
R-SQUARED = 0.974028
ADJUSTED R-SQUARED = 0.967535
DURBIN-WATSON STATISTIC = 1.5455
F-STATISTIC(3, 12) = 150.010
LOG OF LIKELIHOOD FUNCTION = 30.3287
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-3.493316	1.791596	-1.949834
LWIR	0.7417464	0.2445972	3.032522
LOTRR(-1)	0.4427397	0.1300414	3.404605
DD90	-0.1062915	0.4593056E-01	-0.314178


OTHER PUBLIC TRANSFERS OF HOUSEHOLDS
1975-1990
ACTUAL AND FITTED VALUES
10
9.9
9.8
9.7
9.6
9.5
9.4
9.3
9.2
9.1
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME


OTHER PUBLIC TRANSFERS TO HOUSEHOLDS
1975-90
RESIDUALS
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
9.2
9.4
9.6
9.8
10
FITTED VALUES


PUBLIC TRANSFERS TO HOUSEHOLDS 1975-90
RESIDUALS
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
-0.08
-0.09
1 375
1.377
1.379
1 981
1 983
1 985
1 987
1 989
TIME

TOTAL DIRECT TAXES OF HOUSHOLDS

EQUATION 11: TD/PC = f((WI/PC) + (PENS/PC) + (OTR/PC) + (YPP/PC) + (BIH/PC) + D)

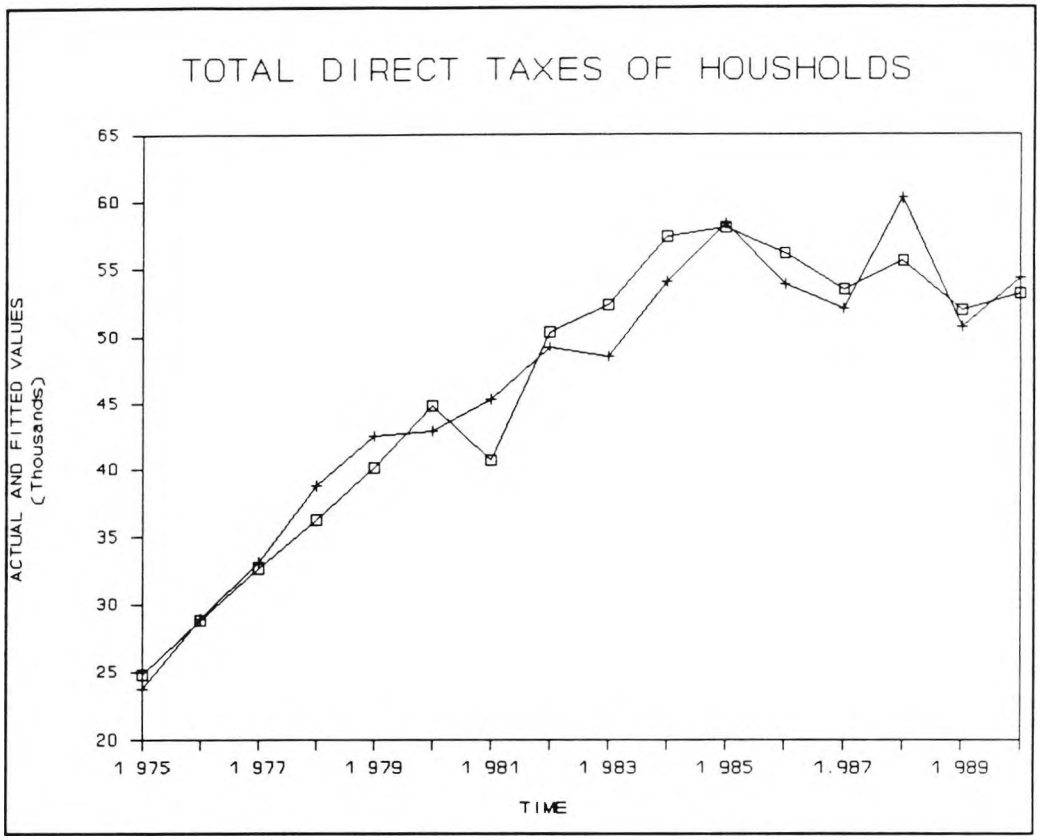
****

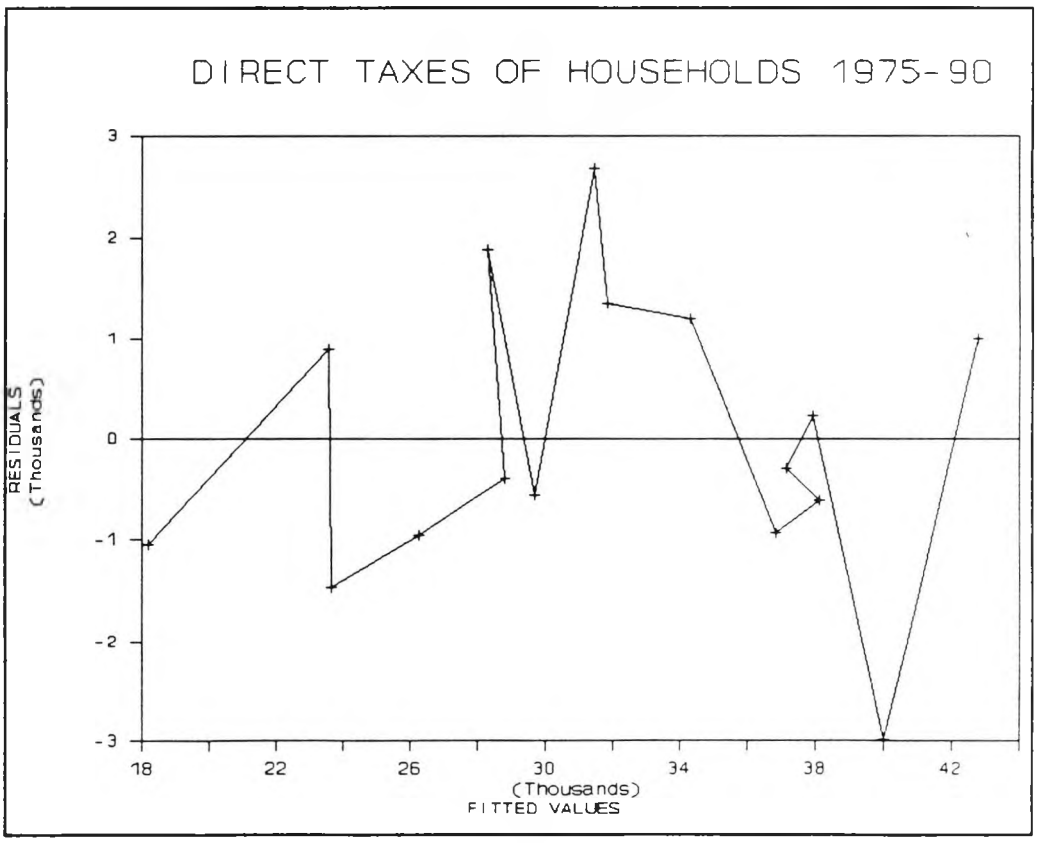
METHOD OF ESTIMATION = ORDINARY LEAST SQUARES

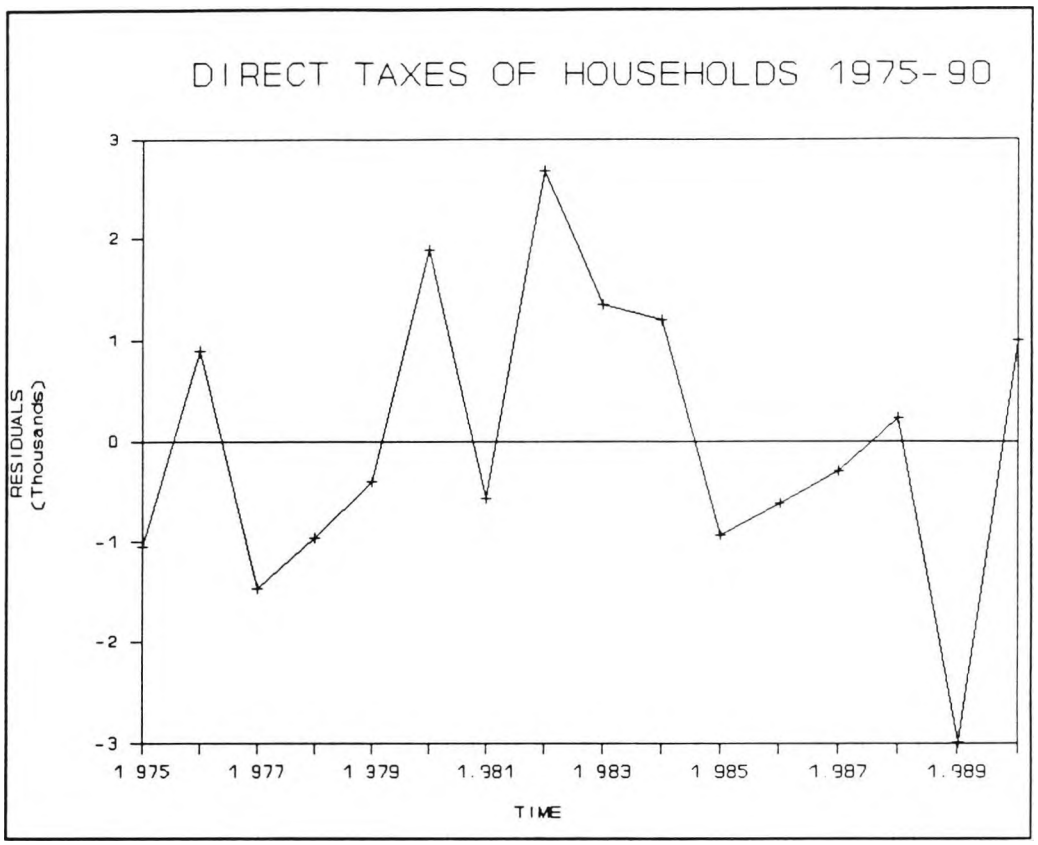
DEPENDENT VARIABLE: TDR

SUM OF SQUARED RESIDUALS = 0.974436E+08
STANDARD ERROR OF THE REGRESSION = 2737.82
MEAN OF DEPENDENT VARIABLE = 46051.5
STANDARD DEVIATION = 10813.3
R-SQUARED = 0.944442
ADJUSTED R-SQUARED = 0.935895
DURBIN-WATSON STATISTIC = 2.1173
F-STATISTIC(2, 13) = 110.495
LOG OF LIKELIHOOD FUNCTION = -147.681
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-46058.77	6363.431	-7.238040
WPOYB	0.1981850	0.1373950E-01	14.42446
D	-12608.73	2493.020	-5.057612


TOTAL DIRECT TAXES OF HOUSHOLDS
ACTUAL AND FITTED VALUES
(Thousands)
65
60
55
50
45
40
35
30
25
20
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME


DIRECT TAXES OF HOUSEHOLDS 1975-90
RESIDUALS
(Thousands)
3
2
1
0
-1
-2
-3
18
22
26
30
34
38
42
(Thousands)
FITTED VALUES


DIRECT TAXES OF HOUSEHOLDS 1975-90
RESIDUALS (Thousands)
3
2
1
0
-1
-2
-3
1 975
1 977
1 979
1.981
1 983
1 985
1 987
1.989
TIME

OTHER COMPONENTS OF HOUSHOLDS DISPOSABLE INCOME

CURRENT SAMPLE : 1975 TO 1990

EQUATION 12 : BIH/PC =f(WI/PC)
****

FIRST-ORDER SERIAL CORRELATION OF THE ERROR

MAXIMUM LIKELIHOOD ITERATIVE TECHNIQUE

CONVERGENCE ACHIEVED AFTER 1 ITERATIONS

FINAL VALUE OF RHO = -0.169328
STANDARD ERROR OF RHO = 0.270801
T-STATISTIC FOR RHO = -0.625284

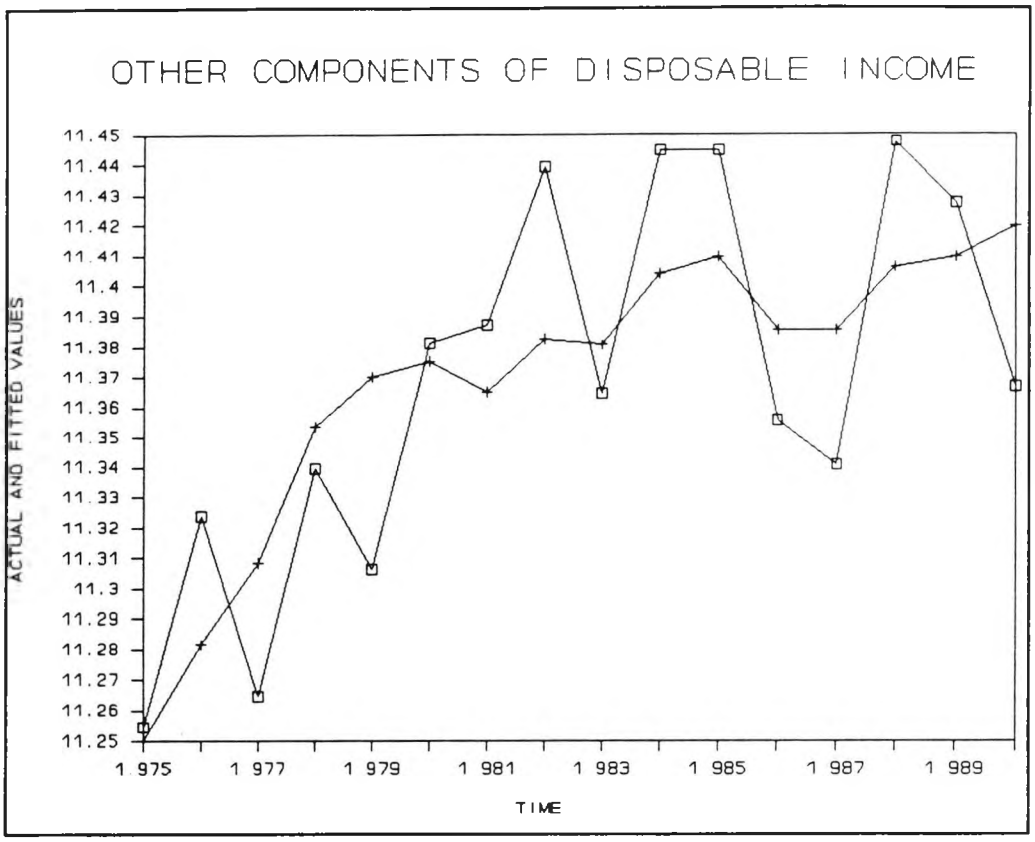
STATISTICS BASED ON RHO-TRANSFORMED VARIABLES

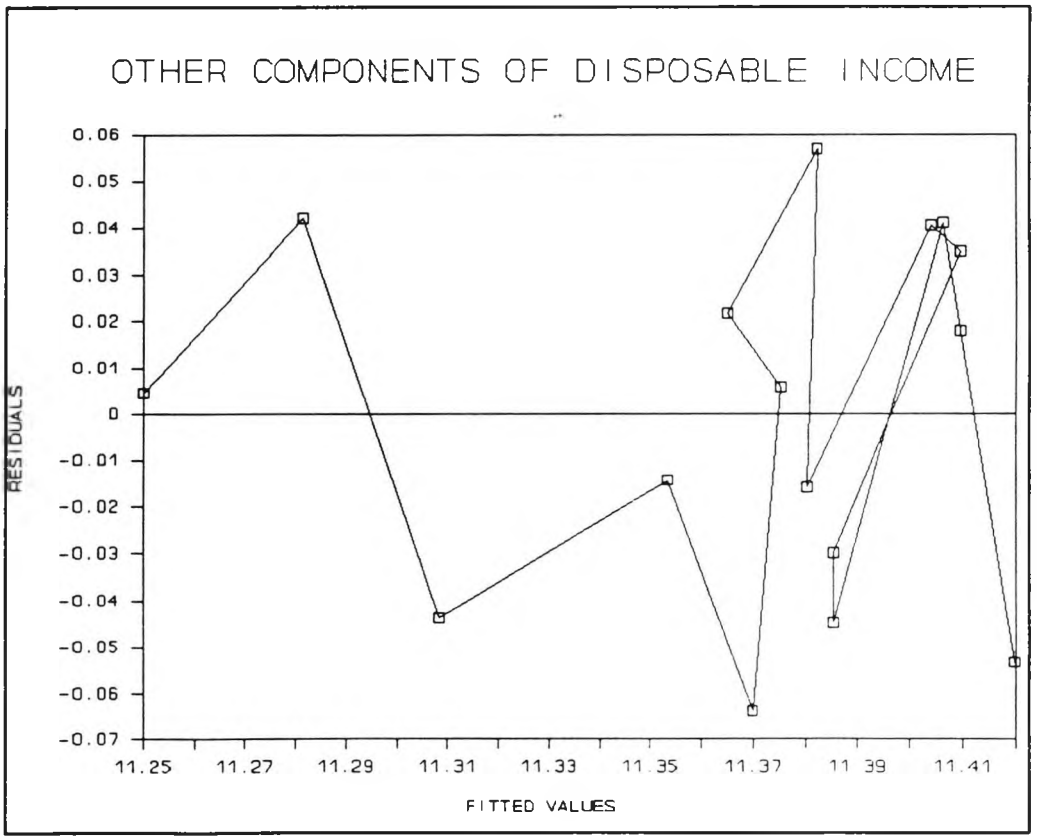
****

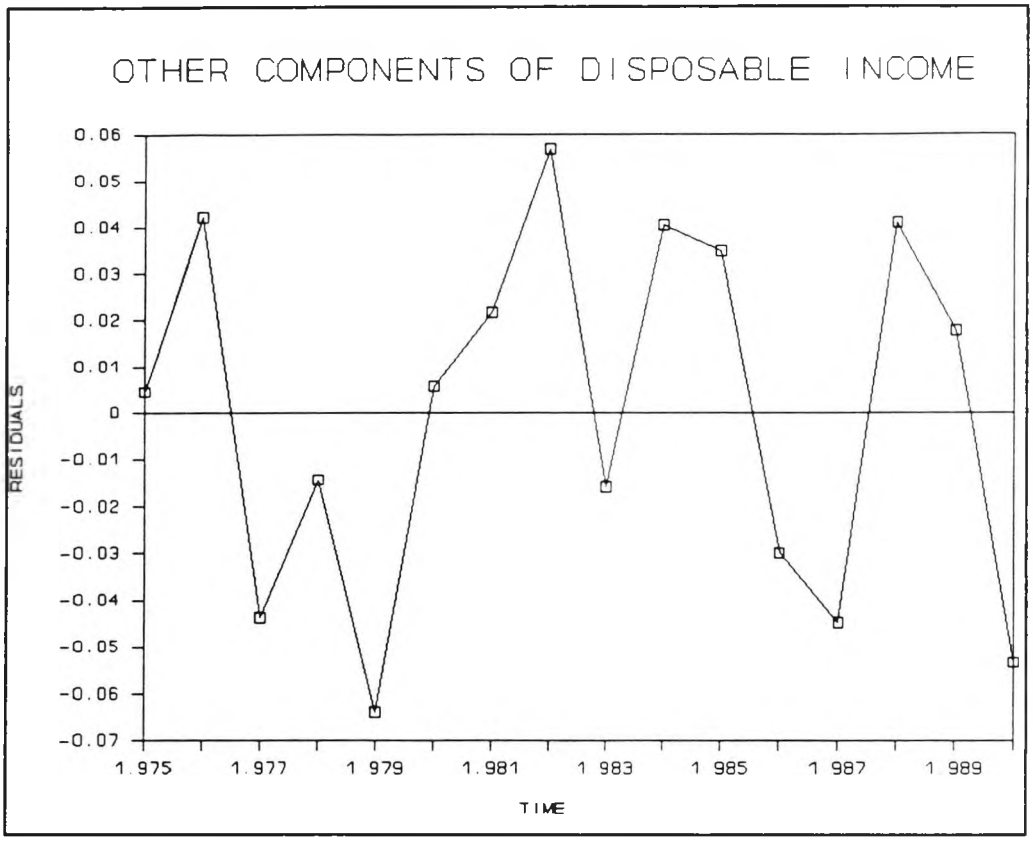
DEPENDENT VARIABLE: LBIHR

SUM OF SQUARED RESIDUALS = 0.226468E-01
STANDARD ERROR OF THE REGRESSION = 0.402197E-01
MEAN OF DEPENDENT VARIABLE = 13.1624
STANDARD DEVIATION = 0.555313
R-SQUARED = 0.995108
ADJUSTED R-SQUARED = 0.994759
DURBIN-WATSON STATISTIC = 1.9644
F-STATISTIC(1, 14) = 2845.49
LOG OF LIKELIHOOD FUNCTION = 29.7651
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	7.506977	0.7362374	10.19641
LWIR	0.3198298	0.6096703E-01	5.245946


OTHER COMPONENTS OF DISPOSABLE INCOME
ACTUAL AND FITTED VALUES
11.45
11.44
11.43
11.42
11.41
11.4
11.39
11.38
11.37
11.36
11.35
11.34
11.33
11.32
11.31
11.3
11.29
11.28
11.27
11.26
11.25
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME


OTHER COMPONENTS OF DISPOSABLE INCOME
RESIDUALS
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
11.25
11.27
11.29
11.31
11.33
11.35
11.37
11.39
11.41
FITTED VALUES


OTHER COMPONENTS OF DISPOSABLE INCOME
RESIDUALS
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
-0.07
1.975
1.977
1.979
1.981
1.983
1.985
1.987
1.989
TIME

LABOR SUPPLY IN NON AGRICULTURAL SECTOR

EQUATION 13 : LS = f (WPOP)

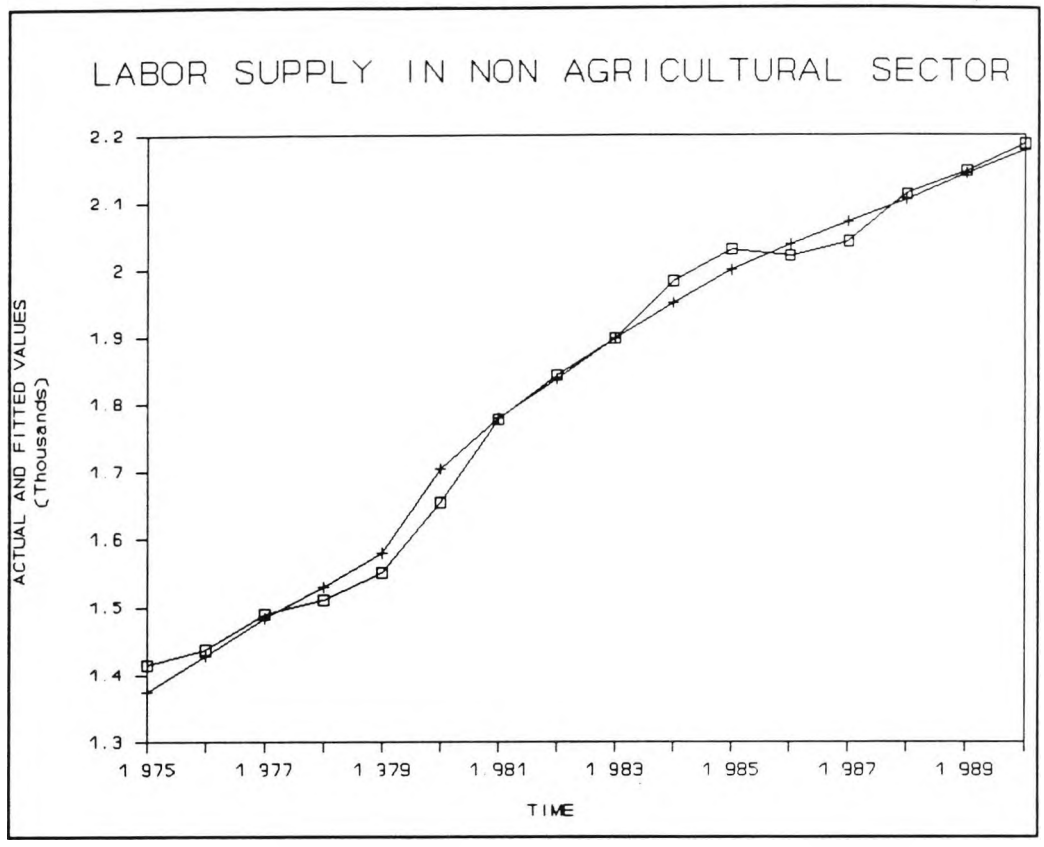
****

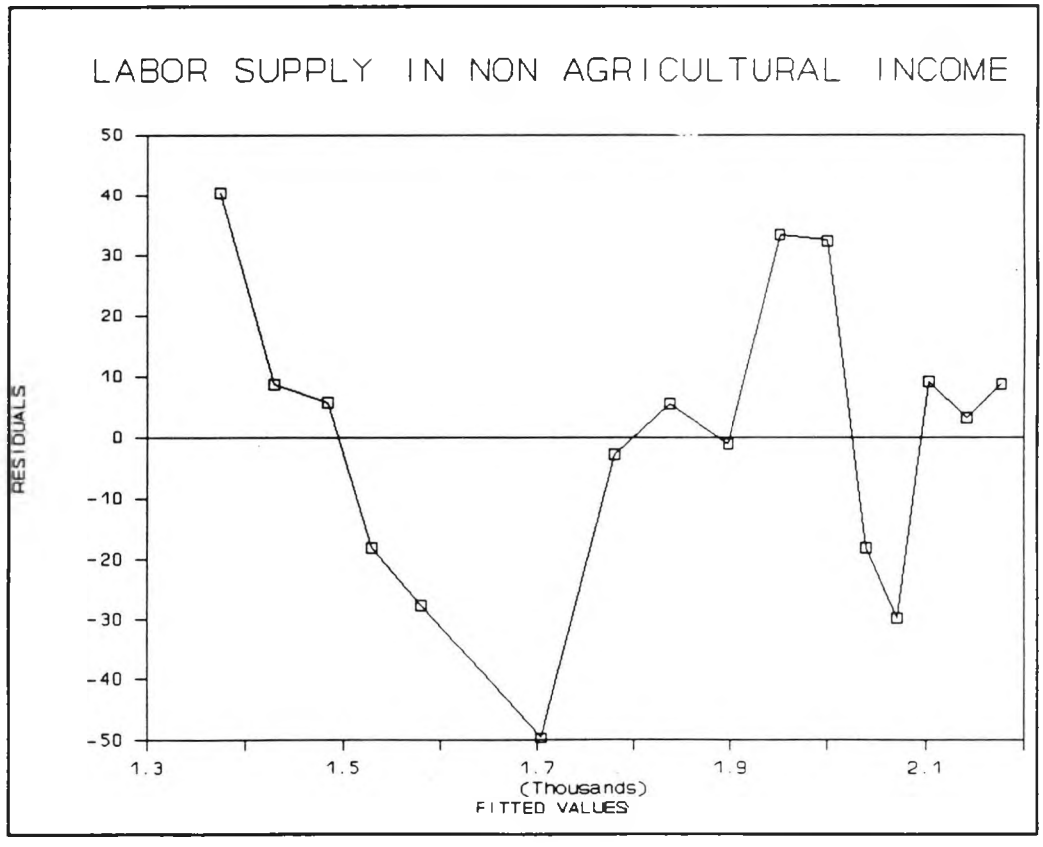
METHOD OF ESTIMATION = ORDINARY LEAST SQUARES

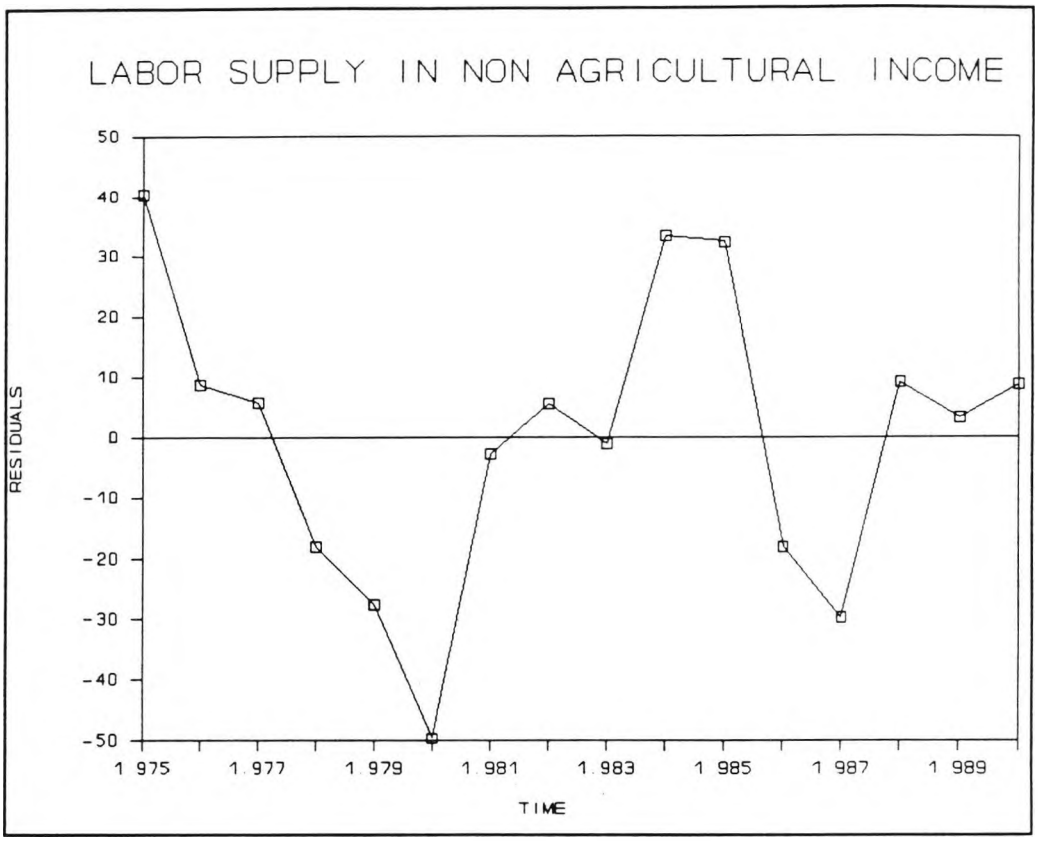
DEPENDENT VARIABLE: LS

SUM OF SQUARED RESIDUALS = 8871.66
STANDARD ERROR OF THE REGRESSION = 25.1732
MEAN OF DEPENDENT VARIABLE = 1818.73
STANDARD DEVIATION = 271.857
R-SQUARED = 0.991997
ADJUSTED R-SQUARED = 0.991426
DURBIN-WATSON STATISTIC = 1.1174
F-STATISTIC(1, 14) = 1735.42
LOG OF LIKELIHOOD FUNCTION = -73.2472
NUMBER OF OBSERVATIONS = 16

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-3427.814	126.0993	-27.18346
WPOP	0.8309609	0.1994702E-01	41.65840


LABOR SUPPLY IN NON AGRICULTURAL SECTOR
ACTUAL AND FITTED VALUES
(Thousands)
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1 975
1 977
1 979
1 981
1 983
1 985
1 987
1 989
TIME

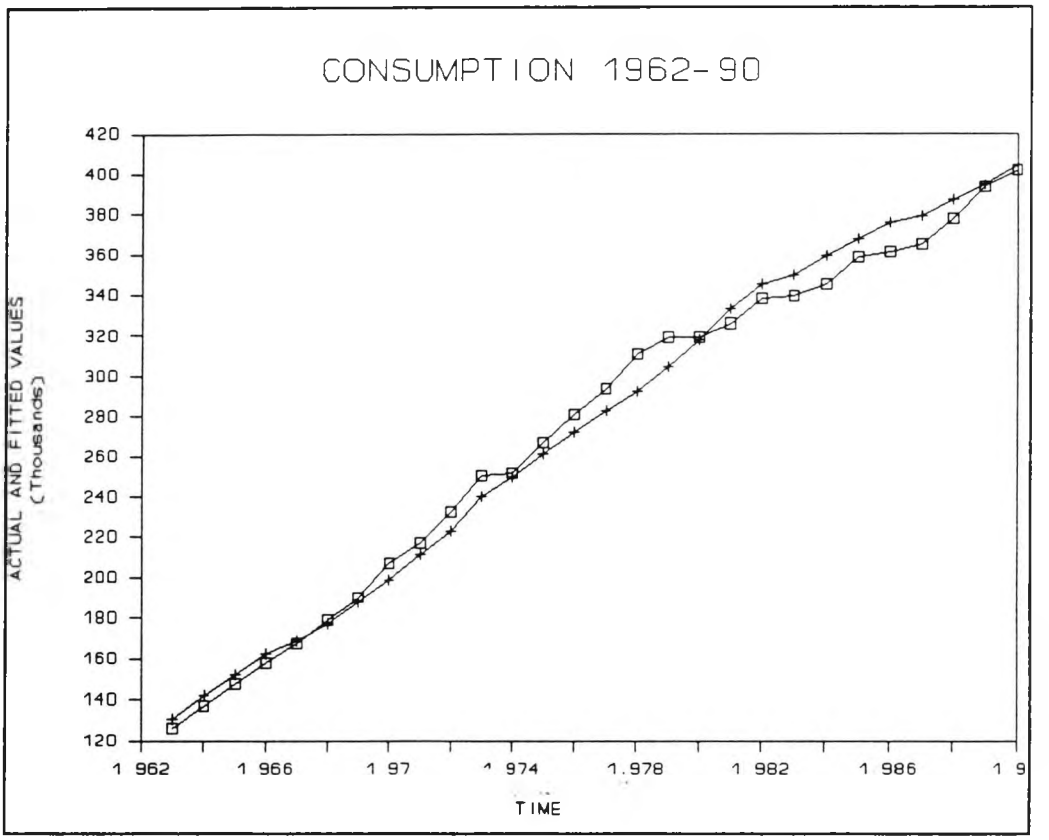

LABOR SUPPLY IN NON AGRICULTURAL INCOME
RESIDUALS
50
40
30
20
10
0
-10
-20
-30
-40
-50
1.3
1.5
1.7
1.9
2.1
(Thousands)
FITTED VALUES

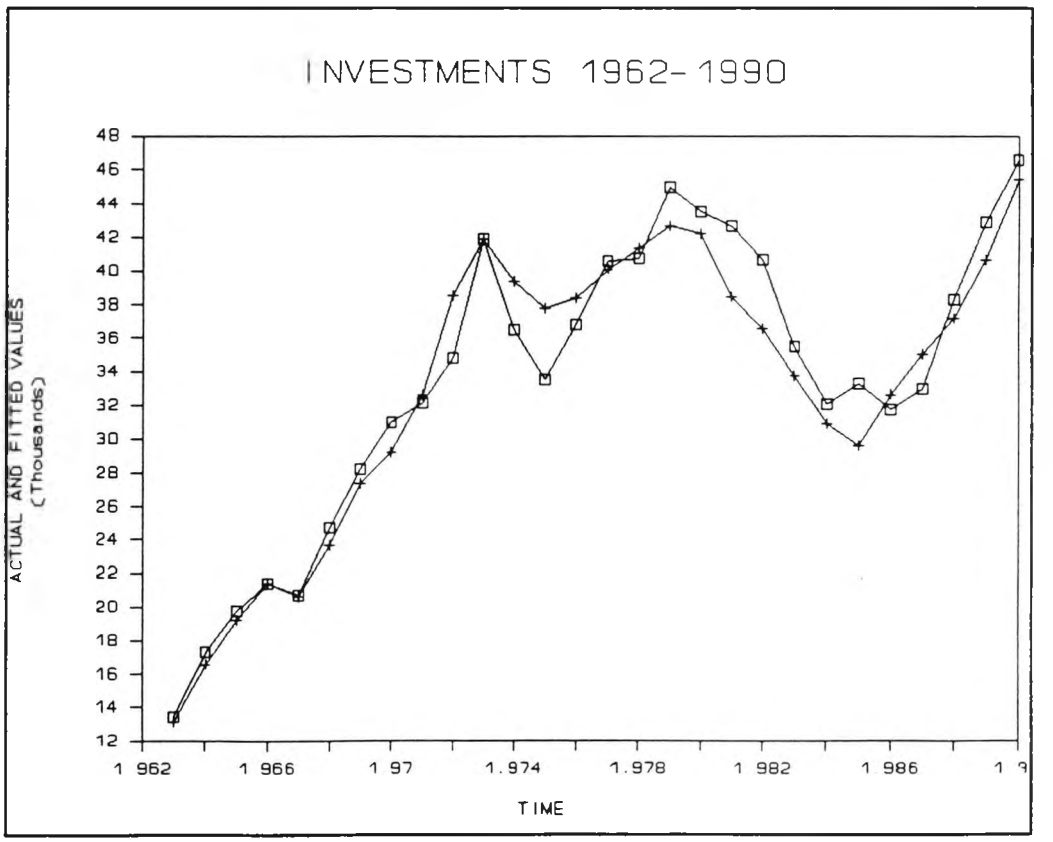

LABOR SUPPLY IN NON AGRICULTURAL INCOME
RESIDUALS
50
40
30
20
10
0
-10
-20
-30
-40
-50
1.975
1.977
1.979
1.981
1.983
1.985
1.987
1.989
TIME

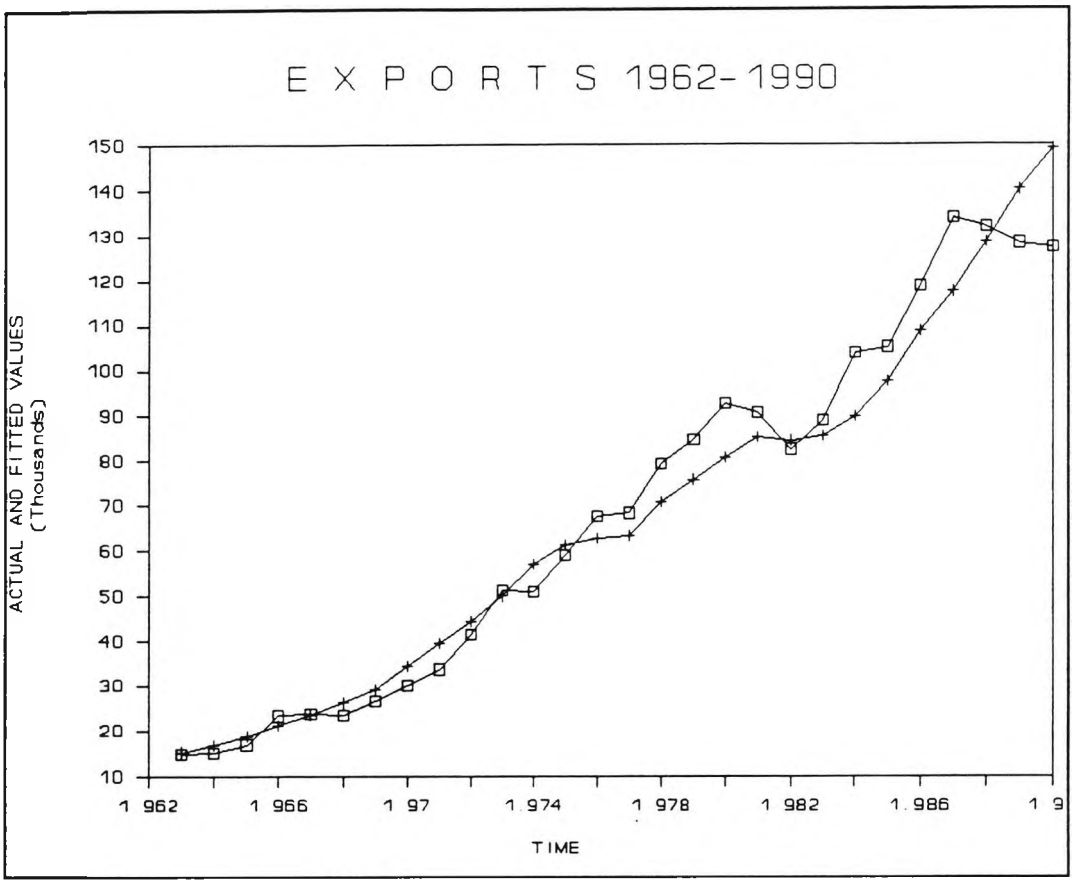
APPENDIX II

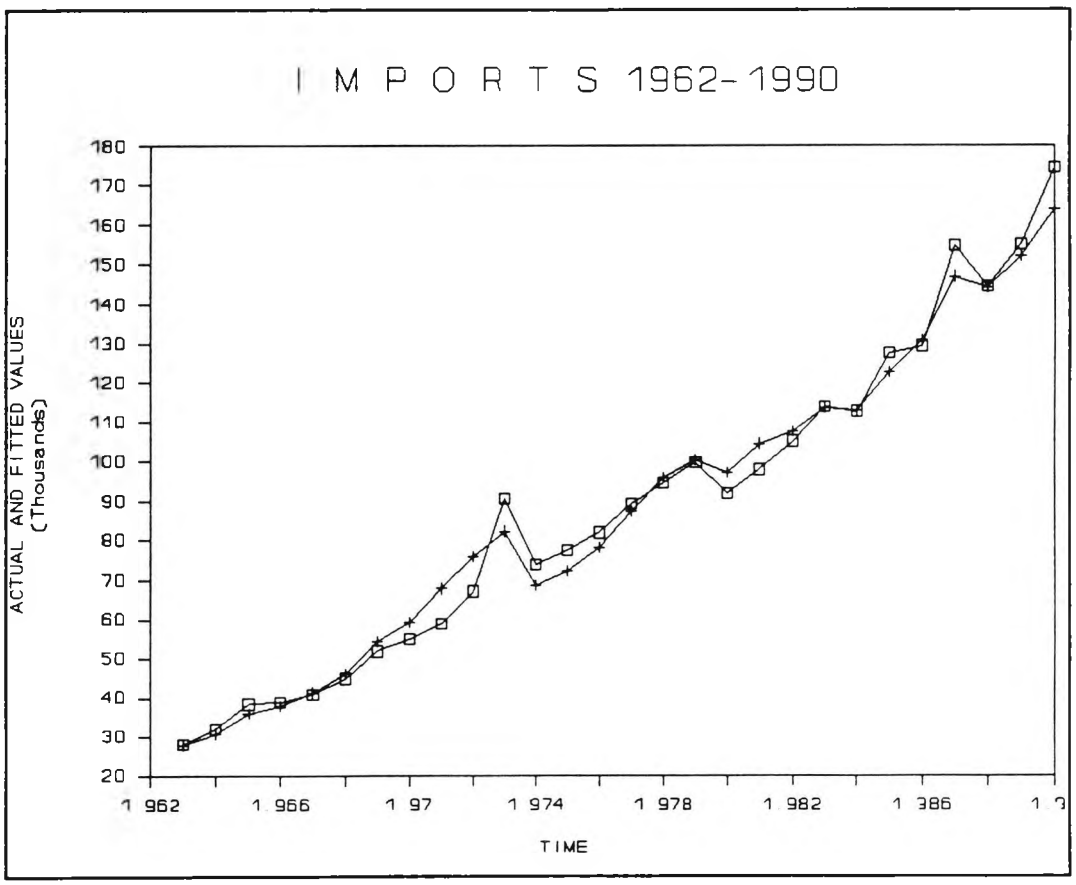
Historical simulation of the model includind the estimated equations for the period 1962-1990.

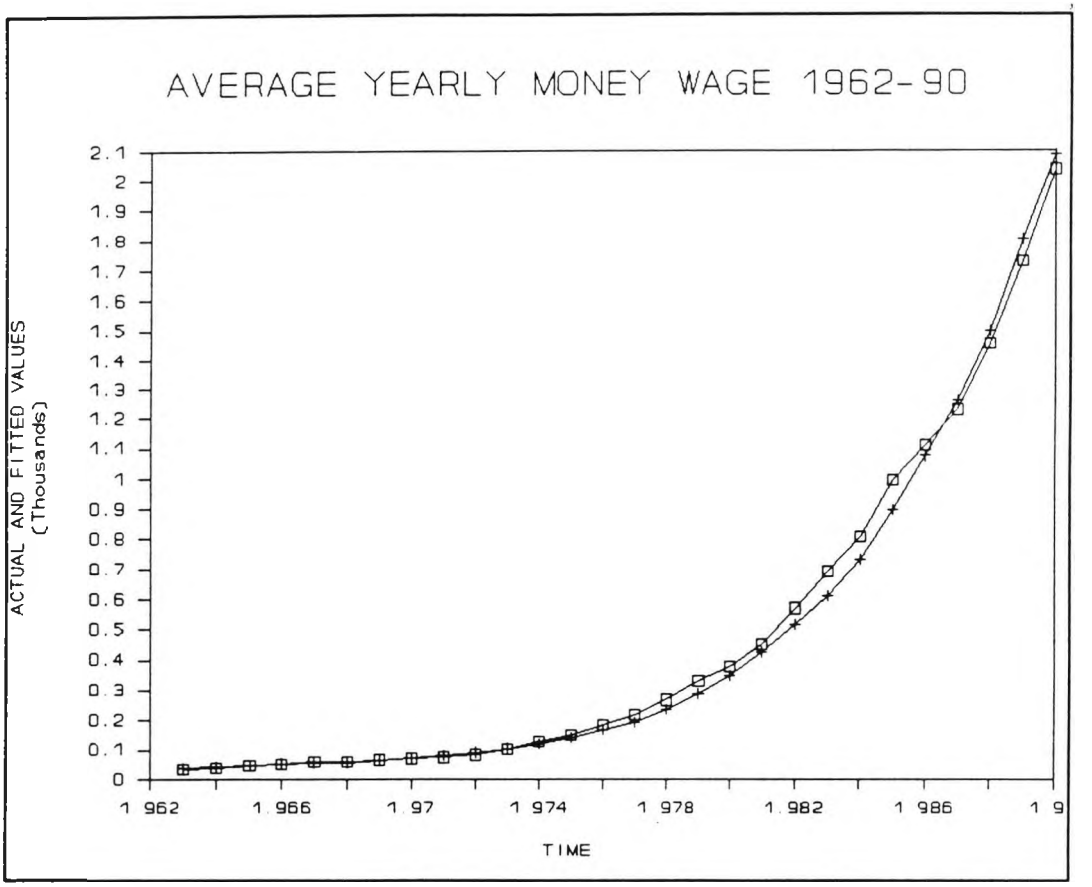
Observed and simulated values of the endogenous variables.

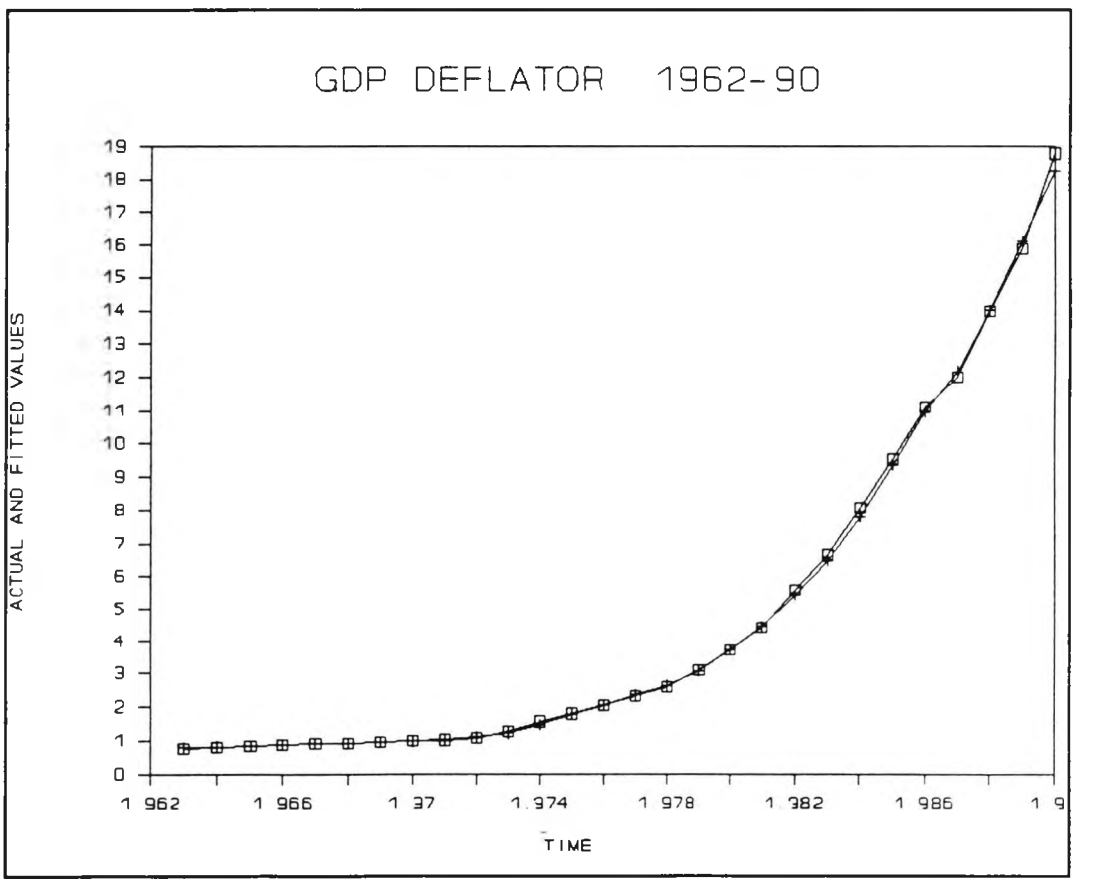


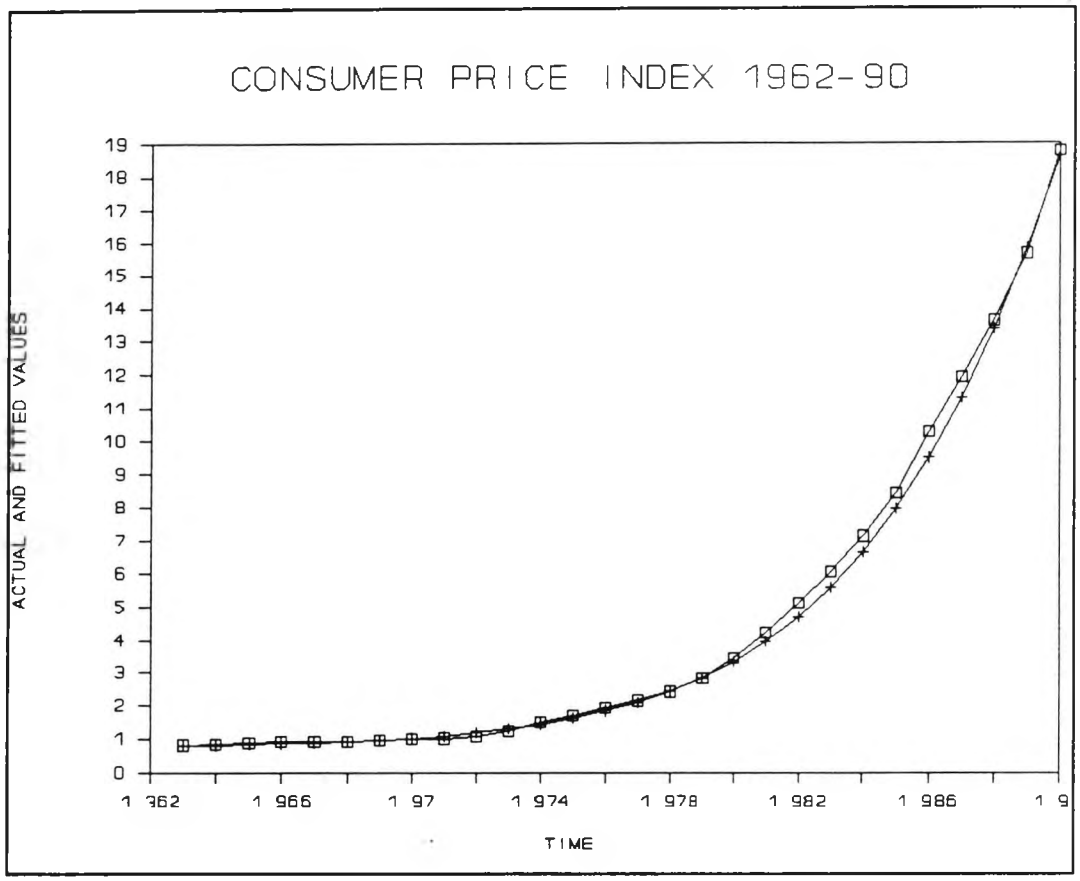


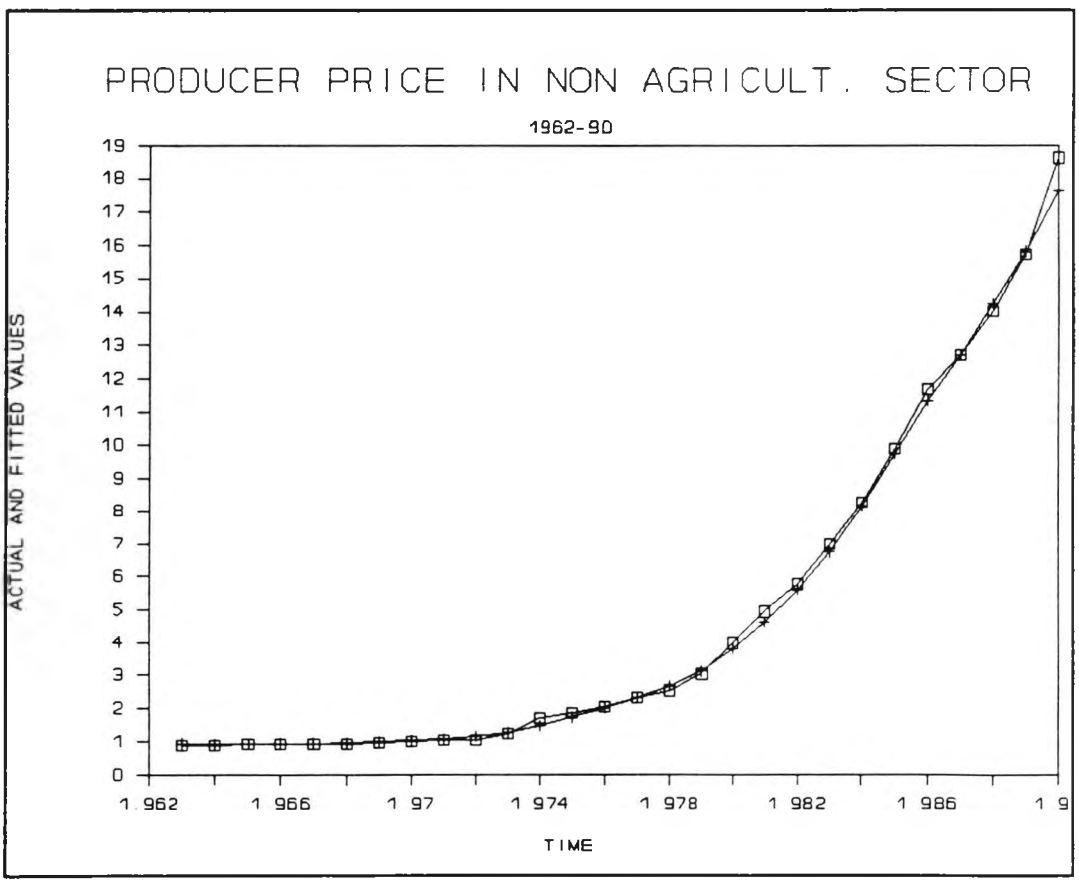

E X P O R T S 1962-1990
ACTUAL AND FITTED VALUES (Thousands)
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
1 962
1 966
1 97
1 974
1 978
1 982
1 986
TIME

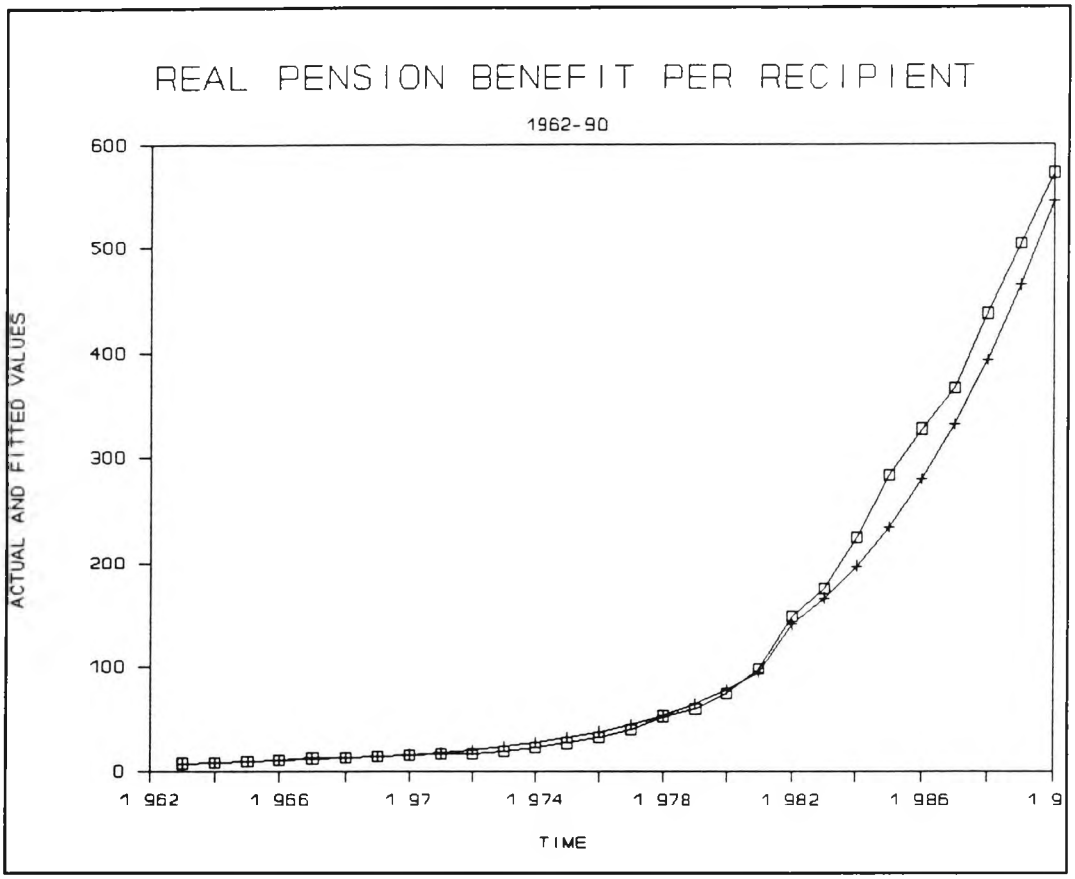

I M P O R T S 1962-1990
ACTUAL AND FITTED VALUES (Thousands)
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
1 962
1 966
1 97
1 974
1 978
1 982
1 986
TIME

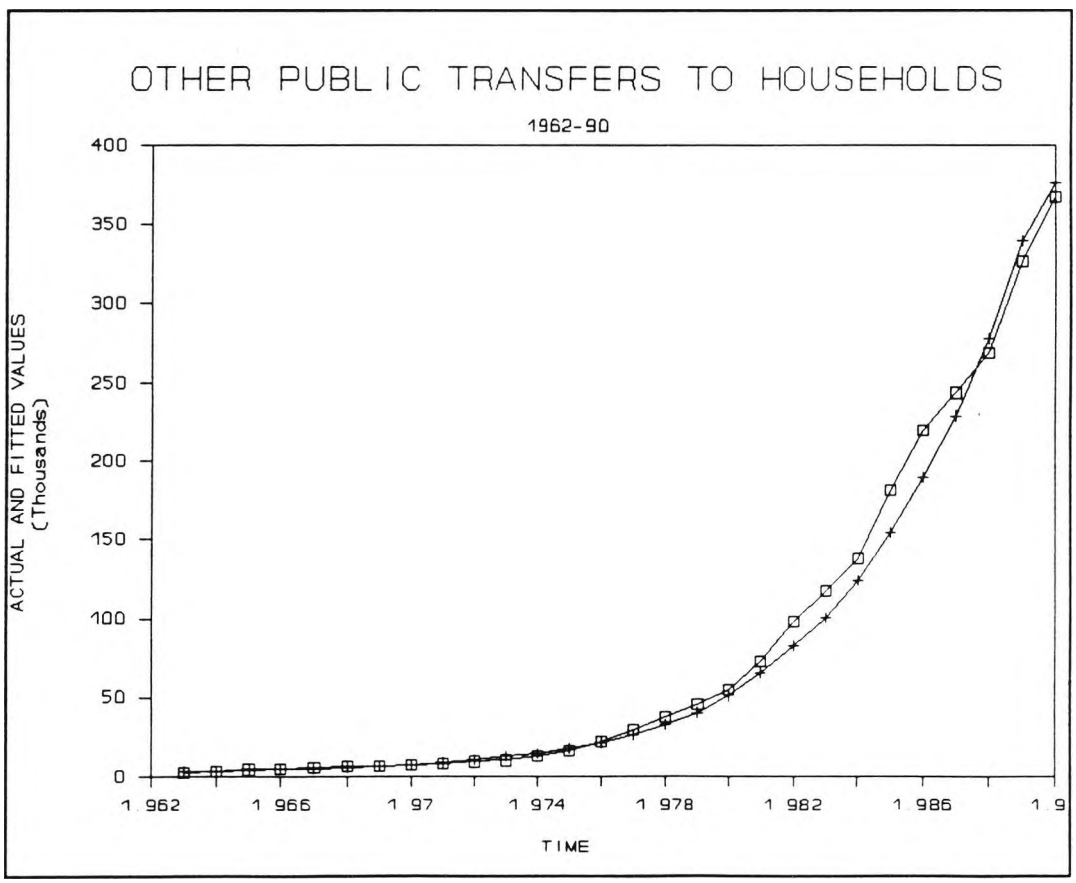

AVERAGE YEARLY MONEY WAGE 1962-90
ACTUAL AND FITTED VALUES
(Thousands)
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 962
1 966
1 97
1 974
1 978
1 982
1 986
1 9
TIME

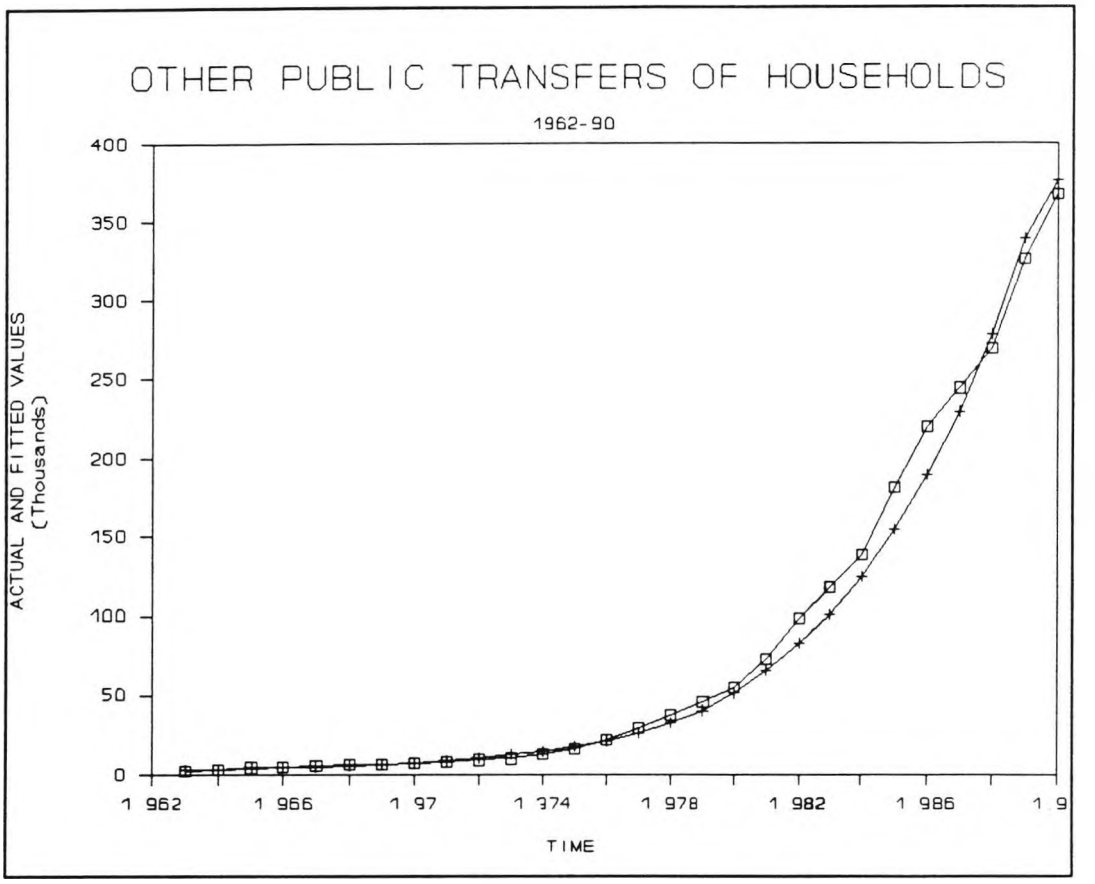

GDP DEFLATOR 1962-90
ACTUAL AND FITTED VALUES
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1 962
1 966
1 37
1 974
1 978
1 382
1 986
1 9
TIME

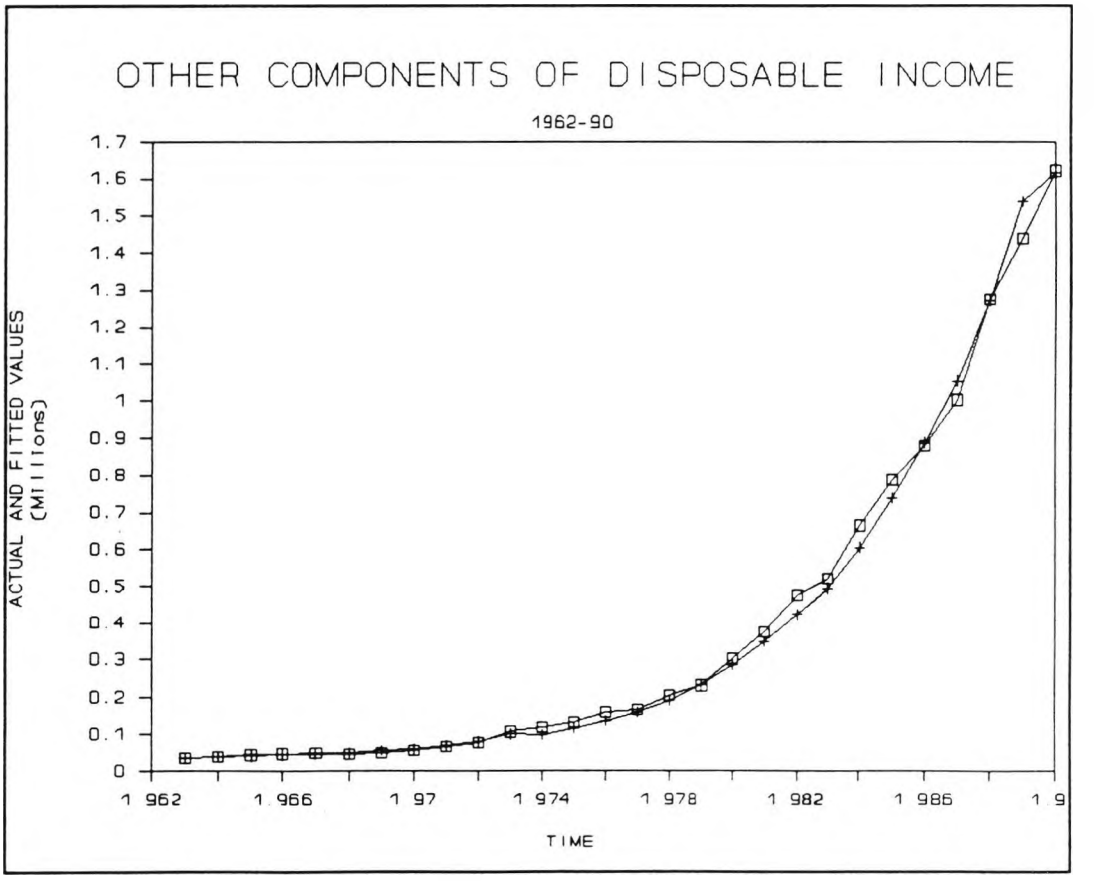

CONSUMER PRICE INDEX 1962-90
ACTUAL AND FITTED VALUES
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1 962
1 966
1 97
1 974
1 978
1 982
1 986
1 9
TIME

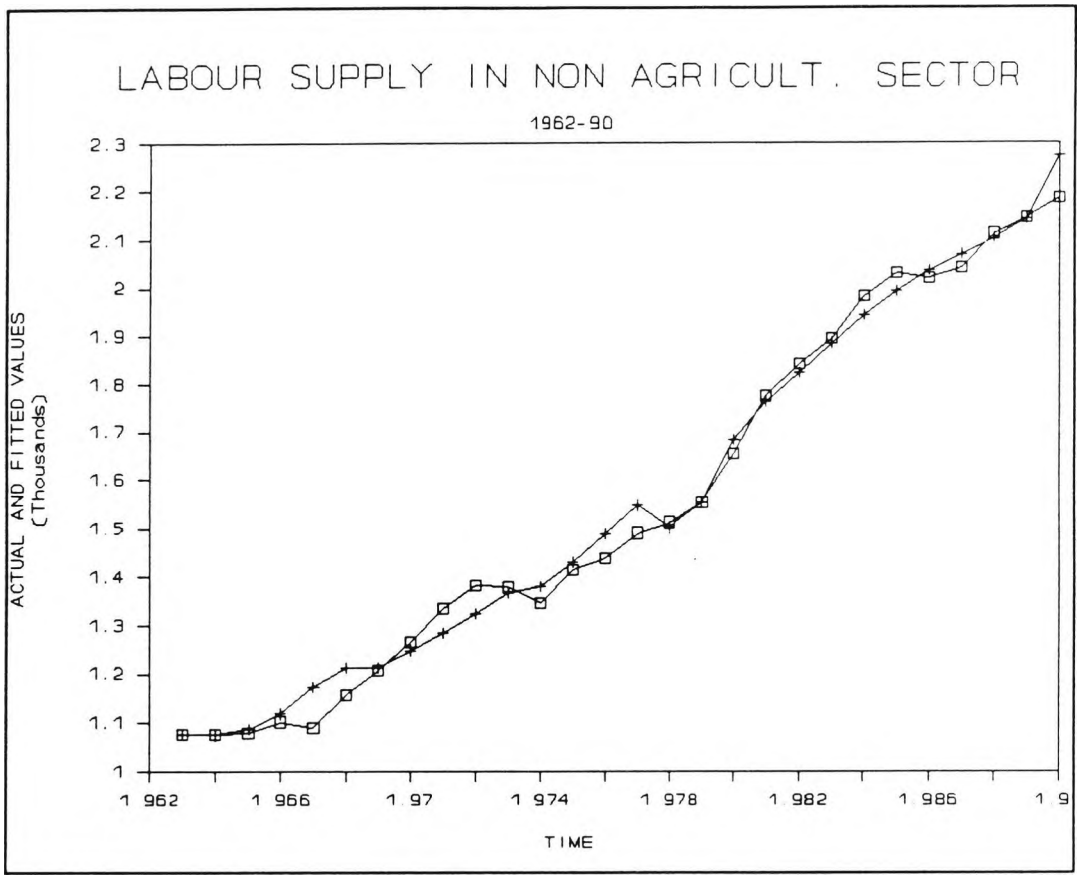

PRODUCER PRICE IN NON AGRICULT. SECTOR
1962-90
ACTUAL AND FITTED VALUES
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1 962
1 966
1 97
1 974
1 978
1 982
1 986
1 9
TIME

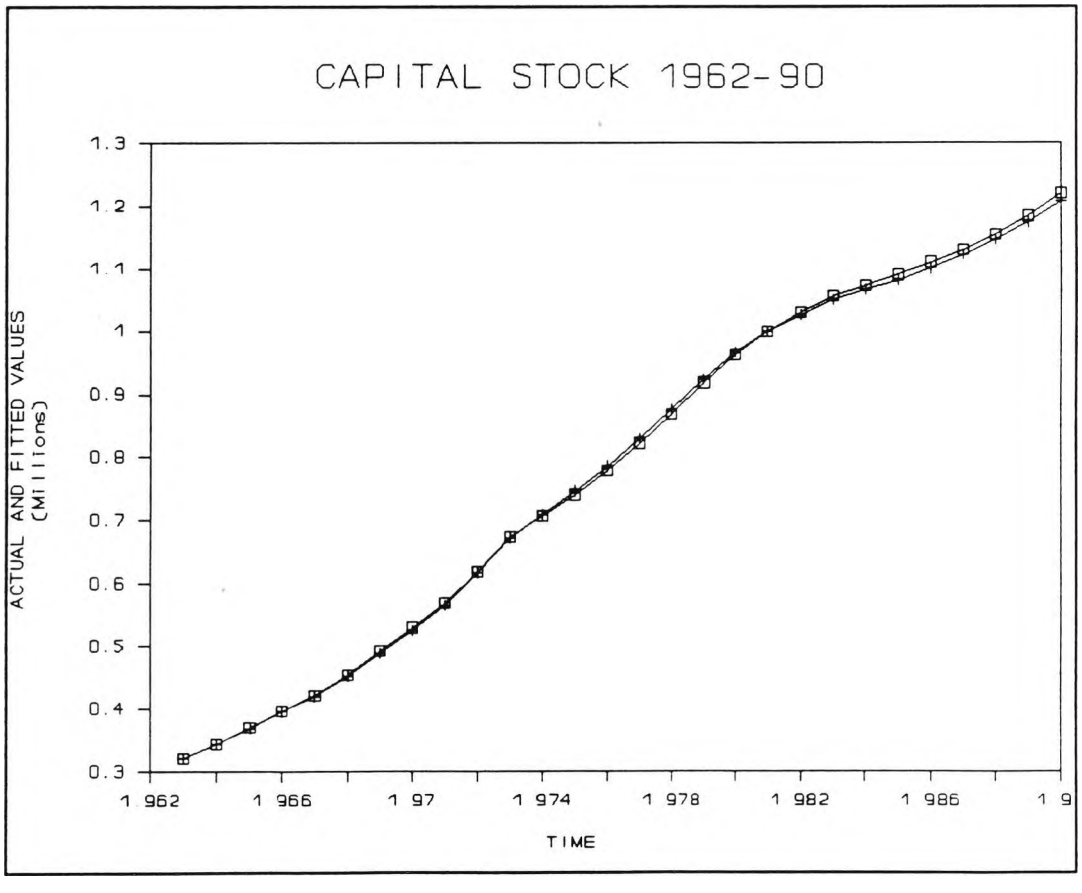

REAL PENSION BENEFIT PER RECIPIENT
1962-90
ACTUAL AND FITTED VALUES
600
500
400
300
200
100
0
1 962
1 966
1 97
1 974
1 978
1 982
1 986
1 9
TIME

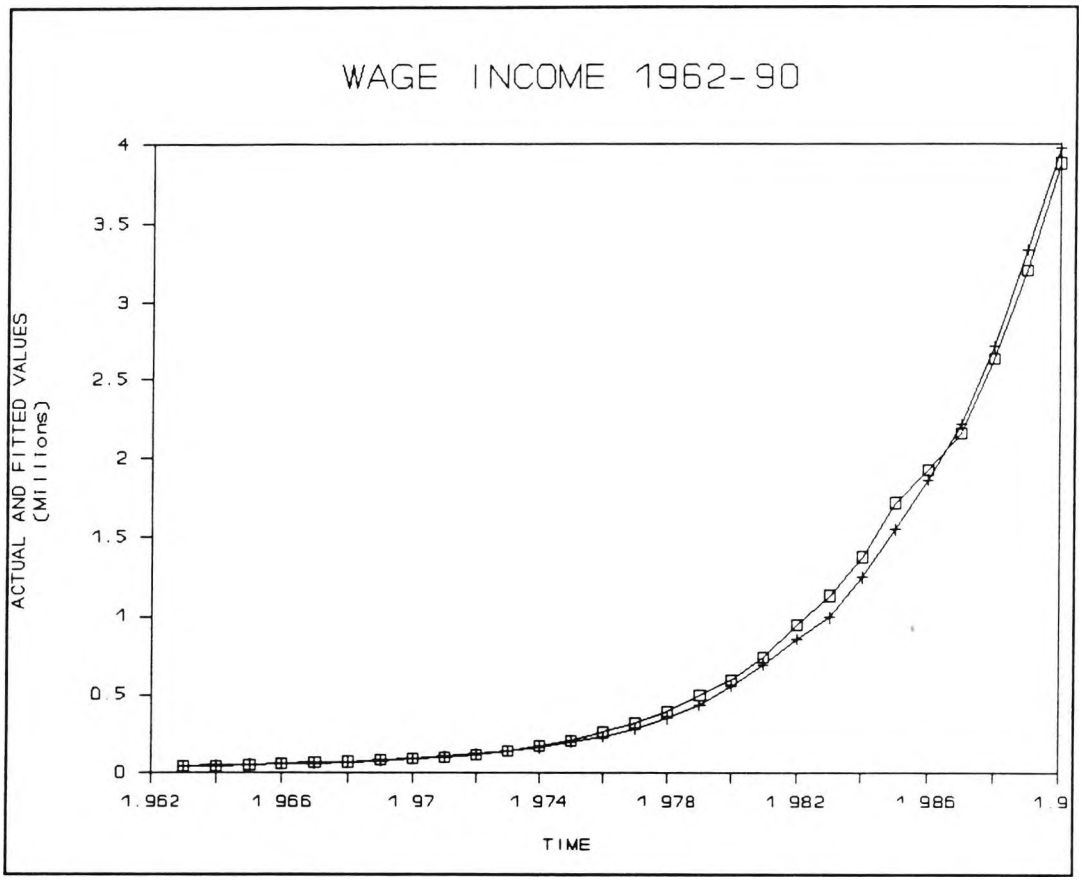

OTHER PUBLIC TRANSFERS TO HOUSEHOLDS
1962-90
ACTUAL AND FITTED VALUES
(Thousands)
400
350
300
250
200
150
100
50
0
1 962
1 966
1 97
1 974
1 978
1 982
1 986
1 9
TIME

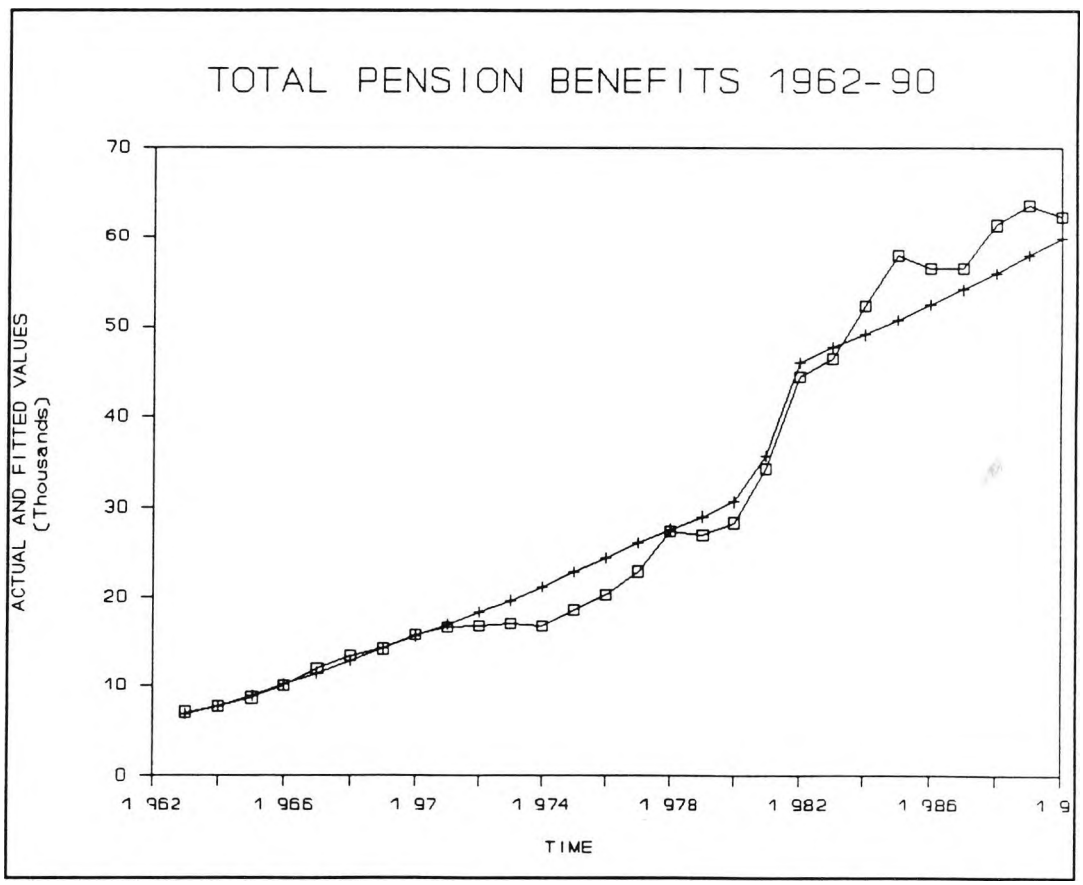

OTHER PUBLIC TRANSFERS OF HOUSEHOLDS
1962-90
ACTUAL AND FITTED VALUES
(Thousands)
400
350
300
250
200
150
100
50
0
1 962
1 966
1 97
1 374
1 978
1 982
1 986
1 9
TIME

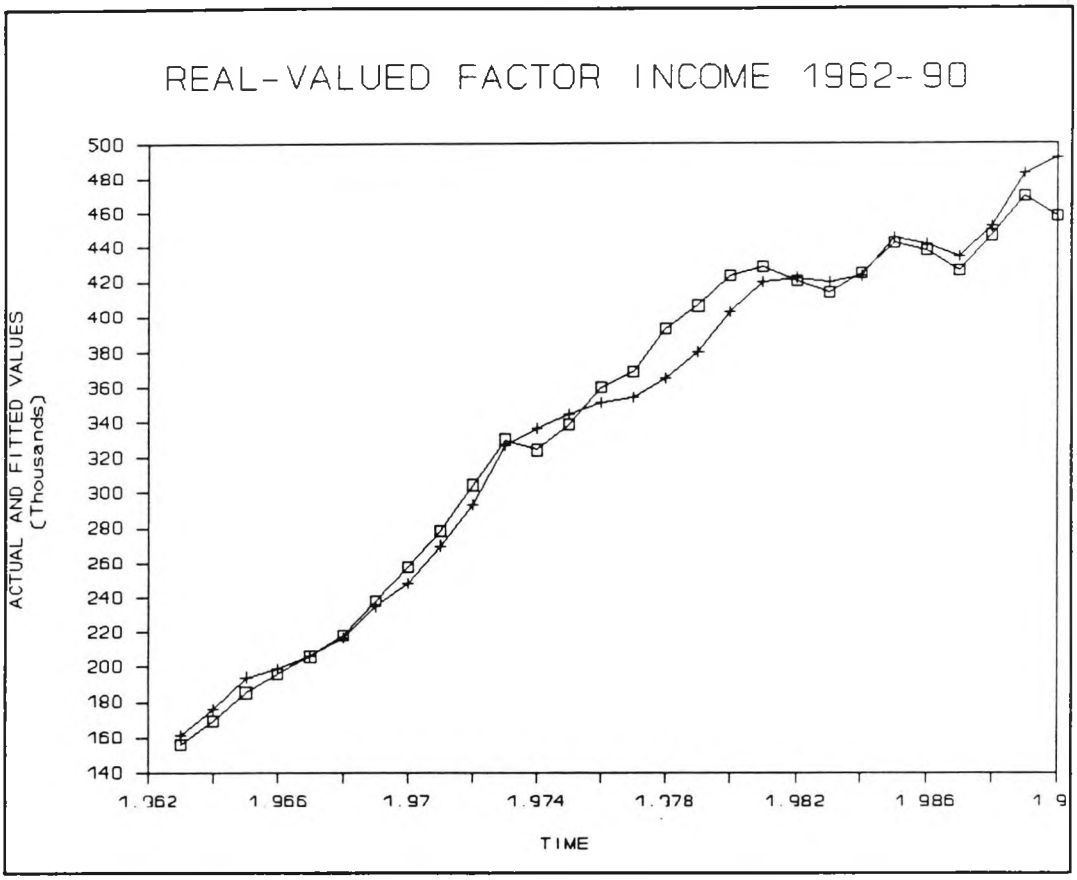

OTHER COMPONENTS OF DISPOSABLE INCOME
1962-90
ACTUAL AND FITTED VALUES
(Millions)
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 962
1 966
1 97
1 974
1 978
1 982
1 986
1 9
TIME

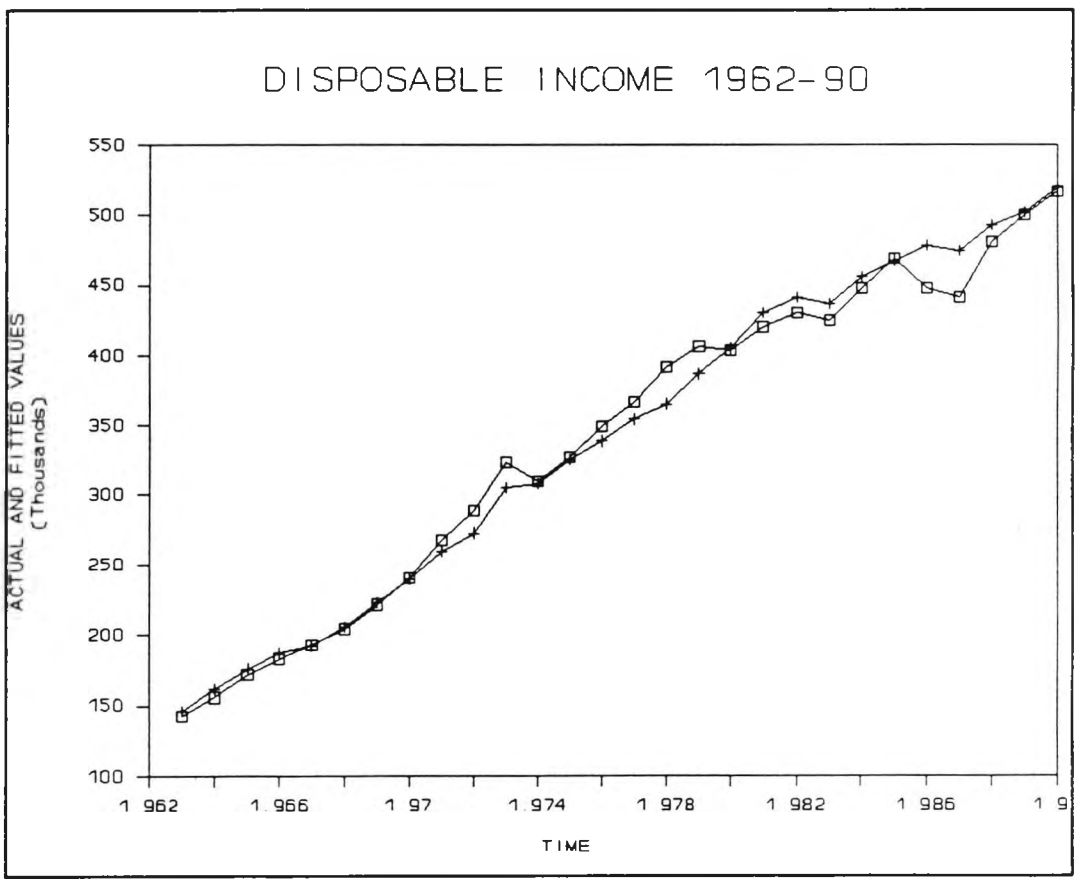

LABOUR SUPPLY IN NON AGRICULT. SECTOR
1962-90
ACTUAL AND FITTED VALUES
(Thousands)
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
1 962
1 966
1 97
1 974
1 978
1 982
1 986
1 9
TIME

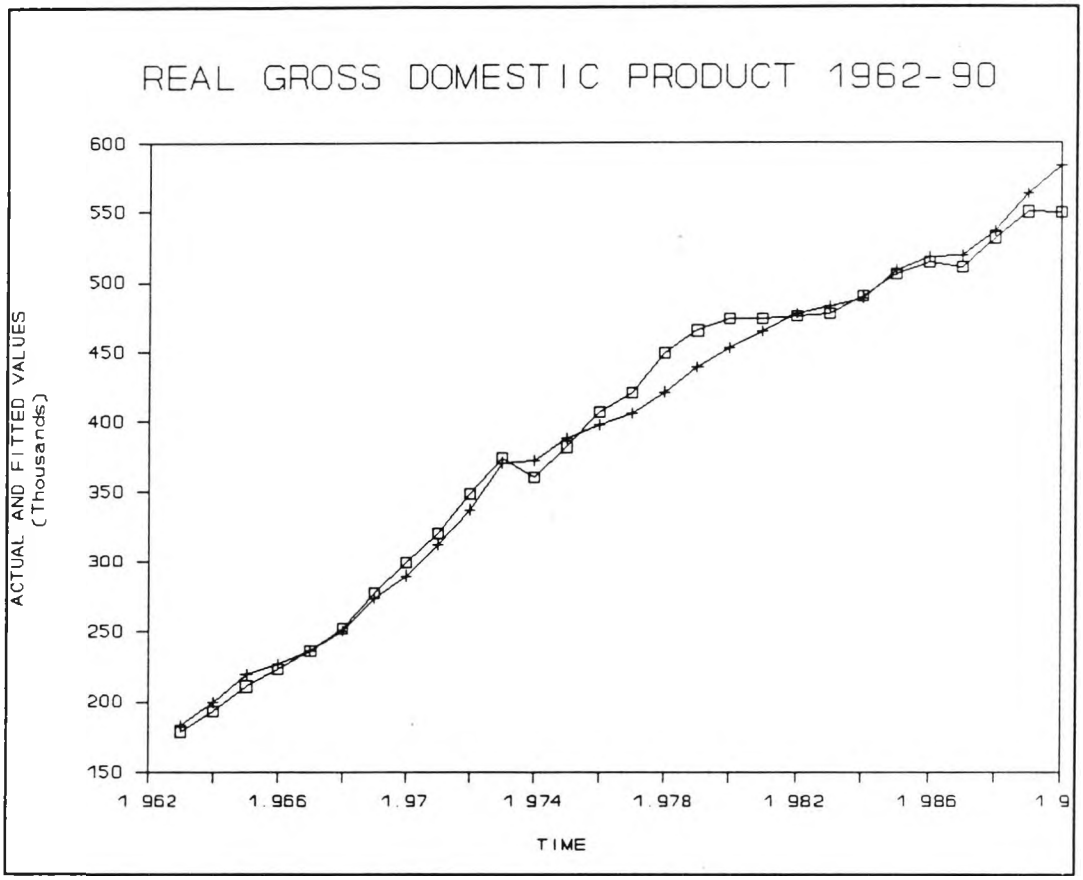

CAPITAL STOCK 1962-90
ACTUAL AND FITTED VALUES
(Millions)
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
1 962
1 966
1 97
1 974
1 978
1 982
1 986
1 9
TIME


WAGE INCOME 1962-90
ACTUAL AND FITTED VALUES (Millions)
4
3.5
3
2.5
2
1.5
1
0.5
0
1.962
1 966
1 97
1 974
1 978
1 982
1 986
1 9
TIME


TOTAL PENSION BENEFITS 1962-90
ACTUAL AND FITTED VALUES (Thousands)
70
60
50
40
30
20
10
0
1 962
1 966
1 97
1 974
1 978
1 982
1 986
1 9
TIME


REAL-VALUED FACTOR INCOME 1962-90
ACTUAL AND FITTED VALUES (Thousands)
500
480
460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
140
1.962
1.966
1.97
1.974
1.978
1.982
1.986
TIME


DISPOSABLE INCOME 1962-90
ACTUAL AND FITTED VALUES (Thousands)
550
500
450
400
350
300
250
200
150
100
1.962
1.966
1.97
1.974
1.978
1.982
1.986
TIME


REAL GROSS DOMESTIC PRODUCT 1962-90
ACTUAL AND FITTED VALUES (Thousands)
600
550
500
450
400
350
300
250
200
150
1 962
1 966
1 97
1 974
1 978
1 982
1 986
1 9
TIME

APPENDIX III

FORECASTING 1987 TO 1990

ESTIMATED MODEL FOR THE PERIOD *1975-1990*

COMPARISON OF ACTUAL AND PREDICTED SERIES

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C O N S U M P T I O N

CORRELATION COEFFICIENT = 0.963
CORRELATION COEFFICIENT SQUARED = 0.92820
ROOT-MEAN-SQUARED ERROR = 9305.87419
MEAN ABSOLUTE ERROR = 7998.10938
MEAN ERROR = 7998.10938
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.25562
THEIL'S INEQUALITY COEFFICIENT = 0.02419
FRACTION OF ERROR DUE TO BIAS = 0.73869
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.12833
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.13299
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF/NCE OF REGR. COEFF.FROM UNITY = 0.09
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.17015

I N V E S T M E N T S

CORRELATION COEFFICIENT = 0.98359
CORRELATION COEFFICIENT SQUARED = 0.96744
ROOT-MEAN-SQUARED ERROR = 1219.74907
MEAN ABSOLUTE ERROR = 780.92969
MEAN ERROR = -484.80078
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.14765
THEIL'S INEQUALITY COEFFICIENT = 0.03009
FRACTION OF ERROR DUE TO BIAS = 0.15797
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.35427
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.48775
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.28
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.56444

I M P O R T S

CORRELATION COEFFICIENT = 0.96626
CORRELATION COEFFICIENT SQUARED = 0.93366
ROOT-MEAN-SQUARED ERROR = 8160.34670
MEAN ABSOLUTE ERROR = 6495.92188
MEAN ERROR = 6495.92188
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.64533
THEIL'S INEQUALITY COEFFICIENT = 0.05174
FRACTION OF ERROR DUE TO BIAS = 0.63367
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.29719
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.06914
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFFR. OF REGR. COEFF. FROM UNITY = 0.25
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.11574

W A G E S

CORRELATION COEFFICIENT = 0.99991
CORRELATION COEFFICIENT SQUARED = 0.99983
ROOT-MEAN-SQUARED ERROR = 59.11769
MEAN ABSOLUTE ERROR = 56.10538
MEAN ERROR = -56.10538
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.06402
THEIL'S INEQUALITY COEFFICIENT = 0.03601
FRACTION OF ERROR DUE TO BIAS = 0.90069
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.09503
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.00428
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.095
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.00456

GDP DEFLATOR

CORRELATION COEFFICIENT = 0.99645
CORRELATION COEFFICIENT SQUARED = 0.99292
ROOT-MEAN-SQUARED ERROR = 0.30855
MEAN ABSOLUTE ERROR = 0.29196
MEAN ERROR = -0.17591
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.06070
THEIL'S INEQUALITY COEFFICIENT = 0.02006
FRACTION OF ERROR DUE TO BIAS = 0.32501
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.23961
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.43538
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFFER. OF REGR. COEFF. FROM UNITY = 0.461
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.46262

CONSUMER PRICES

CORRELATION COEFFICIENT = 0.99678
CORRELATION COEFFICIENT SQUARED = 0.99358
ROOT-MEAN-SQUARED ERROR = 0.61986
MEAN ABSOLUTE ERROR = 0.56449
MEAN ERROR = -0.56449
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.94308
THEIL'S INEQUALITY COEFFICIENT = 0.04074
FRACTION OF ERROR DUE TO BIAS = 0.82934
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.05509
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.11556
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.06
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.10916

PRODUCER PRICES

CORRELATION COEFFICIENT = 0.99148
CORRELATION COEFFICIENT SQUARED = 0.98304
ROOT-MEAN-SQUARED ERROR = 0.53342
MEAN ABSOLUTE ERROR = 0.48079
MEAN ERROR = -0.40353
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.09817
THEIL'S INEQUALITY COEFFICIENT = 0.03455
FRACTION OF ERROR DUE TO BIAS = 0.57228
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.16268
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.26504
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF OF REGR. COEFF. FROM UNITY = 0.14
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.29231

PENSION BENEFITS

CORRELATION COEFFICIENT = 0.99739
CORRELATION COEFFICIENT SQUARED = 0.99478
ROOT-MEAN-SQUARED ERROR = 15.27092
MEAN ABSOLUTE ERROR = 13.82730
MEAN ERROR = -13.82730
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.95824
THEIL'S INEQUALITY COEFFICIENT = 0.03207
FRACTION OF ERROR DUE TO BIAS = 0.81987
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.04228
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.13786
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.048
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.13227

OTHER PUBLIC TRANSFERS

CORRELATION COEFFICIENT = 0.98476
CORRELATION COEFFICIENT SQUARED = 0.96975
ROOT-MEAN-SQUARED ERROR = 17469.72942
MEAN ABSOLUTE ERROR = 15249.32813
MEAN ERROR = -15249.32813
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.96802
THEIL'S INEQUALITY COEFFICIENT = 0.05717
FRACTION OF ERROR DUE TO BIAS = 0.76195
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.00227
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.23577
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.008
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.23000

DIRECT TAXES

CORRELATION COEFFICIENT = 0.96174
CORRELATION COEFFICIENT SQUARED = 0.92494
ROOT-MEAN-SQUARED ERROR = 43677.55166
MEAN ABSOLUTE ERROR = 40166.78125
MEAN ERROR = -22745.62500
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.92041
THEIL'S INEQUALITY COEFFICIENT = 0.05376
FRACTION OF ERROR DUE TO BIAS = 0.27119
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.01793
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.71088
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.06
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.66732

BUSINESS INCOME

CORRELATION COEFFICIENT = 0.98493
CORRELATION COEFFICIENT SQUARED = 0.97010
ROOT-MEAN-SQUARED ERROR = 80002.83895
MEAN ABSOLUTE ERROR = 65865.53125
MEAN ERROR = -62846.84375
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.88173
THEIL'S INEQUALITY COEFFICIENT = 0.05907
FRACTION OF ERROR DUE TO BIAS = 0.61710
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.11077
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.27213
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.14
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.24178

LABOR SUPPLY

CORRELATION COEFFICIENT = 0.97911
CORRELATION COEFFICIENT SQUARED = 0.95866
ROOT-MEAN-SQUARED ERROR = 27.75827
MEAN ABSOLUTE ERROR = 25.87665
MEAN ERROR = 21.46112
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.37148
THEIL'S INEQUALITY COEFFICIENT = 0.01308
FRACTION OF ERROR DUE TO BIAS = 0.59775
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.29483
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.10742
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.25
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.14890

CAPITAL STOCK

CORRELATION COEFFICIENT = 0.99999
CORRELATION COEFFICIENT SQUARED = 0.99998
ROOT-MEAN-SQUARED ERROR = 2047.55289
MEAN ABSOLUTE ERROR = 2035.68750
MEAN ERROR = -2035.68750
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.00493
THEIL'S INEQUALITY COEFFICIENT = 0.00175
FRACTION OF ERROR DUE TO BIAS = 0.98844
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.00652
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.00504
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.007
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.00506

WAGE INCOME

CORRELATION COEFFICIENT = 0.99993
CORRELATION COEFFICIENT SQUARED = 0.99985
ROOT-MEAN-SQUARED ERROR = 106461.39636
MEAN ABSOLUTE ERROR = 101684.37500
MEAN ERROR = -101684.37500
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.04983
THEIL'S INEQUALITY COEFFICIENT = 0.03504
FRACTION OF ERROR DUE TO BIAS = 0.91227
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.08253
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.00520
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.08
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.00546

PENSION BENEFITS

CORRELATION COEFFICIENT = 0.81512
CORRELATION COEFFICIENT SQUARED = 0.66442
ROOT-MEAN-SQUARED ERROR = 1641.05264
MEAN ABSOLUTE ERROR = 1529.73633
MEAN ERROR = 463.30664
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.18353
THEIL'S INEQUALITY COEFFICIENT = 0.02691
FRACTION OF ERROR DUE TO BIAS = 0.07971
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.25365
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.66664
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.042
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.87847

DISPOSABLE INCOME

CORRELATION COEFFICIENT = 0.91240
CORRELATION COEFFICIENT SQUARED = 0.83248
ROOT-MEAN-SQUARED ERROR = 6799.18361
MEAN ABSOLUTE ERROR = 5879.53125
MEAN ERROR = 712.98438
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.88919
THEIL'S INEQUALITY COEFFICIENT = 0.01509
FRACTION OF ERROR DUE TO BIAS = 0.01100
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.00374
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.98527
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.07
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.91814

REAL VALUED FACTOR INCOME

CORRELATION COEFFICIENT = 0.94625
CORRELATION COEFFICIENT SQUARED = 0.89540
ROOT-MEAN-SQUARED ERROR = 11335.46036
MEAN ABSOLUTE ERROR = 10708.10156
MEAN ERROR = 5280.08594
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.18715
THEIL'S INEQUALITY COEFFICIENT = 0.02334
FRACTION OF ERROR DUE TO BIAS = 0.21697
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.25417
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.52886
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.14
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.64567

REAL GROSS DOMESTIC PRODUCT

CORRELATION COEFFICIENT = 0.92793
CORRELATION COEFFICIENT SQUARED = 0.86105
ROOT-MEAN-SQUARED ERROR = 6799.20288
MEAN ABSOLUTE ERROR = 5879.53906
MEAN ERROR = 712.99219
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.82919
THEIL'S INEQUALITY COEFFICIENT = 0.01269
FRACTION OF ERROR DUE TO BIAS = 0.01100
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.07992
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.90909
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.205
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.78308

FORECASTING 1987 TO 1990

ESTIMATED MODEL FOR THE PERIOD *1962-1990*

COMPARISON OF ACTUAL AND PREDICTED SERIES

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C O N S U M P T I O N

CORRELATION COEFFICIENT = 0.97515
CORRELATION COEFFICIENT SQUARED = 0.95091
ROOT-MEAN-SQUARED ERROR = 12882.48168
MEAN ABSOLUTE ERROR = 11547.92188
MEAN ERROR = 11547.92188
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.51467
THEIL'S INEQUALITY COEFFICIENT = 0.03348
FRACTION OF ERROR DUE TO BIAS = 0.80354
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.15689
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.03957
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.136
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.06070

I N V E S T M E N T S

CORRELATION COEFFICIENT = 0.97495
CORRELATION COEFFICIENT SQUARED = 0.95053
ROOT-MEAN-SQUARED ERROR = 1774.73312
MEAN ABSOLUTE ERROR = 1191.93848
MEAN ERROR = -827.15527
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.28253
THEIL'S INEQUALITY COEFFICIENT = 0.04377
FRACTION OF ERROR DUE TO BIAS = 0.21722
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.47095
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.31183
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.378
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.40506

I M P O R T S

CORRELATION COEFFICIENT = 0.97748
CORRELATION COEFFICIENT SQUARED = 0.95546
ROOT-MEAN-SQUARED ERROR = 9378.17893
MEAN ABSOLUTE ERROR = 8469.73438
MEAN ERROR = 8469.73438
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.46060
THEIL'S INEQUALITY COEFFICIENT = 0.05947
FRACTION OF ERROR DUE TO BIAS = 0.81565
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.14453
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.03982
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.125
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.05884

W A G E S

CORRELATION COEFFICIENT = 0.99916
CORRELATION COEFFICIENT SQUARED = 0.99831
ROOT-MEAN-SQUARED ERROR = 85.41844
MEAN ABSOLUTE ERROR = 84.41504
MEAN ERROR = -84.41504
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.98696
THEIL'S INEQUALITY COEFFICIENT = 0.05203
FRACTION OF ERROR DUE TO BIAS = 0.97664
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.00191
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.02144
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.002
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.02117

GDP DEFLATOR

CORRELATION COEFFICIENT = 0.99648
CORRELATION COEFFICIENT SQUARED = 0.99297
ROOT-MEAN-SQUARED ERROR = 0.30991
MEAN ABSOLUTE ERROR = 0.29315
MEAN ERROR = -0.08926
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.09258
THEIL'S INEQUALITY COEFFICIENT = 0.02015
FRACTION OF ERROR DUE TO BIAS = 0.08295
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.50095
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.41611
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.462
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.45543

CONSUMER PRICES

CORRELATION COEFFICIENT = 0.99573
CORRELATION COEFFICIENT SQUARED = 0.99149
ROOT-MEAN-SQUARED ERROR = 1.01958
MEAN ABSOLUTE ERROR = 0.95212
MEAN ERROR = -0.95212
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.90141
THEIL'S INEQUALITY COEFFICIENT = 0.06701
FRACTION OF ERROR DUE TO BIAS = 0.87205
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.06876
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.05919
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.07
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.05347

PRODUCER PRICES

CORRELATION COEFFICIENT = 0.98846
CORRELATION COEFFICIENT SQUARED = 0.97705
ROOT-MEAN-SQUARED ERROR = 0.54194
MEAN ABSOLUTE ERROR = 0.52822
MEAN ERROR = -0.19275
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.20968
THEIL'S INEQUALITY COEFFICIENT = 0.03510
FRACTION OF ERROR DUE TO BIAS = 0.12650
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.55848
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.31501
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.49
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.38329

PENSION BENEFITS

CORRELATION COEFFICIENT = 0.99803
CORRELATION COEFFICIENT SQUARED = 0.99606
ROOT-MEAN-SQUARED ERROR = 19.73141
MEAN ABSOLUTE ERROR = 18.76799
MEAN ERROR = -18.76799
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.95375
THEIL'S INEQUALITY COEFFICIENT = 0.04144
FRACTION OF ERROR DUE TO BIAS = 0.90473
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.03270
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.06257
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.035
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.05973

OTHER PUBLIC TRANSFERS

CORRELATION COEFFICIENT = 0.98782
CORRELATION COEFFICIENT SQUARED = 0.97579
ROOT-MEAN-SQUARED ERROR = 23576.28999
MEAN ABSOLUTE ERROR = 22173.42969
MEAN ERROR = -22173.42969
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.94395
THEIL'S INEQUALITY COEFFICIENT = 0.07715
FRACTION OF ERROR DUE TO BIAS = 0.88453
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.00902
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.10645
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.014
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.10110

DIRECT TAXES

CORRELATION COEFFICIENT = 0.98958
CORRELATION COEFFICIENT SQUARED = 0.97927
ROOT-MEAN-SQUARED ERROR = 84034.59171
MEAN ABSOLUTE ERROR = 68313.25000
MEAN ERROR = -68313.25000
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.74033
THEIL'S INEQUALITY COEFFICIENT = 0.10343
FRACTION OF ERROR DUE TO BIAS = 0.66084
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.27225
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.06691
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.289
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.04980

BUSINESS INCOME

CORRELATION COEFFICIENT = 0.98085
CORRELATION COEFFICIENT SQUARED = 0.96207
ROOT-MEAN-SQUARED ERROR = 89201.95460
MEAN ABSOLUTE ERROR = 76743.21875
MEAN ERROR = -76743.21875
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.95618
THEIL'S INEQUALITY COEFFICIENT = 0.06586
FRACTION OF ERROR DUE TO BIAS = 0.74017
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.00433
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.25550
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.013
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.24669

LABOR SUPPLY

CORRELATION COEFFICIENT = 0.90311
CORRELATION COEFFICIENT SQUARED = 0.81561
ROOT-MEAN-SQUARED ERROR = 44.87761
MEAN ABSOLUTE ERROR = 30.94586
MEAN ERROR = -22.32953
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.60030
THEIL'S INEQUALITY COEFFICIENT = 0.02115
FRACTION OF ERROR DUE TO BIAS = 0.24757
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.35067
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.40176
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.498
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.25411

CAPITAL STOCK

CORRELATION COEFFICIENT = 0.99997
CORRELATION COEFFICIENT SQUARED = 0.99995
ROOT-MEAN-SQUARED ERROR = 3464.68387
MEAN ABSOLUTE ERROR = 3453.84375
MEAN ERROR = -3453.84375
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.00386
THEIL'S INEQUALITY COEFFICIENT = 0.00295
FRACTION OF ERROR DUE TO BIAS = 0.99375
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.00142
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.00483
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.0014
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.00485

WAGE INCOME

CORRELATION COEFFICIENT = 0.99936
CORRELATION COEFFICIENT SQUARED = 0.99872
ROOT-MEAN-SQUARED ERROR = 156743.80851
MEAN ABSOLUTE ERROR = 154658.00000
MEAN ERROR = -154658.00000
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.98329
THEIL'S INEQUALITY COEFFICIENT = 0.05159
FRACTION OF ERROR DUE TO BIAS = 0.97356
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.00450
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.02194
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.005
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.02158

TOTAL PENSION BENEFITS

CORRELATION COEFFICIENT = 0.80103
CORRELATION COEFFICIENT SQUARED = 0.64164
ROOT-MEAN-SQUARED ERROR = 2130.47538
MEAN ABSOLUTE ERROR = 1846.08887
MEAN ERROR = 1292.12207
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.38002
THEIL'S INEQUALITY COEFFICIENT = 0.03493
FRACTION OF ERROR DUE TO BIAS = 0.36784
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.27340
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.35876
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.076
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.55659

REAL VALUED FACTOR INCOME

CORRELATION COEFFICIENT = 0.89433
CORRELATION COEFFICIENT SQUARED = 0.79983
ROOT-MEAN-SQUARED ERROR = 11404.50666
MEAN ABSOLUTE ERROR = 7398.36719
MEAN ERROR = -4975.96094
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.65833
THEIL'S INEQUALITY COEFFICIENT = 0.02532
FRACTION OF ERROR DUE TO BIAS = 0.19037
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.25035
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.55928
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.419
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.38994

DISPOSABLE INCOME

CORRELATION COEFFICIENT = 0.97875
CORRELATION COEFFICIENT SQUARED = 0.95796
ROOT-MEAN-SQUARED ERROR = 17878.90015
MEAN ABSOLUTE ERROR = 16350.20313
MEAN ERROR = 13932.10938
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 1.53461
THEIL'S INEQUALITY COEFFICIENT = 0.03681
FRACTION OF ERROR DUE TO BIAS = 0.60723
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.32553
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.06724
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.28846
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.10431

REAL GROSS DOMESTIC PRODUCT

CORRELATION COEFFICIENT = 0.92841
CORRELATION COEFFICIENT SQUARED = 0.86194
ROOT-MEAN-SQUARED ERROR = 11404.52157
MEAN ABSOLUTE ERROR = 7398.36719
MEAN ERROR = -4975.96094
REGRESSION COEFFICIENT OF ACTUAL ON PREDICTED = 0.64281
THEIL'S INEQUALITY COEFFICIENT = 0.02129
FRACTION OF ERROR DUE TO BIAS = 0.19037
FRACTION OF ERROR DUE TO DIFFERENT VARIATION = 0.39538
FRACTION OF ERROR DUE TO DIFFERENCE COVARIATION = 0.41425
ALTERNATIVE DECOMPOSITION (LAST TWO COMPONENTS):
FRACTION OF ERROR DUE TO DIFF. OF REGR. COEFF. FROM UNITY = 0.53308
FRACTION OF ERROR DUE TO RESIDUAL VARIANCE = 0.27655

REFERENCES

REFERENCES

[1] Aaron Henry, "The social insurance paradox", Canadian Journal of Economics and Political Science (32, 371-374), 1966.

[2] Achenbaum, W.A., "Social Security : Visions and Revisions" Cambridge University Press, Cambridge, 1986.

[3] American Enterprise Institute for Public Policy (AEI), "Reform of social security and federal pension cost of living adjustments", AEI, 1985.

[4] Arthur Andersen, "Guide to UK National Insurance", Arthur Andersen and Co, England, 1989.

[5] Ashford D. and Kelley E. (ed), "Nationalizing Social Security in Europa and America", JAI Press INC., London 1986.

[6] Atkinson, A.B., "Poverty in Britain and reform of social security", Cambridge UP, 1969.

[7] B Benjamin, S. Haberman, G. Helowicz, G. Kaye, D. Wilkie, "Pensions: The Problems of Today and Tomorrow", Allen and Unwin, London, 1987.

[8] Betson, D., "Future directions for microanalytic simulation modelling of the labour market", in: G. Orcutt, J. Merz and H. Quinke (eds.), "Microanalytic simulation models to support social and financial policy", North Holland, 1986.

[9] Blanton K., "Who owns corporate America?" Pensions and Investissement Age 31 Oct. 1983.

[10] Boadway, R.W. and Wildasin, D.E., "Median Voter Model of Social Security", CORE Discussion Paper no. 8714 (Revised version to appear in International Economic Review.), 1987.

[11] Bodie, zvi and Shoven, B. John, Financial Aspects of the United States Pension System, The University of Chicago Press, 1983.

[12] M. J. Boskin, "Social security and retirement decisions" Economic Inquiry, vol. 15, January 1977.

[13] Branson H.W., "Macroeconomic Theory and Policy", Harperand Row, New York, 1972.

[14] Browning, E.K., "Why the Social Insurance Budget is Too Large in a Democratic Society", Economic Inquiry (13 Sept, 373-88), 1975.

[15] Burbidge J.B., "Social security and saving plans in overlapping - generations models", Journal of Public Economics (21, 79-92), 1983.

[16] Campbell, C.D. (ed), "Controlling the Cost of Social Security", Lexington Books, for the American Enterprise Institute, 1984.

[17] Campbell, C.D. (ed.), "Financing social security", American Enterprise Institute for Public Policy, Washington, 1979.

[18] Center of Planning and Economic Research (KEPE), "PROGRAMME 1983-1987" - Report E10 "Social Insurance", KEPE, Athens, 1988.

[19] Center of Planning and Economic Research (KEPE), "PROGRAMME 1988-1992" - Report 10 "Social Insurance", KEPE, Athens, 1990.

[20] Chow, C. Gregory, "Econometrics", McGraw-Hill International book company, 1985.

[21] Cohen, W.J. and Friedman, M., "Social security universal or selective?", American Enterprise Institute for Public Policy Research, Washington, 1972.

[22] Commission of the European Communities, "Comparative tables of the social security schemes in the Member States of the European Communities", Luxembourg, 1988.

[23] Connelly Naomi, "Social Services Departments and Race -a discussion paper", Policy Studies Institute, 1985.

[24] Consumer Councils' Joint Social Security Committee, "Of Benefit to All", National Consumer Council for the Consumer Councils' Joint Social Security Committee, U.K. 1984.

[25] Coodman, John C., "Social Security in the United Kingdom", American Enterprise Institute for Public Policy Research, 1980.

[26] Creedy, J., "State pensions in Britain" - Occasional papers / The National Institute of Economic and Social Research, Cambridge University Press, Cambridge, 1982.

[27] Creedy, J. and Disney, R., "Social Insurance in Transition: An Economic Analysis", Oxford, Clarendon Press, 1985.

[28] Danziger S., Haveman R., "How income transfer programs affect work savings and the income distribution : a critical review" Journal of Economic Literature, Sept. 1981.

[29] Department of Health and Social Security, "Tables of social benefit systems in the Member States of the EC, Portugal and Spain", DHSS, London, 1985.

[30] Diamond, P.A., "National Debt in a Neoclassical Growth Model", American Economic Review (55, Dec.,1125-50), 1965.

[31] Diamond, P.A. and J.A. Mirrlees, "A model of social insurance with variable retirement", Journal of Public Economics (10, 295-336), 1978.

[32] Dilnot, A.W., Kay, J.A. and Morris C.N., "The perform of social security", Clarendon Press, Oxford, 1984.

[33] Dilnot, A.W., "The Economics of Social Security", Oxford University Press, Oxford, 1989.

[34] Disability Alliance, Statutory Sick Pay : The Failure of Privatisation in Social Security, Disability Alliance with Leicester Rights centre and City Council Low Pay Campaign, 1986.

[35] Ellis Bryan, "Pensions in Britain 1955", London 1989.

[36] Ettlin, F., Lybeck, J., Erikson, I., Johansson, S. And Jarnhaii, B., "The Step 1 Quarterly Econometric Model of Sweden. The Equation System". The Economic Research Institute, Stockholm School of Economics, 1979.

[37] Feldstein, M.S., "Does the United State Save Too Little?", American Economic Review (67, May, 116-21), 1977.

[38] Flora, Peter and Heidenheimer, Arnold J. (eds.), "the development of welfare states in Europe and America", New Brunswick and London, 1981.

[39] Friedman, B. and M. Warshawsky, "Annuity Yields and Saving Behaviour in the United States", presented at the NBER conference on Pensions in the U.S. Economy, March, 1985, Baltimore, Md.

[40] Fry, V. Smith, St. and White, St., "Pensioners and the public purse", The Institute for Fiscal Studies, London, 1990.

[41] Gale D., "Pure exchange equilibrium of dynamic economic models", Journal of Economic Review (55, 1126-1150), or Journal of Economic Theory (6, 12-36), 1973.

[42] Garganas N., "A Macro-Economic Model of the Greek Economy" Presented in the project Link meeting, Athens, October 2-7, 1978.

[43] Glennerster Howard, "Social Service Budgets and Social Policy - British and American experience", Allen and Umwin, London, 1975.

[44] Gordon, Margaret S., "Social Security Policies in Industrial Countries" - a comparative analysis, Cambridge University Press, Cambridge, 1988.

[45] Van Gorkon, Serome W., "Social Security Revisited" American Enterprise Institute of Public Policy, Washington, 1979.

[46] Dan M. McGill (ed), "Social security and private pension plans: competitive or complementary?", Homewood, I11 : Richard D. Irwin, 1977.

[47] Van Gorkon, "Social security : the long-term deficit" Washington, D.C : American Enterprise Institute, 1976.

[48] Gremades, B.M (ed), "Spanish Business Law" Law and Taxation Publishers, London and New York, 1985

[49] Great Britain. Central Office of Information. Reference Division, "Social Security in Britain", Her Masesty's Stationery Office (H.M.S.O), London, 1977.

[50] Great Britain. Department of Health and Social Security, "Social Security Statistics", Cmnd. 9517-9520, Reform of Social Security (The green Paper), Volume 1 Reform of Social Security, Volume 2 Programme for Change, Volume 3 background Papers, Volume 4 Housing Benefit Review, HMSO, 1985.

[51] Great Britain. Department of Health and Social Security, "Reform of Social Security - Programme for Action", HMSO, 1985.

[52] W. E. Grifftins, R. C. Hill, G. G. Judge, "Learning and Practicing Econometrics", John Wiley, Singapore, 1993.

[53] Gujarati, Damodar. "Pensions and New York City's Fiscal Crisis", American Enterprise Institute for Public Policy Research, Washington, 1978.

[54] Gustafsson, B.A. and Klevmarken (eds.), "The political economy of social security", Elsevier science publishery B.V., Netherlands, 1989.

[55] Hall Penelope, "Social Services of England and Wales", b. Routledge and K. Poulc, 1969

[56] Haberman, S. "State pension provision and social security in the United Kingdom", City University, London, 1990.

[57] Halter, W. A. and Hemming, R., "The Impact of Demographic Change on Social Security Financing", International Monetary Fund Staff Papers 34, No 3, pp 471-502, 1987.

[58] Hurd, M. and J. Shoven, "The Economic Status of the Elderly", in "Financial Aspects of the United States Pension System", Z. Bodie and J. Shoven, eds., NBER and the University of Chicago Press, 1984.

[59] International Labour Office, "The cost of social security" Thirteenth international inquiry, 1984-1986, Geneva.

[60] International Social Security Association "Quantitative Analysis and the Planning of Social Protection" Studies and Research No 30, Geneva, 1992.

[61] Jean-Jacques, Rosa (ed), " The World Crisis in Social Security", A joint foundation nationale d'economie politique and institute for contemporary studies project, Paris 1982.

[62] J. Johnston, "Econometric methods" third edition, McGraw- Hill Book Company, Singapore, 1988.

[63] Kaim-Caudle, P.R., "Comparative Social Policy and Social Security a ten country study", Martin Roberston and Company Ltd., London, 1973.

[64] Karadeloglou P.V. and Koutsouvelis P.N.,"Macroeconometric Model KEPE-LINK (MYLK)", KEPE, Athens - Greece, 1991.

[65] Koltikoff, L. and Smith D., "Pensions in the American Economy", The University of Chicago Press, Chicago and London, 1983.

[66] Kotlikoff, L.J. and Wise, D.A., "Labour Compensation and the Structure of Private Pension Plans : Evidence for Contractual versus Spot Labour Markets", 55-88 in D.A Wise (ed), "Pensions, Labour and Individual Choice", University of Chicago Press, 1985.

[67] A. Koutsoyiannis, "Theory of Econometrics" Macmillan, London, 1973.

[68] Lynes, T., "The Penguin Guide to Supplementary Benefits" 5th ed., Harmondsworth : Penguin, England, 1985.

[69] McClements, L.D., "The Economics of Social Security", Heinemann Educational, London, 1978.

[70] Meyer, W, C, Social Security - A Critique of Radical Reform Proposals, Lexington Books, Toronto, 1987.

[71] Ministry of Coordination, National Accounts Service,

- "National Accounts of Greece 1958-1975" Athens, 1975.
- "National Accounts of Greece 1970-1981" Athens, 1982.
- "National Accounts of Greece 1980-1991" Athens, 1991.

[72] Ministry of Health, Welfare and Social Insurance,

- "Social Budget 1980", Athens, 1980.
- "Social Budget 1985", Athens, 1985.
- "Social Budget 1990", Athens, 1990.
- "Social Budget 1991", Athens, 1991.

[73] Ministry of Social Insurance, "Suggestions on the themes of the social insurance" National Printing House, Athens, 1984.

[74] Modigliani, F., "Life Cycle, Individual Thrift, and the Wealth of Nations", American Economic Review (76, June, 297-313), 1986.

[75] Alicia H. Munnell,
- "The future of social security", Washington, D.C: The Bookings Institution, 1977.
- "Private pensions and saving: New evidence" Journal of political economy, vol 84, October 1976.

[76] Myers, R.S., "Expansionism in Social Insurance" The Institute of Economic Affairs, London, 1970.

[77] Nelli, H.O. and Marshall, R.A., "The private insurance business in the United States economy", Georgia State University, Atlanta Georgia, 1969.

[78] O E C D, "Social Expenditure 1960-1990. Problems of growth and control", Paris, 1985.

[79] O E C D, "Measuring Health Care 1960-83" Paris, 1985

[80] O E C D, "Economic Surveys 1985/86 - Spain", Paris, April 1986.

[81] O E C D, "Living Conditions in OECD Countries" Paris,1986

[82] O E C D, "Financing and delivering Health Care" Paris, 1987

[83] O E C D, "The future of social protection, Paris", 1988.

[84] O E C D, "Reforming public pensions", Paris, 1988.

[85] O E C D, "Economic Surveys 1988/89 - Spain", Paris, 1989.

[86] O E C D, "Health Care Systems in Transition", Paris, 1990

[87] O E C D, "Economic Surveys 1990/91-Greece", Paris, 1991.

[88] O E C D, "Economic Surveys 1990/91 - Spain", Paris, 1991.

[89] Orcutt, G. and A. Glazer, "Microanalytic modelling and simulation", in : B. Bergamann, G. Eliasson and G. Orcutt (eds.), "Micro simulation - Models, methods and applications", IUI Conference Report 1980:1, Stockholm, Almquist and Wiksell int.

[90] Palmer, E. Edward and Palme Marten, National Social Insurance Board, "A Macroeconomic Analysis of Employer-Contribution Financed Social Security" in "The political economy of Social Security", Ed. by B.A. Gustafsson and N. A. Klevmarken, North Holland, 1989.

[91] Pavlopoulos, P., "A Statistical Model for the Greek Economy 1949-1959", North-Holland Pub. Go., Amsterdam, 1966.

[92] Pensions World, (Social Security) "Euro round - up " by David Callund, January 1991.

[93] Pensions World, (Spain: Social Security) "Scope for improvement?" by Felix Soroa, February 1990.

[94] Pensions World, (Greece : Social Security) "A toe in the water - eureka ?" by Demos Papasavvas, December 1990.

[95] Persson, T., "Deficits and intergenerational welfare in open economies", Journal of International Economics (19, 67-84), 1985.

[96] Pieters, D., "Introduction into the social security law of the member states of the European Community" Bruylant, Brussels, 1991.

[97] R. S. Pindyck and D. L. Rubinfeld, "Econometric Models" third edition, McCRAW-HILL, 1991.

[98] Reischauer, R. D., "Social welfare police in the United States, in the Political Economy of the United States", North Holland, 1982.

[99] Schulz, J., Carrin, G., Krupp, H.-J., Peschke, M., Sclar, E., Van Steenberge, J., "Providing Adequate Retirement Income. Pension Reform in the United States and Abroad" brandeis, New England.

[100] James H. Schulz, "The economics of aging", Belmont, Calif : Wads Worth Press, 1976.

[101] Sherwin Posen, "The World Crisis in Social Security - United States", Bonnel Editions, Paris, 1982.

[102] J.B. Shoven (eds), " Financial Aspects of the United States Pension Scheme", University of Chicago Press, Chicago, 1984.

[103] Silburn, R., "The Future of Social Security", Fabian Society, England, 1985.

[104] Simmous, T. "Social Services for All?", Fabian Society, 1968.

[105] Spanos A. and Skordis T. "A Dynamic Macro-Model for the Greek Economy" KEPE unpublished, Athens-Greece.

[106] Stein Bruno, "Work and welfare in Britain and the USA" The Macmillan Press Ltd., London 1976.

[107] Summers, L.H., "Observations on the Indexation of Old Age Pensions", 231-258 in Z. Bodie and J.B. Shoven (eds), "Financial Aspects of the United States Pension Scheme", Chicago, University of Chicago Press, 1985.

[108] Topel, R., " On Layoffs and Unemployment Insurance". American Economic Review (73, 541-559), 1983.

[109] Tsoris N. "Econometric studies nof Greece", Plato Pub. Co., Athens - Greece, 1976.

[110] Taylor-Gooby, Peter and Jennifer Dale, "Social Theory and Social Welfare", Edward Arnold Publishers Ltd, London, 1981.

[111] The Government Actuary's Department, "Occupational Pension Schemes 1987 - eighth survey", HMSO, London 1980.

[112] The Insurance Institute of London, "Life assurance and pensions in the European Community", London, 1973.

[113] U.S. Department of Health Education, and Welfare, "Social Security Throughout the World 1967", U.S., 1967.

[114] U.S. Department of Health, Education and Welfare Social Security Bulletin, December 1970.

[115] U.S. Department of Health and Human Services, "Social Security Throughout the World 1979" U.S., 1980.

[116] U.S. Department of Health and Human Services, Social Security Bulletin, U.S., November 1991.

[117] Verbon, H. A., "The Rise and Evolution of Public Pension Systems", Public Choice, 52, 75-100.

[118] Vernardakis N, "Econometric modely for the developing economies: A case study of Greece", Saxon House,1978.

[119] Wallis, K. F., "Topics in Applied Econometrics", Second Edition, Gray-Mills Publishing Ltd., London, 1979.

[120] R. Wertheimer, S. Zedlewski, J. Anderson and K. Moore "DYNASIM in comparison with other microsimulation models", in: G. Orcutt, J. Merz and H. Quinke (eds.) "Microanalytic simulation models to support social and financial policy", North Holland, 1986.

[121] Yaari, M., "Uncertain Lifetime, Life Insurance and the Theory of the Consumer", Review of Economic Studies (32, March, pp137-150),1965.

[122] Young Agnes Freda, "Social Services in British Industry" Routledge and K. Paul, 1968.

Sourses of Data

[123] The **International Labour Office (ILO)**
issues at three yearly intervals a comprehensive report
"The Cost of Social Security"

[124] The **European Economic Community (EEC)**
publishes at irregular intervals
"Social Accounts of the Member States of the EEC"

[125] The **Social Security Administration of the U.S. Department of Health, Education and Welfare**
publishes every other year a report
"Social Security Programs Throughout the World"